Collected Abstracts:

Collected abstracts that showcase research, scholarship, leadership and creative projects by undergraduate and graduate students, postdoctoral scholars and medical scholars representing the entire USC System.

Prepared for DISCOVER USC
April 21, 2017.

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Undergraduate Students presentations
Abu Abdo, Nour
Mentor(s): Dr. Christina Cox
Maternal selective serotonin reuptake inhibitor (SSRI) use and neonatal necrotizing enterocolitis.

Objectives
SSRIs are the most common pharmacologic treatment for depression during pregnancy. Data suggests SSRI use during pregnancy may elicit negative effects in neonatal effects including feeding and digestive disturbances, which may ultimately increase the risk of NEC. The primary objective of this study is to determine if maternal SSRI use is associated with the development of NEC in offspring. If an association is found, secondary objectives include evaluating the relationship of dose, duration, and type of SSRI to the development of infant NEC.

Methods
This retrospective cohort will utilize the South Carolina Medicaid Database, the South Carolina registry of births from the SC Department of Health and Environmental Control (DHEC), and hospital discharge records from the SC Hospital Association (SCHA) to link maternal SSRI use to offspring born between January 1, 2008 and December 31, 2016. All data received will be de-identified. Data to be collected includes gestational age, birth weight, concomitant medication use in mother and offspring, maternal smoking, alcohol use, and illicit drug use. Dose, duration, and type of SSRI will also be recorded. The primary outcome of NEC will be identified by the ICD-10 code P77.9. For analysis, a marginal regression model will be used to assess the association between the likelihood of NEC incidence and SSRI use after accounting for known NEC confounders including neonatal demographic data and maternal comorbid conditions. Assistance with data analysis will be obtained through collaboration with the USC statistics department.

Data/Results
Data collection is ongoing.

Citations

Adams, Jesse
Mentor(s): Dr. Courtney Catledge, Dr. Robin Estrada
Evaluation of lung capacity utilizing serial peak flow resulting in students from 6-12 grade participating in Band

Improving lung function and addressing breathing difficulties among younger children with asthma or similar pulmonary dysfunction is a common challenge in pediatric practice. Purpose: To explore spirometry testing on middle school adolescents. We hypothesized that participating in the school band using wind instruments would improve lung capacity. Methods: Thirteen middle school students who performed in the wind section of the band participated in the study. The project, measuring pulmonary functioning through spirometry testing, involved various components including force vital capacity (FVC) and force exertion volume in one second (FEV1). Data collection included height, weight, age, history of pulmonary issues, specific instruments played, smoke exposure, and athletic participation. Results: Upon our preliminary results in this longitudinal study, we currently have inconclusive findings based on the data gathered. There seems to be a trend within the wind instruments that demonstrates an increase in FEV1 and the ratio FEV1/FVC. With regards to the FVC, more than 50% of the participants demonstrated a decrease during post testing. Discussion: These results should be interpreted with caution due to the preliminary nature of this study. The unexpected decrease in FVC would suggest reduced expiration of air with band participation. However, this research had unique considerations and limitations. There was only one school that agreed to participate in all parts of the research. Additionally, we faced certain challenges that could have affected our data, such as improper use of the spirometer and participation in other activities that may have influenced the tested variables.
Adriano, Dimitri  
Mentor(s): Dr. Orgul Ozturk  
Food Stamp Timing And Negative Patterns Of Healthy Food Consumption

The SNAP program (Supplemental Nutrition Assistance Program) is the largest hunger safety net initiative in the United States and has been active for many decades. It is aimed at helping low-income individuals and families to reach standard nutritional goals and avoid hunger. Nevertheless, despite its assistance reducing the effects of poverty among many American families, we would like to question if it has been doing so in the most efficient way possible. Studies suggest the majority of consumption assisted by Food Stamps happens right after the disbursement of the benefits, leaving the rest of the month partially uncovered for the beneficiary. In this project, we will try to unveil if the participants of the SNAP program are successfully reaching their necessary monthly nutritional intake. In order to address that question, we will empirically analyze national level data provided by the Bureau of Labor Statistics (Consumer Expenditure dataset). This issue is significant because if the program is operating in the most efficient manner, many families will be healthier and have access to their basic nutritional needs, which could in turn accelerate their exit from the poverty cycle. In addition, a significant share of the national budget is allocated towards the program, thus it is of best interest for SNAP to operate at its highest level of efficiency.

Aguirre, Melissa  
Mentor(s): Dr. Daniel Freedman  
Advocating for the Future of DREAMERS

Deferred Action for Childhood Arrivals, also known as DACA, is an executive order drafted by the Obama administration in 2012. Due to current political climate change, DACA recipients are living in constant fear of their legal status being once again threatened, however, SC representative Lyndsey Graham and IL representative Dick Durbin drafted the Bar Removal of Individuals Who Dream of Growing Our Economy Act, or Bridge Act, that would give complete protection to childhood arrivals eligible for the program. Working as an intern for SC Appleseed Legal Justice Center has expounded the importance of education on Deferred Action for Childhood Arrivals and the many benefits of this executive order. Many people are not aware that DACA recipients actually contribute to the economy in large quantities. Removing DACA would not only be a disservice to the childhood arrivals, who are eligible and work hard to be productive members of society, but also to our economy. I organized a five-week plan with the assistance of my sorority, Kappa Delta Chi Sorority, Inc. The five-week plan was executed in order to seek allies and supporters of DACA recipients and the DACA program. The first week, there was an informational session on what DACA is, how many people it benefits, and how it has specifically impacted South Carolina. There was also information relayed on who the representatives are for South Carolina and how to get in contact with them to push for the BRIDGE Act and a higher protection for childhood arrivals. The second week there was a panel discussion where DACA recipients from various age groups came and spoke of their experience as DACA recipients. The purpose of the event was to allow people who have a voice in the United States due to their citizenship, get exposure to the adversities these childhood arrivals have faced in order to perhaps influence them to become allies to those same childhood arrivals. The third, fourth, and fifth event have not occurred, however, there will be calling and writing parties for individuals to be able to hand-write and call their legislatures to push for the BRIDGE Act. I organize multiple events that serve to inform people of what Deferred Action for Childhood Arrival and the BRIDGE Act are, therefore, I have the ability to stress just how important it is to advocate with an individual’s state representative not just for the BRIDGE Act in protection of DACA recipients but for any social justice issue any individual finds themselves interested in.
Alers, Victoria  
Mentor(s): Dr. Mythreye Karthikeyan, Dr. Priyanka Singh  
Role of Inhibin in vascular permeability

Ovarian cancer claims the lives of 1 in 100 women, making it the deadliest of all reproductive cancers. About 20% of ovarian cancers are detected at an early stage because the physical symptoms do not show until it metastasizes to other organs. Inhibin, a member of the Transforming Growth Factor Beta (TGFβ) family, is a biomarker for ovarian cancer. Prior studies have demonstrated high levels of Inhibin in cancers besides ovarian, including prostate cancer in patients. Recent studies in our lab suggest that elevated Inhibin contributes to angiogenesis. Angiogenesis is the formation of new blood vessels from the existing blood vessels, and is critical for metastasis, with anti-angiogenic agents currently either approved or in clinical trials. However, several of these have significant toxicities for patients and thus investigating additional angiogenic targets is important. My project examines whether Inhibin in different ovarian cancer sub-types correlated in patients with difference in the vessel density. Moreover, to test the mechanism of Inhibin function on blood vessels, I examined the impact of Inhibin on endothelial cell permeability, the mechanism utilized by cancer cells to metastasize. We optimized immunolabelling of Inhibin and a marker for blood vessels (CD31) using anti-INHA and anti-CD31 antibodies at different concentrations. Using these optimized conditions, we find that Inhibin levels were higher than normal tissues and increased with different grades and stages along with the average vessel density. Permeability assays indicated a role for Inhibin in vascular permeability. These preliminary findings and their implications will be presented and discussed.

Alexander, Kiana  
Mentor(s): Ms. Samantha Lewandowski  
Women LEAD: An Exercise in Leadership, Planning, and Community Building

The University of South Carolina prides itself on its rich community. Through a variety of programs, activities, and student organizations, the university gives students an outlet to explore passions and interest. The Leadership and Service Center (LSC) provides students with support and resources to increase awareness for various initiatives and causes. Though a partnership with the LSC, Women LEAD was created. The program aims to increase awareness of women’s issues and help undergraduate women develop their own leadership skills and styles. Women face a host of different challenges in the professional world including underrepresentation, pay/benefit disparities, and discrimination. Overcoming these obstacles comes with first having an understanding of how they impact team interactions. Women LEAD utilizes activities and guest speakers to educate women about these issues and provide strategies that are applicable in the college and work environments. The program also emphasizes the value of reflection and collaboration. Through written reflections and Socratic discussions, participants are able to relate the topics presented to their own experiences. The goal of the program is to provide members with an arsenal of skills, knowledge, and strategies that will help them become stronger leaders and make a greater impact on the Carolina community and beyond. Through my presentation, I will chronicle the development and execution of the program and how it has contributed to my key insights of team interaction, communication, and marketing.

Allen, Carter  
Mentor(s): Prof. Edsel Peña  
A Comparison of Imputation Algorithms En Route to a Predictive Water Quality Model

A predictive model of water quality in Charleston, SC is sought to inform residents and visitors of potentially dangerous concentrations of bacteria in recreational waterways. This project develops and compares three missing and censored data imputation methods in the context of water quality data, and compares predictive models of estuarine fecal bacteria concentration built under each imputation method. Such a method does not exist for the recreational sites sampled by Charleston Waterkeeper, whose data this project is based on. Each of the imputation algorithms rely on simulations conducted under different distributional assumptions for the missing and censored values in Charleston Waterkeeper’s data. What follows is a consideration of different modeling strategies including multiple regression and logistic regression. This analysis can be expanded by discovering other effective imputation algorithms, and expanding the size of the data set. Those performing modeling of fecal bacteria may use this research to get ideas as to how to deal with missing and censored data that often occurs in measuring water quality over time.
Allen, Kenchina  
**Mentor(s):** Dr. Karen Patten, Prof. Christine Palmer  
**Giving Back**

As a student in the Arnold School of Public Health, I am learning about the numerous health-related challenges with which specific communities may have to encounter. While attending the University of South Carolina I have remained active in my community by volunteering at the local Free Medical Clinic. I also spent some time with Families Improving Together (Project FIT), helping African American Families learn healthy eating habits. As a student in a predominantly white institution and because of the challenges I faced in life, including attending this university I decided to enroll in AFAM 303: an African American Cultures. From this course, I leaned lot of information that changed the way I approached each new day. As a result of the lessons I learned during that course and my new outlook on life, I came to understand that all my key activities are special and why I was driven to so much volunteering. What I learned made me want to dedicate most of my time to helping minorities in my community. I have helped many non-profit organizations aid minorities in the area of health care. Examples include teaching minorities about healthy eating or teaching them about the many health disparities that may harm them. Working in the area of healthy eating and health care for minorities is one way I am promoting social advocacy within my community.

Alsheimer, Quinn  
**Supervisor(s):** Christina Nielsen  
**Mentor(s):** Dr. Patrick Hickey  
**International Service Learning in Nicaragua**

Over spring break, 44 capstone scholars traveled to Nicaragua to provide healthcare in the impoverished communities of Nicaragua. Staying in Ticuantepe and working within the community “Los Rios de Ticuantepe,” we were able to learn about the culture and develop relationships with the community members while providing medical services. Building trust on the first day in the community, we surveyed los/las jefes/jefas (chiefs) of the households to find out about the living conditions and medical ailments, which were often related to one another, of the people. Most of the houses were made from semi-permanent materials such as tarps, pieces of scrap metal, and concrete foundations. Outdoor latrines were used by most households and some had to walk far from their homes to access them. Most people retrieved their water from a nearby river which led to community members having parasites, fungal infections, and dehydration. We had three clinics, set up in churches within the community, and served around 30 people each day. Investing our time in each patient emphasized the trip’s goal, to better prepare us for our future careers in the medical field. With the help of the translator, each group would triage, take a medical history, and perform a physical examination on each patient. Then, when we had our diagnosis and our plan of action, we would call a doctor over to discuss our findings. While we were not always correct in our diagnoses, we were able to learn from each case and be better prepared to diagnose our next patient. Like detectives honing our skills, we were eventually able to make accurate diagnoses from a list of symptoms and family history. Visiting an educational hospital within Masaya, we were also able to see the cultural differences from the structure of the building to operating room procedures. The value of international service learning is incomparable as it allows one to apply what is learned in the classroom to real life while directly impacting the lives of others and learning above and beyond the textbook. To say the least, we were humbled by the experience of going abroad, and feel amazingly blessed to have met the wonderful people of the “Los Rios de Ticuantepe” community in Nicaragua.
Alwan, Akilah  
**Mentor(s):** Dr. Claudia Benitez-Nelson, Dr. Joe Jones  
**Analysis of ecotourism ventures within the Sibun Watershed**  

Last Maymester I visited different ecotourism facilities located within the Sibun Watershed of Belize to observe tourism practices. The goal was to record sustainability initiatives undertaken by tourism facilities in the watershed for publication in the Sibun River Watershed Atlas. This project also included interviewing tour guides and facility owners to understand their views on current environmental efforts in Belize. These interviews were used to identify areas of focus in the reestablishment of the Sibun Watershed Association, an alliance between facility owners, tour guides, and residents within the Sibun Watershed.

Alwan, Akilah  
**Co-Presenter(s):** Taylor Bulow, Mary Ashley Reeves, Alan Boone  
**Mentor(s):** Dr. Sarah Rothenberg  
**The Implications of Methane on Global Environmental Health**  

According to the IPCC, scientists determined methane levels have increased 150% in the last thousand years from ice cores, firn, and whole air samples. Our Global Environmental Health Class is presenting posters at EdVenture centered on greenhouse gases as a service-learning project. Our poster will focus on defining methane, where it comes from, its health effects, and how to mitigate those effects. There are natural and anthropogenic sources of methane within the atmosphere. Anthropogenic sources of methane include agriculture, landfills, leakage of natural gas systems, and fossil fuel combustion. Methane is a much more potent gas than gases such as carbon dioxide, which is why we want to draw attention to methane's effects on global health.

Amalean, Anjal  
**Mentor(s):** Dr. Daniel Fogerty  
**The Effect of Segment Duration of Time-Compressed Speech on Intelligibility**  

Speech has a natural rhythmic variation that appears to correspond to neural oscillations present during perception. The current experiment investigated how different time scales are involved in speech perception. This was accomplished by processing sentences using a combination of time compression and time restoration methods. To create the stimuli, Harvard-IEEE phonetically balanced sentences were time-compressed by a factor of three. Silence was then inserted at different intervals to restore the stimulus to the original duration of the sentence. Speech segmentation was based off of periodic time intervals or by specific speech events. Five conditions each of ten sentences were created with the milliseconds of time-compressed sentence to milliseconds of silence in the following ratios: 15:30, 30:60, 60:120, 90:180, and 120:240. Three more conditions were segmented by different speech events: phoneme, word, and voiced/unvoiced segments. Nine normal-hearing participants were asked to listen over headphones to these temporally manipulated sentences while seated in a sound attenuating booth. Participants repeated aloud what they heard, and the proportion of key words correctly spoken was scored. On average, the periodically interrupted sentences were more intelligible with shorter segments than with longer ones. Additionally, the voiced/unvoiced condition was less intelligible than the phoneme and word conditions. Results also indicate that both periodic timescales and the temporal duration of specific speech events contribute to how speech is processed over time. Determining how these timescales contribute to speech perception can potentially help create better theoretical models of speech perception and improved speech transmission technologies.
Anders, Hayley  
Co-Presenter(s): Brian Principe  
Mentor(s): Dr. Kevin Hull, Dr. Miles Romney  
Olympic-sized bias: How NBC promoted specific athletes’ brands on Instagram during the 2016 Summer Olympics

NBC bought the rights to broadcast the Olympics through 2032—but at a steep price. The network paid $7.25 billion to broadcast every event on television, the NBC app, and online. The contract also gave NBC exclusive rights to share content on social media, including Instagram. The purpose of this study is to examine what athletes NBC showcased on their official Olympic Instagram account. We collected 1,049 Instagram posts from @NBCOlympics starting with the opening ceremonies through the closing ceremony. We analyzed each post to determine who was featured in each post. While NBC can show all of the Olympics and all of the events, they ultimately chose to focus on a select few athletes. Six out of the 11,237 athletes (0.05%) accounted for 25.1% of NBC’s 1,049 Olympic Instagram posts. Michael Phelps dominated the pool and the NBC Olympic Instagram feed. He accounted for 8.9% of NBC’s posts. Simone Biles, was the second most showcased athlete at 6.5%. Usain Bolt followed at nearly half that percentage, 3.4%, swimmer Katie Ledecky accounted for 3.0%, and finally, the beach volleyball duo of Kerry Walsh-Jennings and April Ross totaled 2.1%. Of all these athletes, all but Bolt is American. This demonstrates a clear bias when monitoring NBC’s Olympic Instagram feed. The network is the only place in the United States where Americans can watch the games; however, it is clear that their social media coverage is limited to a select number of athletes. In conclusion, we found that the network limited their coverage to successful, well-known American athletes and generally ignored other Olympic athletes.

Anderson, Kimberly  
Mentor(s): Dr. Joe Jones  
Discovering and Improving My Leadership Skills Though Community Service

My college career has hastily zoomed by, and that unimaginable day I walk across the Colonial Life Arena stage dressed in my black and garnet cap and gown is creeping up on me much faster than I ever could have imaged. In May 2017, I will be graduating with a Bachelor of Science degree in Public Health. Throughout my time here at Carolina, I had the opportunity to immerse myself in community service with every free moment I had. Over the past four years, I served at a variety of organizations in need including the Palmetto Health Baptist Hospital, The Ronald McDonald House, International Service Learning, The Painted Turtle and Harvest Hope Food Bank. My service work has opened new doors of opportunity and allowed me to build strong relationships that have entirely shaped my college career and beyond. My presentation shows how my experiences have been a catalyst for my personal growth by teaching me valuable professional skills such as teamwork, time-management, and communication, which tremendously benefit my future career as a physician assistant. In addition, staying engaged in the community and standing alongside those in need has taught me important life lessons in order to be an impactful and enthusiastic leader as well as an attentive listener. My Graduation with Leadership Distinction in Community Service project demonstrates how I will be able to incorporate these lessons, knowledge, skills and experiences in my next pathway in becoming a physician assistant.
Examining the Relationship between Self-Monitoring and Body Mass Index among African American Adolescents and Parents in the Families Improving Together Trial

Obesity is commonly associated with elevated risk of chronic diseases, health complications, and increased risk of early mortality. Obesity affects some racial minority groups more so than others, with African Americans having one of the highest rates of obesity. Studies have suggested that self-monitoring (i.e., tracking one's calories or physical activity) is a useful tool for improving health behaviors. Past studies have found that the health behaviors of parents and their adolescents are positively related, but little research has examined if adolescents are more likely to self-monitor their health behavior changes when their parents also self-monitor. This research examines the strength of the association between parent and adolescent self-monitoring of diet and physical activity. Additionally, we tested whether baseline characteristics (i.e., baseline body mass index) relate to self-monitoring among parents and adolescents. The proposed project uses data from the Families Improving Together Project, a randomized controlled trial testing the effectiveness of a motivational and family-based weight loss intervention for African American adolescents and parents. Data was assessed from 75 parents (92% female, Mean age = 43.19) and 75 adolescents (66.67% females; Mean age = 13.05, Mean BMI % = 97.04). Self-monitoring was obtained from weekly participant feedback logs in which both parents and adolescents listed whether they tracked their diet and/or physical activity for the week. A summary score for self-monitoring was calculated for each parent and adolescent based on the number of weeks he/she tracked their health behaviors. The results indicated that parent and adolescent tracking were significantly and positively correlated (r = 0.84). Furthermore, we observed that the adolescent's baseline z-BMI was negatively correlated with both adolescent (r = -.25) and parent (r = -.23) tracking. This finding indicates that adolescents who started the trial at a lower weight tended to engage in more self-monitoring, suggesting that they were more engaged in the intervention program.

The Japanese Myth of Homogeneity

Japan is regarded as a very homogenous nation with a population comprised of over 98% ethnic Japanese. The remaining two percent is said to be split between Koreans (half a percent), Chinese (half a percent), and an array of various nationalities and ethnicities. However, in reality, Japan is far more diverse than the census suggests. Rather, minority groups like the Ainu, Okinawans, Burakumin, and Zainichi face erasure due in part to the promulgation of the myth of Japanese homogeneity and the various ideologies surrounding what it means to be Japanese. I will speak about my research into debunking this myth, both inside and outside the classroom during and after my yearlong study abroad experience.
Anderson, Alayjah  
Co-Presenter(s): Katherine Bishop, Rebecca Gulledge, Amber Roberts 
Mentor(s): Prof. Cheryl Armstead  
The Strong Black Woman: African American Women's Views On Hair Management-Related Stress

The Strong Black Woman (SBW) role influences African American women's experiences and reports of stress. The SBW role is a stressful worldview focusing on multiple facets of mastering life control, social status, and predictability. The SBW's hair is the one of the primary indicators of her identity. No scientific paradigm exists that adequately examines hair stress and coping in this population. Medical research has focused on the ability of hair to reveal stress exposure through biomarkers, ignoring the cultural context of hair as a stressor. Hair-related distress and trauma may contribute to depression, anxiety, financial strain, physical conditions, and maladaptive coping. Moreover, few psychologists and health providers are equipped to address these issues. Our convenience sample of 48 AAW, ages 18 or older, was recruited through existing community partnerships. We conducted brief stress surveys and six focus groups. After transcription and coding, findings were analyzed for theme and context by USC Health Equity Laboratory research students. Themes included: painful hair practices, discrimination, extended periods of time devoted to hair care, corporal punishment of children during hair care, physical burns to the skin, worries about hair loss, financial stress, shame and pride regarding hair texture alterations, social and political implications of chosen hair choices, male views of attractiveness, and bullying. It is our goal to develop culturally acceptable mental health promotion messaging within the context of the SBW Schema. We hope to better understand the effects of hair-related stress, trauma, and stigma among AAW.

Angermiller, Jacquelyn  
Mentor(s): Prof. Courtney Worsham  
Learning to Value Education

The impact of community service on a single person is just as important as for an entire group. If you are able to touch or change the mindset of one single child then you are considered great. During the countless hours of giving back, it was found that the teaching of values that one has for themselves and education was the backbone to any confidence building. Being able to relate to the children who attend the events that promote reading and pursuing sports was the reason that I was hooked. Talking to the high school students about sports showed that they knew what they wanted to do, but just did not have the tools and know-how to do so. In serving breakfast to the homeless, it was proven that giving off positive vibes was the key to changing how you look at the less fortunate. After coaching and reading to young children, it displayed the amount of influence your presence can have on young minds. In how can one change their values to be aligned with wanting to be more than your situation. Taking everything into consideration, it is more than simply giving back, it all comes down to giving hungry minds the tools to change their values into something that engulfs education.
Ranavirus and chytrid fungus are two leading causes of global die-offs of many amphibian species. These diseases have steadily become more widespread over recent years. Although some populations seem to be susceptible to one or both diseases, there are also populations where no die-offs or declines have been observed. It is crucial to understand what factors affect the presence or absence of both pathogens. Previous research has hypothesized that prevalence of both pathogens is driven by ecological factors such as temperature, wetland hydroperiod and amphibian community structure. At the United States Department of Energy Savannah River Site, both diseases have been detected but no amphibian die-offs have been observed. Both pathogens were found in over half of 11 wetlands on the site; the prevalence of ranavirus in samples was 37%, while the prevalence of the chytrid fungus was 9.7%. Our long-term goal is to understand what causes spatial and temporal variation in prevalence of these two diseases. We began by analyzing the community structure of 20 wetlands from February through August of 2016. Over 31,000 samples of 24 species were captured via dipnetting and minnow traps. A subset of those samples was tested for disease prevalence through qPCR. Our current project focuses on 5 of the 20 sampled wetlands and will examine change in disease prevalence within a breeding season as different amphibian species arrive and interact in each wetland. Our results will help determine whether seasonality, wetland hydroperiods and/or presence of certain species in communities have a profound effect on the spread of ranavirus and chytridiomycosis. Results of this research could lead to further understanding of how and when the diseases are most spread and provide useful data for future research of ranavirus and chytrid fungus.
Archie, Jasmine  
Mentor(s): Prof. Anna Oswald-Hensley  
Leadership and Learning: The Jasmine Archie Experience  

Abstract  
University Ambassador:  
Being a university ambassador is basically being able to represent the university on and off campus. It means to carry yourself as a leader around the campus and then turn around and represent the traits you have learned in the community. As an ambassador we lead campus tours, we participate in different campus events and help carry them out. We also often come out and help with the different community service events that the school sponsors. I became an ambassador because I was inspired by my ambassador when I attended SOAR in 2015. The ambassadors were so friendly, easy to talk to, and was someone I could approach and talk to about issues that may have been uncomfortable to approach an adult with. I wanted to be someone easy to approach for those who may have been a little uneasy about starting college. Being an ambassador taught me how to talk to almost anybody about anything. It taught me that no matter what I think, someone is always watching so I must carry myself as a leader at all times. The impact which it has had on me would be that, it made me a little more comfortable about speaking in front of crowds of complete strangers. As an ambassador I hope that others can look at me and build the confidence to do what I do, I want others to not be afraid to bring the leader in them. Being an ambassador on the Sumter Campus has been a great opportunity and has taught me a lot and I hope to take the skills with me when I transfer to the next campus and continue being a leader wherever I go.

Student Organization:  
In the Fall of 2016, I introduced a new club to our campus. The club is called Big Sisters of Sumter, which is a support group for the Girl Scouts of Sumter County and surrounding areas. It is a collegiate troop of the Girl Scouts of the Midlands that stands to mentor the girls involved in Girl Scouts and reach out to the community at the same time. It was inspired by a former dean and alumni of USC Sumter. The club participates in the community by assisting the Girl Scouts with their events. By participating I mean giving back in any way possible, we have sponsored a coat drive and are preparing to sponsor an etiquette class for the girls in the more rural communities. Other than being asked to start the club up, the idea soon became inspirational and I wanted to do it for the community and the campus. I felt as if this would be a great addition to the campus. Also, I always wanted to be a part of a big sister’s program as a little girl. I think in this generation it is extremely crucial for more positive female role models. Being a part of the stepping stones of this organization has taught me so much about leadership and working hands on with my peers. It also taught me how to come together as a group and produce efficient results. This club means so much because other than empowering younger girls to believe in themselves but it taught me to believe in myself and what I was capable of. It taught me that people really do appreciate you and the effort you put in trying to make a difference. Seeing that I will be graduating in May, my hopes is that the club will continue and that the meaning all behind will never be forgotten and will go down in the history of this amazing campus.

Arin, Michael  
Mentor(s): Ms. Lisa Camp  
Internship or Apprenticeship? Practice matters.

Once a law student passes the bar, he or she is permitted to start practicing law. A lawyer never “does” law; he or she just continues practicing with real consequences for clients with real legal troubles. As an intern turned litigation paralegal at Semirog Law Firm—a small personal injury firm—I learned to appreciate the value of practice that complements and completes what is taught in the classroom or taught through a textbook. As part of a four-to-five person team, I was responsible for managing case files, procuring medical records, and drafting documents for potential and actual litigation. This experience, as my first taste of the American legal system, not only prepared me for future opportunities requiring a similar skill set, but also influenced my approach to the classroom by seeking practical experiences to create a holistic learning experience. My USC Discover presentation tackles this professional experience and the lessons learned therefrom.
Arin, Michael  
Mentor(s): Ms. Lisa Camp  
**Going Global: When Study Abroad is more than Study Abroad**

In the very small town of Arras, France—closer to the land of beer and fries than the land of wine and cheese—I planned on speaking French, studying French culture, and eating French food for my Sophomore Year. Two Spaniards, two Catalonians, two Irish people, two Czech, two Croatians, five Americans and one Frenchman as dorm-mates later, French culture simply became one of many to discover and explore. My study abroad experience was unhinged from the host-country. Although all of my classes were in French and with predominately French classmates, these classes were suddenly thrust into an international context because of my exposure to a slew of nationalities and cultures. This became readily apparent as my English culture class that I taught filled with Chinese, Czech and French students. For my presentation at USC Discover, I plan on showcasing just how broad study abroad can be and how an international focus can foster novel perspectives through my experience at the Université d’Artois.

Arin, Michael  
Mentor(s): Dr. Alexandre Bonafos, Mrs. Ashley Byrd-White, Dr. Ashley Williard  
**Nobility v. Nation: Cases of Conflicting Justices During the Early French Revolution Trials of Lambesc, Besenval, and Favras (1789-1790)**

Despite the wealth of information on the French Revolution, the courts of law during that period remain an understudied subject matter, in particular the inconsistent application of criminal law in pursuit of suspects of lèse-nation by the Comité des recherches and Châtelet. This study bridges this gap using archival research of court documents and a holistic approach to historians of the time, of the crime, and of the cases in question. Considering the totality of the circumstances, the trials of the prince de Lambesc, baron de Besenval, and marquis de Favras paint a battleground of a multitude of conflicting justices—social, political, and judicial—resulting from the status of the individuals as noblemen. The aristocracy came under extreme scrutiny due to the infamous aristocratic conspiracy, which thus subjected those perceived as nobles to public excommunication, political manipulation, and premature judicial constraint. In defense, they turned to social appeals through the press or written word, political pleas for amnesty or acquittal, and judicial privileges and exemptions—tools of an educated, connected, noble upbringing. The analysis of these case studies nuances the understanding of revolutionary justice and opens the door for greater discussion of the role of the courts in the transfer of power and accountability of elites. My USC Discover presentation covers not only the findings, but also my research experience in the French archives during the summer of 2016.

Armand, Briana  
Mentor(s): Mr. Jay Pou  
**My Pathway to Success**

In August of 2013 while beginning my first semester at the University of South Carolina I did not realize how much a school would lead me to discover so many opportunities that would further me more personally and professionally. If it were not for these opportunities I would not be as successful as I am in my practicum experience this semester at Vital Energy Wellness and Rehab, an outpatient occupational, aquatic, and physical therapy rehabilitation facility. I am earning 300+ hours where I am working a legitimate job with important duties responsibilities that keep the clinic running smoothly every day. I earned this practicum experience with the help of my professors in the exercise science department that offered intriguing and useful lectures in their courses about anatomy, physiology, public health policies, health and wellness, etc. I also have achieved a unique and personal edge that I bring to my practicum, which is my background in Spanish. My study abroad experience and internship at a physical therapy clinic in Seville, Spain granted me the skill to be able to translate exercises and health forms to ensure equal treatment for the Hispanic population that comes to the facility. Communication is key in the health field and I also learned valid lessons in this from my work in undergraduate admissions as a Telecounselor, and classes such as speech and psychology of the personality that gave me an insight into understanding people in general. I have grown into more of a confident and communicative person since the beginning of college and I owe that to my experiences in the classroom and beyond.
Bian, Julia  
Mentor(s): Prof. Thomas Makris  
**Structural studies of Cytochrome P450 enzymes that generate Biofuels**

Due to growing concerns over the depletion of our current fossil fuel sources, efforts towards renewable fuel production are essential. OleT, a cytochrome P450, has recently received attention for its ability to generate terminal alkenes, a common component of liquid transportation fuels, from fatty acids (FA) via a decarboxylation reaction. The OleT reaction is highly atypical for P450s which typically hydroxylate substrates. In order to understand the mechanism, it is important to characterize the enzyme through structural methods. From previous studies, an active-site histidine (His85), solvent, and other active site residues have been implicated as having important roles for substrate binding and activity. In order to verify these roles, we have characterized an ortholog of OleT from Staphylococcus aureus, termed P450staph, which has a predicted active site construction similar to OleT based on sequence homology. A codon optimized P450staph gene results in high yields of protein expression from E. coli BL21(DE3). A typical preparation yields 70 mg/L of highly homogeneous protein after a two-step chromatographic purification. Initial crystallographic conditions for P450staph were determined through high throughput screening. Using these initial hits, several conditions were tested and optimized using pH and precipitant gradients. These result in suitably large crystals with varying morphologies. Preliminary diffraction experiments and ligand-binding assays have been employed to investigate the spatial nuances that determine the catalytic ability of P450staph.

Billingham-Hemminger, Savannah  
Mentor(s): Prof. Daniel Ostergaard  
**Societal Singularity in a Globalized World**

The purpose of this project is to present thought-provoking information about societal singularity versus globalization. With how interconnected all of our societies are, it is often surprising to experience the different traditions, cultural aspects, and non-westernization of other places. America can be a melting pot of different cultures, but it does not provide us with the full singularity of a culture that visiting does. Using Costa Rica, China, and Switzerland, the uniqueness of each society along with its level of globalization will be compared and contrasted. The findings will result in questioning what globalization means, how this compares to westernization, and how it affects each unique culture. Furthermore, it will suggest questions such as 1) how important societal singularity is 2) how it affects the country’s’ level of globalization 3) what sentiment we should have towards globalization as a result. These questions are all important to keep in mind as we enter into more international job fields and industries than ever before.

Billingham-Hemminger, Savannah  
Mentor(s): Mrs. Cinnamon Long  
**Feminism in Management**

While feminism may have a negative connotation to many people, it is an important aspect to consider in the workplace. The history of feminism is very unique, and now, is at a major turning point, just like in the 1990’s. Currently in the workforce are women who have experienced second-wave feminism (1960-1990) and third-wave feminism (1990-present). With this odd, opposing blend of views mixed with generational differences, the job of a manager in the workplace can be difficult. This presentation will draw on the experience of a third-wave feminism generation student in a managerial role at Kohl’s, and how the different influences of feminism affected how the manager should act, communicate, react, and lead. Furthermore, potential suggestions on how to prepare managers, teachers, and others who interact with different age demographics will be proposed.
Blais, Suzanne
Mentor(s): Mr. Alex Blauvelt
ABA Therapy, Autism, and Finding the Pieces to my own Puzzle

During my sophomore year at the University of South Carolina, I decided to search through job mate to look for an internship or employment opportunity. I came across a job opening for a position as a Behavioral Line Therapist and though I did not completely understand all of what the job encompassed, I found the position description interesting and decided to apply. A few weeks later, I was a Behavioral Line Therapist working with Autistic children using ABA therapy techniques. Applied Behavior Analysis, or ABA, can be defined as the application of shaping learning using different motivational methods such as positive reinforcement. Today, ABA is a widely recognized therapy used to assist children with Autism to strengthen different skills such as academic skills, play skills, social skills, and more. My experiences working as a Behavioral Line Therapist have taught me many valuable lessons, helped me to find a passion for working with children with Autism, and have helped me to make several important decisions regarding my future after graduation. The goal of my presentation is to educate others about Autism, the importance of ABA therapy, and to share my experiences while working as a Behavioral Line Therapist and how those experiences have broadened my perspective and help me overcome different challenges which will benefit me in both personal and professional aspects.

Blakley, Briana
Mentor(s): Mrs. Moryah Jackson
Leading in Sport Management

I chose to attend the University of South Carolina four years ago after discovering I could study Sport and Entertainment Management. The Sport and Entertainment Management Program here at the University of South Carolina is recognized as one of the top programs in the world. My major provides students with countless opportunities to grow as young professionals and requires that a considerable amount of time is spent beyond-the-classroom. The summer after my sophomore year, I had the opportunity to work with the South Carolina Athletics Department as a Gamecock Athletic Hospitality Intern. Gamecock Athletic Hospitality is a former ambassador program coordinated under the Colonnade Group, a hospitality and operations management company specializing in creating ultimate fan experiences and exceptional game day events. This intern position required me to recruit a team of qualified student ambassadors, assist in the preparation of premium seating at Williams-Brice Stadium and Founder’s Park, and provide a specialized level of customer service to Gamecock Club members and donors. Through my experience in this professional setting, I enhanced my organizational, communication and leadership skills. More importantly, the Gamecock Athletic Hospitality internship showed me the importance of gaining hands-on experience within the Sport and Entertainment industry.
Blalock, Jonathan  
Mentor(s): Dr. James Carson, Mr. Brandon VanderVeen, Mr. Dennis Fix, Mr. Justin Hardee  
Cancer Cachexia-induced Disruption of the Skeletal Muscle Structure-Function Relationship

The unintentional loss of body weight secondary to chronic disease, termed cachexia, is prevalent in ~80% of cancer patients and accounts for ~20% of all cancer-related deaths. The progressive loss of muscle mass with cachexia is associated with increased fatigue and reduced functional independence resulting in decreased life quality. However, gaps remain in our understanding of the role of specific skeletal muscle function in the overall functional decrements observed in cancer-cachexia. Our lab has previously shown increased non-contractile tissue in cachectic skeletal muscle associated with increased muscle inflammatory signaling. However, whether these structural alterations are related to reduced skeletal muscle function was not determined. Therefore, the purpose of this study is to determine the relationship between structural alterations and functional decrements in skeletal muscle through the progression of cachexia. We hypothesize that the increase in non-contractile tissue is inversely related to decreases in muscle force. To test this hypothesis, cachectic ApcMin/+ (MIN) mice were subjected to muscle force analysis in situ and post-mortem immunohistochemical analysis of muscle non-contractile tissue. The MIN mouse, is an established preclinical model of colorectal cancer which displays a severely cachectic phenotype by 20 weeks of age. Age-matched C57BL/6 mice served as controls. Tibialis anterior (TA) twitch properties, tetanic force, and fatigability was examined to determine skeletal muscle function. As expected, MIN mice had decreased TA weight which was correlated to a decrease in absolute tetanic force. Interestingly, when corrected for muscle cross sectional area, cachectic muscle decreased specific tension roughly 15%, which was not related to TA mass. These functional changes independent of muscle mass suggest the potential for structural changes resulting in decreased muscle function.

Blankman, Sidney  
Mentor(s): Dr. Nina Moreno  
Studying Abroad and the Journey of Discovering New Ways to Communicate

When I started applying to colleges, the ability to study abroad had a significant impact on my decision on where to go. I always knew I wanted to go somewhere I didn’t know much about. After extensive research I decided to study in Prague, Czech Republic at an international university. My classes at USC and my prior experiences made me realize I would have to tweak how I communicated with people while I was abroad. Suddenly, everything I knew about making connections with people was different. I had to learn to adapt and readjust my typical first steps in communication and developing relationships. I had to take into account the different and more private culture present in the Czech Republic. I began by making conversation on school and weather instead of the slightly more personal questions about hometowns and family like I would ask in the U.S. to break the ice. Studying abroad taught me that you have to adjust how you communicate with others based on different aspects that make someone who they are.
### Blew, Lauren
**Mentor(s): Dr. Karen McDonnell**

**Primary Care Nurse Practitioner Perceptions and Lung Cancer Screening Practices: A Qualitative Study**

**Background:** In lung cancer is the leading cause of cancer-related death. The risk of cancer-related death is significantly reduced using screening with low-dose computerized tomography (LDCT). Diagnosing lung cancer in earlier stages with LDCT screening increases the chance of survival for high-risk individuals. Since February 2015, LDCT screening has been more affordable and accessible to high-risk individuals than ever before. Although lung cancer screening has the potential to save lives, very little is known about how it is perceived by primary care providers, and how those perceptions are translated into the practice setting. Nurse practitioners (NPs) are important health care providers responsible for preventative screening services, including lung cancer screening. The goal of this descriptive qualitative study is to enhance our understanding of the perceptions and attitudes of NPs about their lung cancer screening practices.

**Method:** The proposed qualitative research study will collect and analyze data from NPs. This study is innovation because it will be the first national study of NPs’ lung cancer screening perceptions, attitudes, and practices. This research study uses a descriptive qualitative study design. A pre-tested paper survey was distributed to a random national sample of 3,000 NPs self-identified as working in a primary care setting in the United States. Approximately, 191 (6%) NPs responded to the survey. One hundred and twenty-five (65%) NPs agreed to participate in an auto-recorded interview. Interviews are underway. Fifteen interview will be conducted over the telephone and transcribed by a professional service. A qualitative interview guide based on preliminary survey findings has been developed. The interviews will last between 30 to 45 minutes. Participants will be asked to give their informed consent prior to conducting the interviews.

**Analysis:** Thematic analysis will be used to analyze the transcribed interview data to identify common themes.

**Results:** Qualitative interview results may reveal facilitators and barriers to the acceptance of lung cancer screening guidelines by NPs employed in primary care settings.

**Conclusion:** This research team will use these results to inform the development of provider-patient shared decision-making strategies relating to lung cancer screening.

### Block, Samantha
**Mentor(s): Dr. James Carson**

**Muscle inflammatory signaling regulation of cancer-induced mitochondrial dysfunction**

Cancer cachexia is a severe wasting condition associated with chronic inflammation and muscle atrophy. Elevated circulating inflammatory cytokines can activate muscle gp130/STAT3 and NFκB signaling, which induce wasting. Mitochondrial biogenesis and dynamics processes are critical for the maintenance of the muscle mitochondrial network and are disrupted during cachexia. However, inflammatory signaling regulation of cachexia-induced mitochondrial dysfunction is not well understood. Pyrrolidine dithiocarbamate (PDTC), a small thiol compound having anti-inflammatory and anti-oxidative properties, can inhibit muscle NFκB and STAT3 signaling in ApcMin/+ mice. Therefore, the purpose of this study was to determine if short-term PDTC administration could improve tibialis anterior (TA) protein expression related to mitochondrial biogenesis and dynamics in the ApcMin/+ mouse, a model of cancer cachexia. At 16 weeks of age ApcMin/+ mice initiating cachexia (7% body weight loss) were administered PDTC (10mg/kg) daily for 2 weeks. Control ApcMin/+ mice continued to lose body weight during the treatment period, while mice receiving PDTC blocked further body weight loss. While muscle mass was decreased in ApcMin/+ mice, PDTC increased TA muscle mass irrespective of cachexia. PDTC suppressed the cachexia induction of NFκB and STAT3 signaling, which rescued the cachexia suppression of PGC1α protein expression, a regulator of biogenesis. Additionally, PDTC improved disrupted mitochondrial dynamics (Fis1 and Mfn1) protein expression in cachectic muscle. These results link muscle inflammatory signaling with cancer-induced mitochondrial dysfunction. Additional studies are needed to further dissect NFκB and STAT3’s role on mitochondrial dysfunction in cachectic skeletal muscle.
Bloos, Sean  
Mentor(s): Dr. Lucia Pirisi-Creek  
**Development of 3-D Organotypic Raft Cultures Using Neonatal Stem-like Keratinocytes to Investigate HPV-Mediated Dysplasia**

3-D organotypic raft culture systems are a well-established model for investigating HPV-mediated dysplasia. Such cultures can replicate the stratified skin epidermis, including the basal stem cell layer. The use of normal human keratinocytes (normal HKc) produces an orderly and well-organized, skin-like structure. However, this structure is relatively short-lived (approximately two weeks) and lacks a basement membrane. Our project focuses on investigating the behavior of spheroid derived stem-like cells. We hypothesize that these stem-like cells derived from spheroid cultures may produce a more long-lived “skin” and perhaps even develop a basement membrane. The phenotypic appearance of structures formed after the inoculation process will be determined by hematoxylin and eosin staining.

The second aspect of our research focuses on investigating if raft cultures using either normal HKc mass cultures or spheroid-derived HKc are a suitable substrate for the formation and study of intraepithelial neoplasia. Currently, the tumorigenic ability of transformed cells is studied by utilizing nude mice. We are working towards developing a raft culture system that would be a sustainable alternative to animal models, allowing us to determine the growth potential and invasiveness of HPV-transformed cells. We hypothesize that HPV-transformed cells at various stages of in vitro progression will form lesions of correspondingly increasing severity, resembling intraepithelial neoplasia, when injected into raft cultures among normal HKc. The presence and expression of HPV oncogenes will be analyzed by in situ hybridization by RNAScope. The extent of intraepithelial neoplasia will be determined through immunofluorescence to explore the markers of cellular differentiation.

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Boatwright, Uzuri  
Mentor(s): Ms. Kim Chong  
**Graduation with Leadership Distinction in Professional and Civic Engagement: The Road Less Traveled By**

Uzuri Boatwright, Chemistry, Senior  
As an African American woman in the STEM field, I have always been aware that I served a higher purpose. Coming into a predominantly white institution from the city of Charleston, South Carolina, I am no stranger to adversity. I was always involved in my community whether it was volunteering with youth programs, the NAACP, College of Charleston Upward Bound, as well as local political leaders. For this reason, I brought that drive and passion when I came to the University of South Carolina and decided to get involved in my new community. There are three R's that describe my experience these past four years: Revolutionary, Recreating Peace, and Reach Out and Touch. In this presentation, I will illustrate how these three R’s along with my professional experience and organizational involvement have molded me into a well-rounded activist, student, and leader. Travel down this road with me that many have seen but few have taken.
Boeckermann, Lauren  
Mentor(s): Dr. Andrew Kaczynski, Ms. Sarah King  
Dreaming Big and Living Small: Examining Motivations for Tiny House Living

In America, the average house size has increased from 1660 ft² to 2596 ft² from 1973 to 2013. To pay for the extra space, home prices have risen to more than nine times the average price in 1970, accounting for inflation. As more people have moved closer to city centers, there has been an increase in urban sprawl which has caused a 50% increase in the negative environmental impact of housing since the 1950’s. Given these concerns, many people have reevaluated their needs and desires leading to the tiny house movement. Given that this push to live in structures typically less than 500 ft² is relatively new, little academic research exists regarding factors driving the movement. Therefore, the purpose of this study is to examine tiny house dwellers’ motivations for moving into their current homes.

The Tiny House Community Survey (THCS) is an online survey distributed through tiny house social media accounts. The THCS assesses tiny house residents’ motivations for living tiny through seven diverse items (e.g., simpler life, sustainability and environmental factors, cost, etc.) and one open-ended question to describe their most salient motivation. Descriptive and multivariate analyses are ongoing within SPSS 22.0 to compare the motivations of tiny house dwellers according to a variety of socio-demographic and structural factors (e.g., gender, location, house size).

This innovative study will add to the limited research regarding tiny houses, thereby increasing understanding of this lifestyle choice. Future research will focus on factors such as satisfaction and individual and community health of tiny house dwellers.

Boling, Mitchell  
Mentor(s): Mrs. Laura Carnes  
A humanistic approach to student services: Academic advising as a transformational practice

Given my course of study in both organizational leadership and liberal studies, I have begun to approach societal problems as solvable in two ways: 1) as a human centered, whole person approach which recognizes and celebrates agency within individuals and the collective group and 2) as transformational versus transactional acquisitions. While serving as a Peer Advisor at Lancaster, I began to notice the importance academic advising may have upon the holistic student experience. I understand academic to be the summation of guidance and resources designed to enhance the student experience, and it may serve as an avenue for mentorship into a student’s chosen career path. Currently, USC Lancaster employs faculty and staff to perform academic advising. As the university begins to define what it means to be an academic advisor, I find it important to include humanistic and transformational practices within the spectrum of academic advising. I am currently working with the Director of Student Engagement and Success at USC Lancaster to implement a walk-in summer advisement center for students in need of academic advisement. Currently, USC Lancaster does not have an advisement center, and the summer advisement center will be used to pilot the importance of a center dedicated to academic advisement procedures and processes that focus on the “whole” student in transformational ways versus a transactional approach tied to solely course registration. During my Discover USC presentation, I will highlight the importance of this plan along with recommend solutions, and a detailed plan for implementation while addressing the importance of basic needs, emotional intelligence, and the will to serve as ways to ensure the academic advisement center is truly transformative.
Botbyl, Rachel  
Mentor(s): Dr. Hexin Chen, Mr. Yogin Patel  
miRNA-489 regulates G2/M transition by directly targeting FoxM1

A microRNA (miRNA) is a non-coding RNA that regulates the expression of genes through interactions with messenger RNAs. These gene interactions are critical in countless physiological and pathophysiological processes, including the formation and maintenance of cancerous cells. The original objective of this project was to provide evidence that miRNA-489 directly downregulates the expression of CDK-6, a gene which plays a role in the proliferation of cancer cells by causing them to enter the s-phase of the cell cycle. We found, however, that CDK-6 is not a target of miRNA-489. Instead, we found that overexpression of miRNA-489 arrests the cell cycle at the G2/M-phase. We identified that FoxM1, which is a key transcription factor for the G2/M transition, plays a role in this process. In this study, we were looking to find whether miRNA-489 downregulates FoxM1 directly or indirectly. To answer this question, we cloned the 3'-UTR of FoxM1 and Cyclin E2 into a PGL-3 promoter plasmid. By performing a 3'-UTR luciferase assay, we confirmed that FoxM1 is a direct target of miRNA-489. We also located miRNA-489 binding sites on the FoxM1 3'-UTR by creating a mutant of the FoxM1 3'-UTR. With the mutant, we were able to recover gene expression by removing the sequence to which miRNA-489 normally binds. This finding will allow for further investigation into the role of miRNA-489 in cell cycle regulation.

Bowers, Lacy  
Co-Presenter(s): Sha’Deja Johnson, Iver Vasquez  
Mentor(s): Dr. Fernanda Burke  
Chemistry Explodes in Lancaster: The Looking for a Reaction with the USC Lancaster Chemistry Club Goes Beyond the Classroom

The USC Lancaster Chemistry Club was founded in fall 2008 to give students the opportunity to become better acquainted with chemistry, to secure the intellectual stimulation that arises from professional association, and obtain experience in preparing and presenting technical material before an audience. Through chemistry demonstrations and interactions with the community, we raise public awareness and stimulate interest for chemistry and the sciences amongst K-12 students and adults. Over the past nine years, the club has had many active members who meet monthly and participate in several events on and off campus each semester. These events include visits to local elementary schools and high schools, assisting boy scouts in earning their chemistry merit badge, chemistry challenges for junior and senior students in the honors/AP programs, field trips to government and academic institutions, science fair chemistry demonstrations and a lecture series that hosts professionals and past students who have chosen to pursue careers in the sciences. We are an integral part of the on-campus and off-campus activities and are the ones conducting the demonstrations and hands-on activities. Community members are usually delighted by the experiments and very impressed with our knowledge and skill in presenting them. For further information about the USCL Chemistry Club, please visit our website at http://usclancaster.sc.edu/studentlife/chemclub/index.html.

Boyd, Cameron  
Mentor(s): Ms. Theresa Harrison  
Putting on my Hardhat, Safety Glasses, Earplugs, and Coveralls

After my sophomore and junior years while at USC, I had the opportunity to work with a Fortune 100 company as an engineering intern in both production and reliability. Performance Materials and Technologies is sector within Honeywell that focuses on providing specialty products such as refrigerants, nuclear fuel, and medicine packaging for various customers. My two internships were centered on meeting production goals and maintaining a mechanical integrity program. In both of these industry experiences, I had the pleasure to meet and network with chemical, mechanical, electrical, and civil engineers as well as operators. I collected data for railcar and truck unload times as well as creating a P&ID for a boiler system through team efforts. Through these experiences, I wanted to see my classroom learning in action and how I can use my personal knowledge to impact the chemical industry in a positive manner. The learning curve was steep but in each internship, I understood what a day in the shoes of an engineer looks like. I applied my technical skills and learned how to use SAP, AUTOCAD, and Uniformance. The Honeywell culture and values fit me especially pertaining to the Honeywell Operating System. The confirmation of my major choice out of high school was answered and I knew this was for me from the start. Participating and networking in these internships led me to ultimately accept a position within Honeywell as an engineer who will have the opportunity to rotate to different plants for a three year stint.
Study Title: Incidence of Conversion Total Knee Arthroplasty following operatively treated Tibial Plateau and Distal Femur Fractures

Ben Jackson MD, Andrew Swentik MD, Sydney Boykin

Background:
Periarticular fractures surrounding the knee are common injuries and can be challenging fractures to treat. Over the past decade technologic advances in plate and screw technology have advanced periarticular fracture care. However, the ability to track clinical outcomes in patients treated with this new technology has been limited.

One common problem seen in these fractures is the development of posttraumatic arthritis. The incidence and onset of symptoms in post-traumatic arthritis is an important question and one with poor supporting literature to date. It is a complication which may lead to the need for subsequent total knee arthroplasty (TKA) or reconstructive osteotomy to correct the mechanical alignment of the extremity. The development of post-traumatic arthritis can take years or decades to develop which helps explain the paucity of data. The goal of our study is to review all proximal tibia and distal femur fractures treated operatively within the state of South Carolina to determine this incidence and review the interval time between which these procedures occur.

Methods:
We retrospectively reviewed all patients who underwent total knee arthroplasty, knee arthrodesis, or reconstructive osteotomy following a tibial plateau fracture or distal femur fracture in South Carolina from 1996-2015. This data was selected using ICD-9 procedure and diagnosis codes, and was obtained from the South Carolina Revenue and Fiscal Affairs Office. Patient demographics, including age, gender, race, and admission type were analyzed to identify potential risk factors.

Results:
1264 patients had operative tibial plateau fractures while 4,075 patients were found to have operative distal femur fractures. Of these patients, 1895 underwent reconstructive surgery. This gives us a conversion rate of 34%. We are still waiting on final data to allow us to report on the incidence of tibial plateau and distal femur fractures independently as well as the time interval between index and revision procedures.

Conclusion:
Operatively treated fractures are subject to possible complications including nonunion, malunion, infection and post-traumatic arthritis to name a few. Given the complicated nature, and wide variation in severity of distal femur and proximal tibia injuries there is no current consensus treatment for all fractures. After a thorough literature review we concluded there was a need to better define the population of patients who require revision surgery in this cohort. We performed a data base study to review all operatively treated fractures in South Carolina from 2006-2015. We were able to show the incidence of revision surgery, a total knee, tibial or femoral osteotomy, or knee fusion following tibial plateau or distal femur fracture was 34%. This clinical information is instrumental for surgeons to have when counseling patients on their options and risks of operative treatment of periarticular fractures around the knee.
Bradford, Erin  
Mentor(s): Ms. Anna Oswald-Hensley  
Erin Bradford’s GLD Portfolio

Student Organization:  
During the summer, I was selected to be a University of South Carolina Sumter Ambassador. As a University of South Carolina Sumter Ambassador, we are representing the school for current and future students. One activity we participated in heavily was SOAR; which was our schools orientation. For these days, we were required to be there all day, as we would all get assigned a certain group and had to inform them on anything they needed and take them on a tour of the campus. Having done this all summer, it taught me a lot about leading others and branching out of my comfort zone. Being an Elementary Education major, leadership development is very important. If I can’t lead my class and be the example for them, then I am not going to succeed as an Educator. I have continued my time as an Ambassador into this school year, and plan to do so as long as I can.

Peer Mentorship:  
In the Fall of 2016 I did an internship with another fellow peer and a staff member here at University of South Carolina Sumter. The Internship was called The Teacher as a Manager. This required us to be Peer Leaders in a University 101 class. Our job as Peer Leaders was to be the example, and learn what it is like to lead a group. We were also responsible for being a role model in the classroom, and were to give direction and instruction for the students currently enrolled in UNIV 101. It was something I enjoyed, because it required us to be in a classroom, and we also were to teach a couple lessons as well. This was beneficial for me, once again, since I am an Elementary Education major. The leadership aspect helped me a lot, but so did being in the classroom. Even though I won't be working with students that age once I have received my degree, classroom management still applies. It was an awesome experience, and one that I am extremely thankful for, because I think it will impact me and my students later on in life.

Bradley, Marshall  
Mentor(s): Dr. Lara Ducate  
Wien, Wein, and WU: A Study Abroad Story

Vienna is the capital of Austria, a small German-speaking country located directly in the middle of Europe. Austria is home to many things: Mozart, Red Bull, and Wirtschaftsuniversität Wien (WU) or Vienna University of Economics and Business. At this university, I mainly studied international business and economics from a uniquely European perspective. Furthermore, I made new friends from all over the world and gained a wider view of the world, realizing simultaneously that the world is paradoxically much larger than I expected, but that it is a small world after all. By the end of the semester, I made new friends from all over the world, learned global business techniques, immersed myself in a new culture, and gained valuable insights that one can only gain from being sent to a top-ranked business school in a beautiful country. Come hear about how I learned a few things about life by eating a lot of schnitzel.

Bradley, Marshall  
Mentor(s): Dr. Orgul Ozturk  
Immigration and Integration

Immigration is a global phenomenon that inundates our media and politics. Powerful rhetoric poses immigration as a problem for societies around the world. This begs the question: how does immigration affect our daily lives? It has been argued that immigrants strongly influence rates of crime in the place they settle. The purpose of this project is to find out if there truly is a correlation between rates of immigration and crime rates.
Bradley, Becca  
Mentor(s): Mrs. Ashley Schrye  
Aprendizaje Mundial (A Global Learning Experience)

During my four years at Carolina, opportunities I have had to study other parts of the world first-hand have been integral to my undergraduate experience. During the summer before my sophomore year, I spent a month volunteering at a school for the deaf in Nicaragua called HC3 through the Dobson Volunteer Service Program. This experience inspired me to study abroad for a semester in Central America. During the spring semester of my junior year, I studied at the University of Costa Rica in San José, Costa Rica. During my time in Costa Rica, my confidence in the classroom and in my daily life greatly increased. My knowledge of Spanish grew tremendously, and my understanding of how to live in another culture grew as well. These two global learning experiences have shaped who I am and have challenged and aided me in my public relations major and Spanish minor. In the future, I plan to use what I have learned during my experiences to better my communication skills with others, regardless of their native language. I know that my global learning experiences have increased and will continue to increase my opportunities in the job market and in everyday life. Global learning has been integral to my growth and development, and I know my passion for it that I have found at Carolina will continue to grow throughout my lifetime.

Bramblett, Rachel  
Mentor(s): Ms. Elise Lewis  
Learning to Associate and Expand Classroom Learning with Professional Skill

From the three years I have been a student at the University of South Carolina, I have been challenged and given irreplaceable opportunities to learn excellence in leadership and communication. By going through the process of Graduation with Leadership Distinction in Professional and Civic Engagement, I was able to realize what connections I made from my college courses to hands on skills. Through peer leadership and professional experience, I learned to apply the knowledge I acquired within the classroom to life situations both with my career and personal life. The application of the skills learned through courses not only solidified what was taught, but gave it meaning and personal importance unique to me. Learning became not only a means to obtain a degree, but a way to change perspectives and gain new understanding to be able to adapt to new environments and become an exceptional leader in any situation. The most important lessons from my opportunities of being and Resident Mentor as well as an intern in my field of study included being aware and embracing diversity, exuding confidence and clarity in public communication, and being able to use quick retention in the professional setting. I will be able to carry all of these skill sets into my career and the each step leading up to working in the profession I aspire to.

Breal, Hannah  
Mentor(s): Dr. Glenn Weaver, Dr. Michael Beets  
Identifying Cost of School-Based Physical Activity Interventions

Background: The prevalence of obesity in the United States has become a pressing health concern during the past thirty years, with 16.9% of youth and 34.9% of adults documented as obese in 2011-2012. Schools have been called on to help address this issue through intervention programs, which will cost to implement. The purpose of this study is to identify the proportion of current school budgets that would need to be dedicated to current physical activity interventions.

Methods: A systematic search of two electronic databases was conducted (google scholar and pubmed). Studies were eligible to be included if they fulfilled the following criteria: 1) The interventions evaluated were school-based, 2) the evaluation reported actual cost results, and 3) the article was written in English. Studies were excluded if they were simulations of actual interventions or secondary cost evaluations. The findings were synthesized and per school costs of interventions were calculated and converted to 2014 U.S. dollars. The most recent (2014) per school expenditures were collected from National Center for Education Statistics and the Census Bureau.

Results: A total of 1355 studies were identified via the literature search. After removing duplicates and studies that did not meet our inclusion criteria, 8 studies were included in the final analyses. Per school intervention costs will be expressed as a percentage of the most recent state per pupil expenditures.

Conclusions: Identifying the cost of interventions in comparison to per school expenditures is an important step towards identifying how much schools are willing to pay for these interventions.
Bremer, Devon  
Mentor(s): Dr. Amanda Wangwright  
National Student Advertising Competition: Culminating Everything I had Learned Thus Far

This Spring, I participated in the NSAC Ad Team through the Journalism School at USC. Each year a client is selected, and about 120 schools across the country work through most of the semester to draft an entirely new campaign using the budget provided by the client. The competition ends with districts, regionals and finals, and the winning campaign is often adopted by the client. This experience culminated every skill and concept I had learned and practiced over my previous seven semesters. I learned the importance of preliminary research - answering “why?” before attempting to create something. I also had a chance to work with an entirely unknown product and new target audience.

What made this experience significant was how valuable the real life experience was to everyone in the class. I had taken seven semesters worth of classes prior to this, and learned a wealth of information, but nothing up to this point had given me insight into what working in the real world would really be like like this competition did.

I'm applying to the VCU Brandcenter to pursue a Masters of Advertising after I graduate, and this competition will give me a strong advantage over other applicants. Beyond that, this experience provided me with the closest thing possible to what I'll be doing in the workplace, which is something few can experience before they graduate.

Brewer, Katherine  
Mentor(s): Mr. Ryan Lloyd  
A Three Year Journey

Upon entering the University of South Carolina I was eager to see how I would change as a person and a leader. Coming into college I already felt like a leader. I had set goals for myself and knew what I wanted to do with my life. My leadership positions within Preston Ambassadors, Y-IMPACT, and Preston Green Team have tested my existing leadership skills and expanded the boundaries of what I thought leadership could be. My work experience at The Masters Golf Tournament, The Sands Resorts, and The Barn at Harmon made me take my coursework and put it into action on a daily basis. Over the past three years I have stepped outside of my comfort zone more times than I can count. Stepping outside of my comfort zone has resulted in some of my fondest memories; memories that left a lasting impression on me. The lessons I learned in and out of the classroom helped me become a better person and stronger leader.
Bright, Matthew  
Mentor(s): Dr. Cynthia Nichols  
Sedation Dentistry: An application of medical histories and observation records to create a protocol aimed at identifying high-risk patients.

Through retrospective medical record analysis at the Palmetto Health USC Medical Group, Department of Dentistry, this study aims to evaluate patient outcomes when treated with the sedative compounds Midazolam, Fentanyl, Diazepam, and Demerol, in the hopes of establishing interdepartmental policies that will guide patient selection for in-office sedative procedures. Moderate sedation provides a safe and effective option for treatment to those with complex dental cases or a phobia associated with dental care. By looking at the established Dental Patient Procedure Observation Records and the prescribed dosage of sedatives in comparison to body mass index (BMI), reported pain levels, additional prescribed and over the counter medications, pre-existing conditions, paradoxical reactions, inter-procedural complications, and physician notes at follow up of 375 patients over approximately three years, this study aims to develop an algorithm to help determine which patients may be predisposed to an unfavorable sedation outcome. This study is ongoing, and preliminary data provides a solid foundation for later analysis. My experience at the Palmetto Health Dental Center has enhanced my ability to develop relationships and work with mentors to help accomplish my goal of becoming a dentist. My valuable interactions with dental residents has not only increased my scope of knowledge about dental terminology and procedures, but has also helped to prepare me for the application and interview process for dental school admission. I look forward to continuing my role at the Palmetto Health USC Medical Group, Department of Dentistry and plan to apply for additional funding through the South Carolina Honors College, Science Undergraduate Research Fellowship (SURF) Grant program, as well as submit my findings for publication in Anesthesia Progress, the official publication of the American Dental Society of Anesthesiology.

Brooks, Mary-Margaret  
Mentor(s): Ms. Tricia Kennedy  
Semester in Switzerland

During the spring semester of 2016 I studied abroad at the University of St. Gallen in St. Gallen, Switzerland through the International Business program. As an International Business major with a German minor, I have long had an interest in exploring other cultures and how business operates there. This opportunity allowed me to fully become immersed in Swiss culture for four months, living in a small town where I had to practice my German on a daily basis just to get around the town. Additionally, I was able to take classes that were extremely interesting to me and were not offered at USC. For example, I took a class on Social Entrepreneurship and one on Public Finance. These classes allowed for me to further explore topics that were of interest to me in both my IB and Finance majors. Another significant part of my experience abroad was the independence I gained from traveling to so many places on my own. I had not doubted my ability to navigate a bus system in Sweden at 10pm on my own before, not speaking a word of Swedish, but these types of experiences proved to me that I really am able to conquer anything and this boosted my overall confidence that I had in myself. This experience in Switzerland is such an important part of my overall USC experience because I was able to connect my studies from my USC classes to this real world experience, drawing everything together.
Bross, Morgan  
Mentor(s): Ms. Ashley Byrd-White  
Promoting Physical Activity and Nutrition in Children: P2YP

Throughout this semester, I have been completing my internship with a large-scale, multi-million research project funded by the National Institutes of Health, known as Policy to Practice in Youth Programs (P2YP). P2YP is a health initiative that is aimed towards children in afterschool programs. P2YP has a vision for all afterschool programs to serve at least one fruit of vegetable during their programs hours and have all of the children accumulate their daily-recommended 60 minutes of moderate-to-vigorous physical activity each day. As an Exercise Science major at the University of South Carolina, my internship has allowed me to gain hands-on experience with data collection and acknowledge the need of educating younger individuals on the importance of physical activity and proper nutrition. I have had the opportunity to systematically review research articles for a pilot study, collect data through SOSPAN scans and accelerometers, along with observing snack time and physical activity at afterschool programs. Participating in this internship has given me the understanding that implementing small changes at a young age will go a long way. I have been reassured that the health care field is the right track for me. Through this experience, I hope to pursue a career as a physician assistant and be an advocate for physical activity and nutrition in pediatrics at my place of work.

Brown, Krishnan  
Mentor(s): Dr. LeAnn Norris, Dr. Bryan Love  
Clinical Impact of Prescription Medication Quantity on Grip Strength

Purpose
Hand grip strength has been widely used as a practical and reliable measurement for evaluating age-related changes and alterations in biological functions. The use of specific medications, including cardiovascular agents, have been associated with reduced grip strength. Studies have also found that grip strength is inversely related to polypharmacy, the concurrent use of five or more medications. Additional research is necessary to determine whether the association between grip strength and other medication classes is generalizable.

Methods
This study examined associations between prescription medication count and grip strength among 5,197 patients, aged 18 years and older who participated in the 2011–2012 National Health and Nutrition Examination Survey (NHANES). Prescription medication use was self reported and collected by a trained interviewer. Baseline demographic information was collected and evaluated including age, gender, medications history, and prescription count. Muscle strength was assessed using the Takei digital grip strength dynamometer. Combined grip strength was calculated by totaling the best reading from each hand. Multiple linear regression models were used to examine the association between combined grip strength and the number of medications used, with and without an adjustment for gender, age, height, and arm circumference.

Results
The average age of the NHANES patients was 45.9 years. The mean height was 175.8 cm for men and 162.1 cm for women. Mean combined grip strength, measured in kilograms, was higher among men than women (89.8 kg vs. 56.4 kg; p < 0.001). Men and women reported an average of 1.57 and 2.06 prescriptions, respectively (p < 0.001). In both unadjusted and adjusted models, there was a linear decline in combined grip strength associated with increasing number of medications (p < 0.001).

Conclusion
Increasing quantity of prescription medications is associated with reduced grip strength independent of age, gender, height, and arm circumference. Additional studies are needed to clarify if reduced grip strength is directly due to medication use or another underlying process.
Brown, Joseph  
Mentor(s): Dr. Heather Moorefield-Lang, Prof. George Shaw  
Are Librarians Still Important?

Technological advancement has increased significantly over the past 30 years and there is an increasing amount of digital natives that are comfortable with technology; many are trained from a young age to find information on their own. As a result, there is a widespread trend to move sources and information from print to electronic. This has caused people to consider if libraries and librarians, which are often associated with print books, are still relevant. The objective of this study is to determine whether or not school libraries and librarians are still relevant to students even with their increased reliance on technology. To research this, a survey consisting of seven closed-ended questions and 5 open-ended questions has been given to school librarians in the state of South Carolina in order to find out whether they believe school libraries and librarians are still relevant to students and the school system and why. The conclusion will be presented at the poster showing.

Brown, Adam  
Mentor(s): Dr. Nina Moreno  
Thinking Differently About Giving Back

I have learned so much here at the University of South Carolina, all of these teachings culminated in my experiences giving back in the community and here at school. As a University 101 peer leader I was able to use my broad range of perspectives to guide and mentor 19 first year students through their first semester at school. I was able to put my class work to use as philanthropy chair of my fraternity, Pi Kappa Phi, and as Finance Assistant at the Family Connection of South Carolina. In these positions I was able to assist the community in supporting those with disabilities. Following the Civic and Professional Engagement Track, these experiences and knowledge gained have allowed all of these experiences to better me and therefore better my future workplace.

Brown, Austin  
Mentor(s): Mrs. Stuart Hunter  
The Logic of Leadership

As a Supplemental Instruction (SI) Leader, I worked with students enrolled in a historically difficult college course: Deductive Logic. After seven semesters, I supported four different faculty members and hundreds of students, while adding on roles within the SI department as a Program Assistant and Program Mentor. My interest in Logic was the first reason I became an SI Leader, but being able to help students work through the difficult material and see that a class can shape someone’s college experience kept me in the role. The communication, time management, and leadership skills I gained over the semesters are invaluable; I plan to use them regularly throughout my professional career and with each leadership role I take in the future.

Bryant, De’Aira  
Mentor(s): Dr. Jenay Beer, Ms. Karina Liles  
Engaging Minorities in Computer Science via Online Game & Robot Hip-Hop Dance

Science, technology, engineering, and mathematics (STEM) careers are among the fastest growing fields in the world today. However, the rate of a growing job market in comparison to the demographic makeup of the current STEM community will leave the United States unable to produce the diverse and skilled workforce necessary to compete in the global marketplace. Though some studies have promoted underrepresented minority engagement in STEM related fields, very little work has investigated how effective engagement tools, such as hip-hop, can be utilized to captivate students in a way that relates to their own cultural experiences. In this study, we discuss details on the preliminary development and user testing of an interactive, educational game that will be used to engage minority middle school students in computer science by incorporating hip-hop dance with a simulated robot. This culturally tailored educational experience will introduce students to fundamental computer science principles in the hopes of promoting increased perceptions and openness to the field of computer science. In this report, we discuss details of our game design, study methodology, usability assessments on lesson content, robot dance moves, and preliminary results of survey data from South Carolina middle school students.
Buck, Maria  
Co-Presenter(s): Elizabeth Lombardo  
Mentor(s): Dr. Dawn Wilson, Dr. Allison Sweeney  
The Relationship between Parental Monitoring, Limit Setting, Family Structure, and Behavioral Tracking in the Families Improving Together Randomized Controlled Trial

Lifestyle interventions are an effective approach for weight loss, but it remains unclear why some individuals are more responsive to treatment than others. Previous studies show that greater parental monitoring and limit-setting is associated with adolescent weight loss, but few studies have examined its impact on adolescents’ self-monitoring skills. This study examines how family structure and parents’ tendency to monitor and set limits for their adolescents relates to adolescents’ success at tracking their diet and physical activity goals in the Families Improving Together (FIT) for Weight Loss Trial. Project FIT is a randomized controlled trial testing the effectiveness of family-based weight loss intervention among overweight African American adolescents and parents. Data was assessed from 75 parents (92% female caregivers, Mean age = 43.19) and 75 adolescents (66.67% females; Mean age = 13.05). Parental monitoring and limit setting were measured with the parenting strategies for eating and physical activity scale. Marital status and parent education level were also measured to determine family structure. For 8 weeks, adolescents and parents set a diet or physical activity goal, and their weekly progress towards tracking their goals was coded as yes or no to create a summary score. Parent limit-setting was positively correlated with both parent (r = .581) and teen (r = .602) tracking during the program. Tracking was also positively associated with higher parents’ education level (r = .232) and was great among parents who were married (vs. unmarried) (t(72) = 2.034, p = .046). These findings suggest that parent factors are important for family-based weight loss programs.

Bullock, Caroline  
Mentor(s): Mr. Alex Blauvelt  
Caroline Bullock's Graduation with Leadership Distinction in Professional and Civic Engagement

As a premedical student, you are aware of what you need to do as an undergraduate to get an acceptance into medical school. You excel in the right courses, gain first hand experience, participate in extracurricular activities, all to show you will succeed in medical school. But along the way I discovered there are other equally as important aspects of being a successful medical student and physician. Volunteering at Cincinnati Children's Hospital Medical Center illuminated the importance of good bedside manner as a physician and how appreciative patients are when you brighten their day. Research in medically related fields showed me that while physicians save lives, research provides the resources necessary to save those lives. While I also excelled in the right courses and integrated my textbook knowledge with real life examples and experiences, I believe that my holistic approach to medical school and a career as a physician helps highlight the importance of helping others in whatever way they need most and helps not lose sight of the importance of the human side of healthcare.

Burack, Elissa  
Mentor(s): Dr. Judith Kalb, Dr. Robert Cox  
Russia vs. the World: Russian Framing of Putin's Foreign Policy

Russian foreign policy is of great concern to American policymakers and citizens who believe that Russia’s actions reflect President Vladimir Putin’s attempt to become a full-fledged dictator. However, Americans rarely take into consideration how the same actions are portrayed in Russia. This project examines the effectiveness of the Russian government's framing of foreign policy issues to influence public opinion in a favorable direction. It examines Russian newspaper coverage of the Syrian crisis, the annexation of Crimea, and the 2016 United States presidential election in Russia, and identifies three frames commonly used by Russian newspapers when covering these issues: Nationalism, the Threat of the West, and Global Security Threats. The study further finds that these frames correspond with the Russian government’s preferred course of action on each of the issues. An examination of Russian public opinion shows that the most prominent frame is the “Threat of the West,” which aligns with both the government’s and citizens’ views. The findings indicate that the Russian government can generate legitimacy for its strategy of retaliation against the West by framing it as a just reaction to its perception that the West has treated Russia unfairly.
Burdet, Kevin
Mentor(s): Dr. Tobias Lanz
Humanitarian and Environmental Policy in Geneva Switzerland

As a junior abroad in Switzerland, Geneva, I was involved in a program focused on multilateral diplomacy and international relations, taught through guest speakers from organizations like the UN, Doctors without Borders, and the World Trade Organization and from local Geneva universities. We also visited the European Commission in Brussels and the OECD and UNESCO in Paris. Throughout hearing these speakers, we created three essays; one was a topic on Swiss culture, where I interviewed locals on the canton relations between Genevois and Vaudois. In the second, I interviewed policymakers and professors on the geopolitical conflict of energy in Europe, and my capstone research was a case study on women’s local conservation governance in rural Cambodia. I did this program because it would give insight into the functioning of international organizations, allow me to network in Europe, and grow in my comprehension of diplomacy, energy policy, and women’s empowerment. Beyond learning from speakers and research, I gained deep insight into regional topics through fellow international colleagues. A few insights were on Western African energy infrastructure, political struggles of Eritrea, and non-state nations’ rights. These insights all were pertinent in understanding global politics beyond a western viewpoint, and valuable for my goal to work with international policy. This experience was professionally significant as it showed me the abilities of law in formulating change for the environment. I am now seeking conservation policy and environmental law internships before applying for law school to become a global environmental lawyer.

Burdet, Kevin
Mentor(s): Dr. Tobias Lanz, Dr. Joey Von Nessen
Policies for Coastal Communities: A Case Study of strategies to mitigate seasonal tourism in Southern Oregon Coastal Communities

Seasonal unemployment is an emerging issue alongside the increase in global tourism. A tourism industry’s economic activity fluctuates based on seasonal temperature changes, which is detrimental to the economic welfare of rural communities dependent on tourism. State, regional, and local policies help develop strategies to help struggling communities fight seasonality cycles. The purpose of this case study is to observe and evaluate policies to mitigate effects of seasonality. The study focuses on the southern Oregon coast, once economically diverse through fishing and lumber, now at the forefront of implementing seasonality solutions as tourism has grown to be the dominant regional industry. A background for developing this topic was setup through a literature review of the Southern Coast’s social and economic history, individual town profiles, and news on regional and state cooperation. The mitigation policies emerged in this study through semi-formal interviews in person and on phone with towns’ chamber of commerce, regional marketing organizations, the Oregon Tourism association, and rural development institutes. The collection of Oregon tourism discourse and actions of individuals directed this research to discuss several strategies, their pros, and their cons.

Burdet, Kevin
Mentor(s): Ms. Kimberly Dressler, Mrs. Mia Cherry
Saudade: Discovering the world through student exchange in the United States

By studying at the University of Oregon through National Student Exchange, I quickly became connected with fellow NSE students and international exchange students, broadening my understanding of several distinct cultures such as Brazil and Japan, and establishing closer ties to the current affairs of these countries. Between studying among a new staff of professors and traveling to see family, friends, and for research, my academic experience was greatly enhanced in joining the Exchange.
Burger, Jamie  
Mentor(s): Ms. Kerry McIver  
**Participation in Sedentary Behaviors During the Transition From Elementary to Middle School**

Extensive research shows the negative health effects of decreased physical activity (PA) and increased sedentary behavior (SB) in children. There has been little research into the types of SB’s youth participate in and how those behaviors change over time. Understanding these changes will help researchers and practitioners develop interventions that may alleviate the trend for increased SB as children age. **PURPOSE:** The purpose of this study was to examine the differences in SB by activity type, gender, and county in a cohort of children as they transition from elementary to middle school. **METHODS:** Fifth-grade students from 2 diverse school districts were recruited for the study. Each student was measured once per year in their 5th, 6th, and 7th grade years. Participants completed a self-reported PA recall indicating their participation in specific activities throughout the past 5 days. Participants answered additional questions about the context of the behaviors. Repeated measures ANOVA were used to determine differences in the percent of children reporting SBs by gender and district, over time. **RESULTS:** Complete data were available for 585 students, 44.3% male and 48% from district 1 and 52% from district 2. Overall, regardless of county or gender, participation in video games, reading, and watching TV/movies decreased over time. Homework participation from students in district 1 decreased (90.7 to 82.3%), while in district 2 participation increased (59.3 to 78.3%), p=0.0155. There were no significant differences in the prevalence of participating in SBs by gender, but there were decreases in SB over time for both genders (non-significant). **CONCLUSION:** Time spent reading, playing video games, and watching TV or movies decreases from 5th to 6th to 7th grade. Given the decrease in reported participation in these SBs, additional research is needed on the SBs that are contributing to increased time in SB as children get older.

Burrell, Allison  
Mentor(s): Dr. Jerry Hilbish  
**Selection vs Selection in a hybrid zone: Directional selection among adults opposed by selection among larvae**

Hybrid zones formed between two species involve complex interactions in which the stability of the zone is determined by the interplay of dispersal and natural selection. The mussels Mytilus edulis and M. galloprovincialis hybridize at numerous locations in Europe, including Southwest England. In this region there is strong directional selection among adult mussels that favors alleles derived from M. galloprovincialis and hybrid populations that are strongly isolated from neighboring populations of each parent species. Consequently this hybrid zone should be unstable, yet the zone has been stable for at least 30 years. We tested the hypothesis that there is selection in the larval stage that counteracts the directional selection for M. galloprovincialis alleles among adults. We sampled mussel larvae in different stages of development from plankton samples collected from Southwest England. There was strong directional selection favoring M. edulis alleles during larval development and that the majority of selection occurred shortly after the transition from trochophore to veliger. Opposing directional selection during different stages of the life-history contributes the stabilization of this hybrid zone.
Buss, Quinn  
**Mentor(s): Dr. Lara Ducate**  
**Mind the Gap: Connecting Science to Culture in the U.K. and Europe**

The age-old question: what are you doing after graduation? Before my Fall 2015 global exchange experience in Canterbury, England, this question filled me with panic. After all, I was a science major who loved literature; a tutor who loved teaching with a fear of public speaking; an admirer of British culture who wanted to see the world but had never been on a plane. Surrounded by Pre-Med Biology majors with seemingly one-track goals, my myriad of intangible aspirations and personal interests conflicted with my academics and did not seem to point toward one clear direction.  
Ironically, it took the experiences of living abroad, exploring cultures, and studying in a different higher education system for me to realize the value and relevance of my USC degree. In Europe, I had the opportunity to explore my personal interests, traveling to different countries and historical sites. However, I did not anticipate how these experiences would complement what I had learned in my undergraduate studies as a means of interdisciplinary learning. Identifying plants in the gardens of Versailles, viewing the engineering feats of cathedrals I had learned about, and other experiences abroad made me realize the purpose of this knowledge and develop a newfound appreciation for otherwise glanced-over subjects as I fused them with my passion for travel. I experienced different aspects of each education system and witnessed firsthand how interdisciplinary learning can make broad majors specific to each student, increasing student engagement and success. Furthermore, I discovered interdisciplinary education as a catalyst for achieving not just academic growth, but also personal growth. My international travels helped me grow as a listener, leader, and communicator as I forged international relationships and embraced the diversity of different cultures. My global experience redefined my views on success, my education and its purpose, and my future path in the global community as I tailored a global outlook to my non-globally-structured major.

Butler, Bryana  
**Mentor(s): Mr. Ryan Lloyd**  
**Autism - Understanding the Spectrum**

During the school year, I never took on the responsibility of a job because school took up more hours than there were in a day, so I dedicated my summer breaks to experimenting with different jobs. This past summer I worked for Autism-Beyond, a company that provides Applied Behavioral Analysis or ABA therapy to individuals with autism to help improve behavior and achieve specific goals. The job was challenging, and it required me to be creative, patient, and adaptable. I was exposed to a variety of children all very different from each other, which created new learning opportunities each day. Even though I loved every child I did therapy with, the overall experience made me realize that this job was not a career path I wanted to pursue. I will discuss the knowledge I gained about autism and my outlook on this disorder after completing my time working with this company.

Butler, Regan  
**Mentor(s): Dr. Melanie Palomares**  
**Linking Glass Pattern Coherence and Reading Ability**

Glass patterns are stimuli that are moires of randomly placed dots. Prior research has found that there is a connection between an individual’s ability to detect coherence in static Glass patterns, and the individuals reading fluency. However, there has not been a lot of research in regards to coherence detection being connected with reading comprehension. Individuals will be shown four static Glass patterns at each coherence level, starting at 100% coherence, and will be asked to select which of the four images has coherence. The individual will continue until they make an error. This will be the coherence at which they have reached a threshold. Individuals will then preform multiple reading comprehension tasks. A regression analysis will be conducted in order to determine if static Glass patterns can be utilized as a form of testing reading comprehension ability. This research could lead to a new way to assess an individual’s reading ability, without making them read, which would be advantageous in potentially diagnosing reading disabilities in young children.
Byler, Dara  
**Mentor(s): Dr. Xuewen Wang**  
**The Effects of the Different Menstrual Cycle Phases on Exercise Performance**

Various factors are known to affect exercise performance. The menstrual cycle is one factor that lacks consistent evidence regarding its relationship to exercise performance. In particular, there is a lack of evidence on the effects of the menstrual cycle phases and their effect on exercise. The goal of this study is to examine the effects of the menstrual cycle phases on three aspects of exercise performance, strength, endurance, and power. Three different tests will be used: a handgrip dynamometer test, the YMCA submaximal cycle test, and the Margaria step test will be used to measure strength, endurance, and power, respectively. Young female eumenorrheic participants will be tested during both the Follicular and the Luteal phase of their menstrual cycle. Data from both phases will be collected and analyzed. It is hypothesized that there is a slight increase in exercise performance during the Luteal phase.

Byrd, Destiny  
**Mentor(s): Dr. Brie Turner-McGrievy**  
**A comparison of dietary assessment from two electronic records during behavioral weight-loss interventions**

Background: Apps for monitoring dietary intake are common and often used in behavioral weight-loss research to provide information and feedback to participants. Research comparing reported intake from commercially available dietary tracking apps to accepted means of dietary recall is lacking.

Objective: To compare caloric, macro-, and select micronutrient intake from a commercially available dietary tracking app (FatSecret) to reported intake from the Automated Self-Administered 24 (ASA24) dietary recall system, which is considered an accurate and valid way to collect dietary intake data.

Methods: Post hoc analysis of observations (n=59) from two behavioral weight-loss interventions was conducted. In both interventions, participants tracked their dietary intake on days selected for the research, including weekdays and weekend days, using the FatSecret app and the ASA24 diet recall. A paired-samples t-test was used to compare calories, total fat, carbohydrates, fiber, sugar, protein, cholesterol, and sodium from same day observations using the two systems.

Results: Significant differences were observed among calories (1241±409 app vs. 1386±430kcals ASA24, P<.05), total fat (48±21 app vs. 54±23g ASA24, P<.05), carbohydrates (146±55 app vs. 162±61g ASA24, P<.05), and sugar (52±28 app vs. 68±35g ASA24, P<.05), and sodium (2020±894 app vs. 2609±989mgs. ASA24, P<.05). No significant differences were noted between reported fiber, protein, or cholesterol intake.

Conclusion: Commercially available apps present a convenient method of dietary self-monitoring, but may not provide valid information on dietary intake when compared to accepted means of dietary recall. Researchers should use caution when using dietary information reported from apps as part of behavioral research interventions.

Cagle, Kelsey  
**Mentor(s): Ms. Elise Lewis**  
**Gaining New Perspectives through Global Studies**

I am pursuing Graduation with Leadership Distinction in the Global Learning pathway in order to reflect on my time abroad in Ireland but also my overall 4 years as a student at USC. During my time abroad I gained many new perspectives on life that have changed my way of thinking within the grand scheme of things. While being abroad I gained a new sense of independence as an adult and I also acquired appreciated knowledge regarding cultural awareness and it’s importance. My college career also taught me some not so obvious lessons such as the affects of different teaching methods and their values. Through creating my GLD portfolio, I have been allowed to reflect on many aspects of my college experience and how they all came together to culminate in making me a more well-rounded and diverse student. As I get ready to embark on a new adventure following graduation in December 2017 with a BS in Chemistry, I plan to implement these life-altering lessons in order to fully appreciate the world around me.
Callahan, Molly  
Mentor(s): Ms. Anne-Marie Hantman  
STEM to Student Affairs – Why Peer Leadership Defined My College Experience

When I began my undergraduate career, I planned to go into medicine and eventually transition into teaching whenever I felt ready to retire from the hospital. However, the more time I spent in college, the more I realized that while my desire to help people through my career was unwavering, teaching was more in line with how I wanted to affect the lives of others and change the world. Recognizing that my major did not include any strategies for learning to teach effectively, I added a minor in General Education and began the coursework. Around the same time, I was fortunate enough to begin my first year as a Resident Mentor (RM). This job reaffirmed my desire to work in the field of education and make a difference every day in the lives of emerging adults, because I found the work fulfilling and engaging. During a student teaching experience in my junior year, I realized that although working with high school students was rewarding, I preferred the interactions I had with college students as their Resident Mentor. They fueled my passion to continue growing and working hard so I am able to serve them to the best of my abilities. I was fortunate to have a variety of opportunities during my undergraduate career to serve my peers, not only as a Resident Mentor, but as a Resident Mentor Training Leader and later as a University 101 Peer Leader and even as a student assistant in the Office of Student Conduct and Academic Integrity. It was through these experiences I came to the insights that perseverance is a learned behavior, achievement is relative, and expanding one’s frame of reference is vital.

Canavan, Jamie  
Mentor(s): Dr. Joe Jones  
Pursuing what you are passionate about pays off

In beginning my journey as an undergraduate at the University of South Carolina I began to pursue a degree in environmental studies. Though I have always been passionate about art, I had previously considered it to be primarily a hobby and not a viable career path. Through the encouragement of my peers and advisors I have had the courage to change my passion for the arts into a promising career that I hope to continue pursuing in my post-graduate career. Here at the University of South Carolina we truly have no limits as students and can achieve anything we set our minds to. In my presentation I hope to share with you all that being passionate about something can truly pay off in terms of your future.

Cannon, Kelly  
Mentor(s): Prof. Courtney Worsham  
Cross-Cultural Leadership

In serving as both a University 101 Peer Leader and a Global Carolina Peer Leader I was put into a leadership position in which empathy was a valued skill. Global Carolina is an organization that is similar to University 101 but instead of freshman entering the university the students are enrolled in the English Program for Internationals and will not only be transitioning into the USC community but also the United States. Having traveled abroad for significant lengths of time, I was able to understand my students’ transitions from a place of experience and involvement in my own transitions into living in these countries. Without having also faced culture shock and new customs in another country, it would have been difficult to support my students at the level they were seeking. Coupling my passion for leadership with my passion for different cultures, I was able to lead my students into successful transitions cross-culturally.
Bipolar Disorder and Alzheimer’s disease are associated with cyclic nucleotide signaling deficits in specific subcellular compartments, namely the cytosolic—but not membrane—fractions. Thus, to adequately treat these disorders, it may be necessary to restore cyclic nucleotide signaling in a compartment-specific manner. Phosphodiesterases (PDEs) play an important role in maintaining the integrity of cyclic nucleotide microdomains by acting on select pools of substrate. PDE11A4 in brain is expressed almost exclusively in the hippocampal formation, a brain region implicated in the pathophysiology of bipolar disorder and Alzheimer's disease, and PDE11A4 is enriched in the cytosolic versus soluble membrane fraction of hippocampal neurons. Here, we identify intramolecular signals that control the subcellular trafficking of PDE11A4 between these two fractions in the hopes of identifying novel ways to therapeutically target this enzyme in a compartment-specific manner.

When expressed in either COS-1 or HEK293T cells, mouse GFP-PDE11A4 (WT) and human PDE11A4 are distributed throughout the cytoplasm and in sphere-shaped “puncta” representative of organelles, as indicated by transmission electron microscopy. These puncta are not golgi, and do not colocalize with lysosome, autophagosome, nor degradation organelle markers. Nevertheless, live-imaging shows smaller PDE11A4 puncta moving within the cell and fusing with larger puncta. Phosphomimic mutations of serine 117 (S117D) and S124D increase trafficking of PDE11A4 into these puncta, while S162D and disruption of homodimerization block this trafficking. Interestingly, S117D and S124D appear to synergize, as S117D/S124D double mutants potentiate PDE11A4 aggregation relative to S117D or S124D; whereas, S162D is able to completely block the effect of S117D/S124. Biochemical fractionation shows that S162D and disruption of homodimerization shift PDE11A4 from the membrane to the cytosol; whereas, S117D/S124D shifts PDE11A4 from the cytosol to the membrane. In line with these effects, we consistently find PDE11A4 phosphorylated at S162 (pS162) in the cytosol; whereas, pS117/pS124 is in both the cytosol and membrane. Further, immunocytochemistry labeling of mouse WT and human PDE11A4 shows pS117 in cytosol and in puncta. Consistent with the fact that phosphomimic mutations of 117 and 124 synergize functionally, pS117 is decreased in the phosphoresistant S124A mutant and is increased in the phosphomimic S124D mutation, and phosphorylation of S124 is similarly changed in response to the phosphoresistant/mimic status of S117. We find no consistent phosphorylation interactions between S162 and S117/S124; however, disrupting homodimerization decreases pS162. Importantly, we observe phosphorylation of 117, 124, and 162 in vivo in mouse hippocampus. These studies are the first to identify intramolecular signals that control the subcellular compartmentalization of PDE11A4, and may point to novel mechanisms by which we can therapeutically target this enzyme in a compartment-specific manner.

Caputo, Casey
Mentor(s): Mr. David DeWeil
Preparing to Become a Principled Business Leader through Professional and Civic Engagement

Casey Caputo, Global Supply Chain and Operations Management/Human Resources - Senior. Between working part time throughout college, interning every summer, and making a difference in organizations, I have made the most of my time at the University of South Carolina and feel strongly that my time as an undergraduate has well prepared me for my full time career. My academic aspirations for Global Supply Chain and Operations Management I have learned within the classroom and are supported by real world experience. I have developed professional competencies of process improvement, supply chain analysis, and lean six sigma methodologies, which directly correlate to my future as an Enterprise Applications Consultant with IBM. Beyond the classroom, I am actively involved on the executive board of Alpha Kappa Psi Professional Business Fraternity as Vice President of Recruitment where I am responsible for planning and facilitating the recruitment process as well as developing new members to reach full brotherhood. All of these experiences in my four years at Carolina have enabled me to become a principled business leader and I am thankful to tie them all in together by pursuing Graduation with Leadership Distinction with the Professional and Civic Engagement pathway.
Carey, Kevin  
Mentor(s): Mrs. Stuart Hunter  
Lessons Learned through Servant Leadership

Throughout my undergraduate career at the University of South Carolina I have acted in many capacities as a student leader. Of these experiences, my position as a Resident Mentor in the Housing Department has provided me the most opportunities for both personal and professional growth. Serving as a Resident Mentor has allowed me to gain a plethora of transferable skills while fostering the success of my peers in the Carolinian community. My experience in this role has taught me the importance of interpersonal skills and their role in creating a culture which values diversity and inclusion. As a result of my experiences, I have been able to identify and better understand both my values and beliefs. With this knowledge in hand, I will be able to enter the professional workforce as a balanced and dynamic leader.

Carey, Joshua  
Co-Presenter(s): Lauren Philbans, Jacob Shimek, Jacob Gottlieb  
Mentor(s): Dr. Sanjay Ahire  
Capstone Inventory Redesign Project

This project was done with the purpose of increasing patient satisfaction. To do this the problem was addressed by increasing nurse satisfaction by improving the inventory system.

Carlson, Molly  
Co-Presenter(s): Sydney Cowart, Alexis Michalos  
Mentor(s): Dr. Sara Schwebel  
Getting Technical with the Lone Woman and Last Indians Archive

In 1853 a group of otter hunters led by George Nidever sailed back to the California mainland with the Lone Woman of San Nicolas Island aboard their ship. The Nicoleña woman had lived on San Nicolas Island, located off the coast of California, alone for eighteen years following the relocation of her people to the California mainland in 1835. The Lone Woman lived for several weeks on the mainland before dying along with her story, as no one who spoke her language could be found. The fascination surrounding the Lone Woman and the minimal information about her true account has led to a mythicization of her story, trackable through the plethora of newspaper articles, magazine entries, archeological expeditions, and fictionalized versions of her life, the most famous of which today is Scott O’Dell’s Island of the Blue Dolphins (1960). The Lone Woman and Last Indians Digital Archive (http://calliope.cse.sc.edu/lonewoman/home) seeks to uncover the story behind the multitude of reports about this Nicoleña. First begun by USC professor Sara Schwebel, the Archive contains a wealth of information that explores the circulation of the Lone Woman’s story over a period of 150 years.

Digital archives enable information to be analyzed and adapted into interactive features, attracting a wide-range of viewers from researchers to schoolchildren interested in learning the real story behind Island of the Blue Dolphins. Through our work, we have tackled the technical component of the project, all within the realm of statistics, data visualization, and copyediting. Two of our group members were tasked with rendering the data beyond the displays already created for the site. Using the programming tools Tableau and Carto, they created visualizations and geovisualizations that meaningfully interpreted the data, revealing trends previously undetectable in the raw data. The third member of our team focused on copyediting the website according to style guides created for the archive based on the Chicago Manual of Style, 16th Edition. Using these guidelines, the citations for each source were standardized, and the various descriptions of important people, places, organizations, and ships were reviewed. Through this work we hope we have achieved our goal of rendering the data in a clear and comprehensive manner for accessibility by a wide audience.
Colorectal Cancer (CRC) is the third most frequent cancer and the second leading cause of cancer deaths in the United States (1). Initiation of CRC occurs through mutations in critical tumor suppressor or DNA repair genes, however its progression to malignancy depends on multiple interactions with non-neoplastic cells in the tumor microenvironment. These include immune cells, fibroblasts, endothelial cells and components of the extracellular matrix that secrete a diverse combination of cytokines, chemokines, and growth factors, that activate signaling pathways or introduce new mutations in cancer cells, promoting tumor growth, and metastasis (2,3). Interleukin 33 (IL-33) is a cytokine released by necrotic epithelial cells and acts as an innate warning signal, inducing the production of pro-inflammatory cytokines. (4). The levels of IL-33 have been linked to the growth and metastasis of CRC, with an increased expression in malignant tumors and precancerous polyps (4,5,6). The purpose of this study is to determine the role of IL-33 on tumor burden, the tumor microenvironment, and response to chemotherapy in mouse models of CRC. We hypothesize that IL-33 promotes tumor growth by remodeling the tumor microenvironment and recruiting pro-inflammatory cells. We used ApcMin/+ mice that are predisposed to developing adenomatous polyps due to the loss of the tumor suppressor adenomatous polyposis coli (Apc) gene. We crossed these mice to the IL-33/-/- mice to generate use ApcMin/+ mice lacking IL-33. We determined the effect of loss of IL-33 on tumor burden and response to systemic treatment with 5-fluorouracil (5-FU), a chemotherapeutic agent. The results showed that loss of IL-33 decreased tumor burden and prolonged tumor recurrence post therapy in treated mice. The data suggests that targeting the IL-33 signaling pathway alone or in combination with conventional chemotherapeutic agents may be a viable therapeutic strategy to enhance antitumor efficacy and extend tumor free survival.

Carroll, Erika
Mentor(s): Dr. Karen Patten
Riding the Cultural Adjustment Curve

This past spring semester, I studied for almost five months abroad at the Copenhagen Business School in Copenhagen, Denmark. Before traveling abroad, students are required to attend a Study Abroad Orientation presentation. Besides learning the countries laws and tips on how not to be the obnoxious American, the presenters also spoke about the Cultural Adjustment Curve that people typically experience while living abroad. The curve begins with experiencing a feeling of euphoria- everything is new and exciting. All I wanted to do was go out, explore my new city, and see all it had to offer. Then, there is a lull as you become frustrated with the little nuisances, which can lead to homesickness and this feeling of missing out. My Copenhagen nuisances were learning to shop and cook using a different language, while adjusting to the Danish culture. Then, I realized that I was 4,000 miles away from my support system and missing out on important political and social situations in my home state and in the nation. So I began calling home more and watching more Netflix in bed. However, through persistence, one gains a surface-level adjustment to the new country and its culture. In my adjustment curve, I experienced adjusting to the way of life, which is a critical part of living abroad - accepting the good and bad of both my home country of America and the Danish culture. I remembered what I was there to do - study, explore, and live. Even though I learned about the Cultural Adjustment Curve before I left, nothing could truly prepare me for living and learning in a completely different country and how it would help me grow as a person and a student.
Carroll, Sarah  
Mentor(s): Ms. Maegan Gudridge  
**International Adaptability**

In my presentation, I will describe how my experiences during my study abroad endeavors have affected my business education and activities at the University of South Carolina. During my time abroad, I have found connections between my global activities and some of my classes, internships, and leadership positions. My leadership experience has also included a position as the Vice President of Philanthropy for my sorority, in which I found global connections of acclimatization to carry on into the future.

The most important aspect I’ve learned from my global experiences is how many business studies can be applied in diverse, international settings; one simply needs to adapt to better fit the culture.

Without these experiences at and through the University of South Carolina, I do not believe I would have made this vital realization. I want to keep this insight with me as I continue onto the next part of my life and start a career. This awareness is important to me because it encompasses hands on and learning experiences that I am truly passionate about and can benefit anyone who is eager about international connections.

Carroll, Johnny  
Mentor(s): Dr. William Jackson  
**T-Bid expression in ptBidTNG(INS2)R to induce Apoptosis in a HIV infected Cell**

The Human Immunodeficiency Virus (HIV-1) is a retrovirus that affects CD4+ T-lymphocytes, which is the causative agent of the Acquired Immunodeficiency Syndrome (AIDS). We have created a HIV-based retrovirus to express pro-apoptotic genes as a way to kill HIV infected cells. This retrovirus, pLTNG(INS2)R, contains the HIV-1 Long Terminal Repeats (LTR), which function as the virus promote/enhancer to control transcription of viral genes. HIV-1 and pLTNG(INS2)R transcription is initiated in the 5’ LTR and begins with a 60 nucleotide RNA sequence called the Trans-Activing Response Element (TAR). TAR interacts with the virus transactivator of transcription (Tat) to upregulate transcription. Gene expression in pLTNG(INS2)R is also controlled by the HIV-1 Regulator of Viral Protein Expression (Rev), which acts to promote transport of viral mRNAs to the cytoplasm for translation. We hypothesize that pLTNG(INS2)R can be used to express the pro-apoptotic gene t-Bid, to induce cell death in cells that express HIV-1 Tat and Rev.

Carson, Anthony  
Mentor(s): Dr. John Grady  
**#ReadyForRio: How a Revised Rule 40 Impacted Athlete Sponsorship at the 2016 Rio Olympic Games**

The purpose of this research was to analyze Rule 40, a bylaw of the Olympic Charter that limits athlete sponsorship, and determine the effect of its revision for official sponsors and non-affiliated brands during the 2016 Olympic Games. While Rule 40 was amended to give athletes greater flexibility in their ability to be used in advertising, it also required event organizers to balance the official sponsor’s needs of exclusivity in their sponsorship agreements. Using observational data gathered on-site and online during the 2016 Olympics, unique insight was gained regarding the changing Olympic sponsorship landscape. The researchers found that Rule 40 allowed official sponsors to effectively activate on-site featuring Olympic athletes while many non-sponsor brands shifted to social media to promote their brands and the athletes they sponsor during the Games. In the future, the IOC will need to have a more detailed strategy for monitoring social media and providing metrics for online sponsorship value in order to encourage brands to become official partners of the Olympic Games.
Casl, Michelle
Mentor(s): Dr. Amber Fallucca
Increasing the Number of Furever Homes Through Fostering Dogs in the Midlands

Each year in Richland and Lexington Counties more than 15,000 dogs and cats enter two municipal shelters, with 7,700 being put to their death. Pawmetto Lifeline is a non-profit animal rescue that prevents dogs and cats from being euthanized, by placing them into foster homes. I first became a foster dog mom when the flood took place. My mom would not allow me to adopt a dog of my own just yet, so I took advantage of this opportunity to help rescue dogs in the Midlands. I had each foster for two weeks at my apartment and bathed, administered medication, brought them to be neutered or spayed, fed them, took them on walks, and most importantly loved them. From this experience I realized just how many pets are without a home and often killed in just the Columbia area. I learned the impact a foster parent can have on the animal. Many of the dogs I fostered had extreme anxiety, or needed medication everyday from an illness they picked up from in the shelter. I want others to become aware of how they can help in their local community by doing something they also love. I have enjoyed watching each dog transform in the two short weeks. Many of the skills that I used while fostering dogs will also apply when I am a licensed Physical Therapist, such as: compassion, dedication, being responsible, and seeking the interest of transformation. I hope my GLD presentation encourages others to become a foster parent!

Castleberry, Katherine
Mentor(s): Dr. Carole Oskeritzian, Dr. John Fuseler
Novel morphometrics establish mast cell-dependent angiogenesis in atopic dermatitis pathogenesis

Atopic dermatitis (AD) is a chronic skin inflammation with tissue remodeling and angiogenesis, the formation of new vasculature. Skin-resident mast cells (MC) are localized around blood vessels (BV), composed of endothelial cells (EC) and secrete many mediators when activated. Degranulation is the major process through which stimulated MC release intracytoplasmic granule-associated bioactive molecules, including proangiogenic vascular endothelial growth factor-A (VEGF). The pathogenic mechanisms of pre-symptomatic AD remain unknown. Using an established human AD-like mouse model, we observed early alterations of the hypodermis, the most vascularized skin layer, following a single exposure to antigen ovalbumin (OVA). I reasoned that perivascular MC activation may contribute to AD initiation through VEGF secretion, resulting in angiogenesis. Skin samples were collected from OVA-treated mice (and controls). Skin sections mounted on slides were exposed to anti-CD31 (EC receptor), anti-tryptase (MC-restricted protease) and anti-VEGF antibodies (Abs), and visualized with fluorescently-labeled Abs. Images were analyzed with MetaMorph® software. Morphometric descriptors were developed to quantify CD31+ BV, calculate MC coordinates, measure MC degranulation, and localize VEGF molecules within images. We discovered that a single OVA treatment significantly increased CD31 expression, indicative of angiogenesis. Mapping analysis indicated that 90% of MC were located within a 100-µm perimeter around BV. MC degranulation was increased in OVA-treated skins, compared to controls. Importantly, VEGF was only localized to MC and BV. Our results unraveled novel pathogenic events of pre-lesional AD and identified new targets to prevent AD development. Future investigations will focus on quantification of VEGF in MC relative to BV in preclinical AD.

Cauthen, Chandler
Mentor(s): Mrs. Laura Carnes
Examining ethics within marketing: Bridging unethical pasts to ethical and sustainable futures

Marketing to individuals should encompass more than “selling” of a product. As I have experienced life as college student at USC Lancaster, my understanding of ethical marketing behaviors has been shaped via my engagement on campus, in the workplace, and in the classroom. As I prepare to engage in a professional future within the marketing realm I now see the importance of enabling ethical marketing habits not just from a corporate standpoint, but from a humanistic standpoint. When the marketer is concerned with the betterment of both the company and individual all parties benefit, thus creating long term success for corporations and a better way of life for the individual.
Cecco, Madison  
**Mentor(s): Dr. Joe Jones**  
**Environmental Importance in Public Health**

Our environment, the world in which we live and work, is a mirror of our attitudes and expectations. For the past two summers, I had the opportunity to spend my time interning for the Environmental Protection Agency (EPA) in Washington, DC. My primary responsibility was to assist EPA’s research scientists with the development of Provisional Advisory Levels (PALs) for national emergencies. The PALs project is one of the most important projects undertaken by EPA’s National Homeland Security Research Center (NHSRC). The PALs are numeric toxicological standards that relate various doses of dangerous chemical agents that might result from terrorist attacks, industrial accidents, natural disasters, or other types of environmental disasters. My specific role was creating and populating the PALs database, creating risk communication documentation, and planning a pilot program. My internship has been influential on developing my collaboration and communication skills and I believe that being able to be a part of such an important public health program made my passion for public health blossom. I have always been passionate about environmental conservation, so when I started my coursework in Public Health, I was able to find a perfect combination of the environment and public health in my environmental health courses. These courses lead me to pursue my EPA internship opportunity and has inspired me to pursue environmental public health in my future.

Cederstrom, Collytte  
**Mentor(s): Dr. Adam Pazda, Dr. Elaine Clanton Harpine, Dr. William Harpine**  
**Analysis of Reading Interventions for a Group-Centered Prevention Program**

Preliminary testing was conducted on testing materials with a 56-hour group-centered training program to advance reading skills. We chose a case study clinical grouping of at-risk students ages 1st through 3rd grade. We wanted to establish the validity and reliability of testing materials (both skills and attitude) before launching a full scale study. Our hypothesis was supported, and we even achieved surprising positive results above what we predicted.

Cervino, Julianna  
**Mentor(s): Mrs. Elise Lewis**  
**Empowering, Analyzing and Collaborating**

During my time here as a student at the University of South Carolina, I have gained valuable insight and experiences through what I have learned in the classroom and outside of the classroom. I plan to graduate with Leadership Distinction in Professional and Civic Engagement. I have had leadership experiences, volunteer opportunities and internships that have enhanced and echoed the curriculum in my classes. As I reflect on my time at Carolina, I have learned ways to empower marginalized voices, how to analyze risks and find mitigation techniques, and how to collaborate and work on a team. These themes have guided me throughout my education and have provided a platform for my professional and civic engagement in the Columbia community. I have been able to incorporate what I learned in the class into my role as a University 101 Peer leader, my internship at Medline Industries, my role on USC Dance Marathon, my research under Dr. Kiaris, and my various volunteering experiences throughout Columbia. I plan to take this valuable insight and apply it to my future career path of becoming a physician. The manifestation of empowerment, risk management and teamwork will be crucial in my success as a doctor.
Chabot, Claire  
**Mentor(s): Dr. Doug Pittman**  
**Cellular Localization of the RAD51D Protein**

The protein encoded by the RAD51D gene is vital for the repair of DNA double strand breaks (DSBs) via the homologous recombination (HR) pathway. Cells that do not express RAD51D are hypersensitive to DNA damage, particularly DNA interstrand crosslinking (ICL) agents. Previous work in the Pittman laboratory identified a direct interaction between RAD51D and an E3 ubiquitin ligase, RNF138. RNF138 mediates ubiquitination of RAD51D, a modification that occurs at lysine residues. Lysine to arginine substitutions were introduced at twelve lysine residues along RAD51D, and these constructs were expressed in Rad51d-deficient mouse embryonic fibroblasts (MEFs) treated with the DNA ICL agent, mitomycin C (MMC). Substitution at two residues – K235 and K298 – increased cellular sensitivity to MMC and resulted in complete cell death. A potential mechanism for increased sensitivity is disruption of nuclear localization of the RAD51D protein. The goal of this project was to determine if substituting a lysine with an arginine at residue 235 or 298 will prevent nuclear localization of the RAD51D protein. Fusion proteins between RAD51D WT, K0, K235R, and K298R constructs and EGFP were generated and transiently expressed in Rad51d-deficient MEFs. Cellular localization of the fusion proteins was detected using a fluorescence microscope. The RAD51D-WT-EGFP and RAD51D-K298R-EGFP proteins were expressed throughout the cell, including the nucleus. These results demonstrate that increased cellular sensitivity to MMC of cells expressing the RAD51D-K298R construct is not the result of decreased nuclear localization of the protein. Ongoing experiments to confirm the localization of the RAD51D-K0-EGFP and RAD51D-K235R-EGFP proteins are in progress.

Chalfant, Carolyn  
**Mentor(s): Prof. Cathy Brookshire**  
**From Pen to Performance: Little Fishmaid**

Ever since high school, I’ve been involved in children’s theatre. Before beginning my creative project, which was directing and producing an original children’s play called Little Fishmaid, I had already begun to diversify my experiences in theatre from primarily acting to crewing, set design, costuming, lighting, and more. Little Fishmaid renewed my familiarity with these fields and also allowed me the experiences of directing, producing, and playwriting. With the production, I wanted to explore topics such as feminism and the environment, try my hand at creating a comedy that would be family-friendly, practice leadership skills that I had obtained thus far in my activities at USC, understand how the many pieces of theatre work together while experimenting with a low-to-no budget production, and generally gain experience in new areas of theatre. Despite budgetary challenges, I also wanted to do something I loved for a greater cause, and was able to give about $500 to the charitable organization Curing Kids Cancer by production’s end. As a prospective professional artist, I understand in much greater detail what is involved in developing a play from an idea to a show that audiences pay to see, and I believe I am better prepared to communicate and exist in a professional theatre environment. I am grateful for USC’s support in this critical component of my education.
Chalfant, Carolyn
Mentor(s): Mr. Alex Blauvelt, Ms. Theresa Harrison, Prof. David Britt
Getting Civically Engaged for Theatrical Reasons

As a theater major, my life is incredibly busy, especially any time I am in a show. Performing theatre majors currently in shows are in the theatre around 20-28 hours per week. Despite the time commitment, I genuinely love acting, and lately directing and writing too. But for much of my college career, I’ve usually put my shows aside, to learn some important skills in my extracurriculars. Being a very shy person coming into college, I wanted to get leadership experience and build my confidence in dealing with people. After a great experience with my Capstone Ambassadors my first semester, I became a Capstone Ambassador, and later Vice President of Social Affairs on the Capstone Programming Council. Pausing acting, I stage managed three shows. All of these experiences helped me to understand the technical ins and outs and the intrapersonal skills necessary to lead something. Later on, artistic talent not completely forgotten and managerial skills newly strengthened, I directed and produced my first original show, and had an amazing time. From April 7th-9th, I will be directing another show. Neither artistically fulfilling experience would have happened without my choosing Graduation with Leadership Distinction in Professional and Civic Engagement. In this presentation, I will briefly discuss some of my core experiences from Graduation with Leadership Distinction. Then you’ll see a scene from my most recent production, performed by two high school aged actors.

Chandler, Tiana
Mentor(s): Dr. C. Nathan Hancock
Development of an mPing-based Activation Tag for Zebrafish Mutagenesis

Transposable elements (TEs) are DNA sequences that move from one location in the genome to another. A transposable element used frequently for mutagenesis is the element known as mPing, first discovered in rice (Oryza sativa). In order for mPing to transpose from one area of the genome to another it must be provided the proteins ORF1 (Open Reading Frame 1) and Transposase (TPase). This element also preferentially inserts upstream or downstream of genes. This preference can be advantageous in regards to inducing mutations that affect gene expression. One technique of mutagenesis utilized is the use of activation tags, which is an insertional sequence that contains enhancer elements thereby inducing overexpression of nearby genes. To make mPing into an activation tag, we inserted the enhancer sequence from the Xenopus laevis Elongation Factor 1 promoter into a hyperactive version of mPing, mmPing20, creating mmPing20X. A yeast transposition assay showed that mmPing20X transposes at rates similar to mPing. mmPing20X was then inserted into the reporter gene mCherry to function as a visual marker for transposition. Along with the mCherry:mmPing20X reporter, a separate construct containing an ORF1 ONE and TPase genes fused together using a T2A peptide was made. To test these constructs in vivo, they will be injected into zebrafish (Danio rerio) an excellent model organism for vertebrate biology. Fish displaying mCherry expression will indicate that transposition of mmPing20X is occurring.
Chapman, Kristina  
Co-Presenter(s): Megan Wilkey, Addie Goins  
Mentor(s): Dr. Alan Waldman  

Impact of Sequence Divergence on Recombinational DNA Double-Strand Break Repair in Mammalian Cells

We investigated the impact of sequence divergence on DNA double-strand break repair occurring via homologous recombination (HR) in cultured thymidine kinase deficient mouse fibroblasts. We designed and stably transfected cells with a DNA construct harboring a herpes tk gene (the “recipient”) that was rendered nonfunctional by insertion of an oligonucleotide containing the recognition site for endonuclease I-SceI. The construct also contained a closely linked truncated “donor” tk sequence. The donor could potentially restore function to the recipient gene via HR provoked by induction of a double-strand break (DSB) at the I-SceI site in the recipient. HR events were recoverable by selection for tk-positive clones. The donor sequence contained 33 mismatches relative to the recipient. The mismatches were clustered, forming a localized segment of DNA sequence displaying 20% divergence relative to the recipient. The mismatched segment was surrounded by regions of high homology. Our construct was engineered so that when the donor was aligned with the recipient, the DSB site in the recipient was aligned opposite the mismatched segment. This design enabled us to potentially capture HR repair events initiating between diverged sequences. Previous work demonstrated that mammalian cells fastidiously avoid HR between mismatched sequences. In the current work, we asked the following question: can flanking regions of high homology enable genetic exchange between highly diverged sequences, or is the rejection of exchange between diverged sequences predominant and not overcome by nearby homologous interactions. Our work contributes to a greater understanding of the mechanisms that maintain genome stability.

Chapman, Brianna  
Mentor(s): Dr. Sarah Miller  

Seeing Student Government through a New Filter

During my time at the University of South Carolina Salkehatchie, I have become involved with the Student Government Association (SGA), and have learned what an impact it can make on student life at a small campus. Through my coursework in Public Communication and Rhetoric and Composition, I have gained the ability to speak confidently and professionally, as well as how to tailor my presentations toward my specific audience. This has helped me be able to promote SGA to make more students want to be involved with events and happenings on campus. I have also used the knowledge from my classes to feel confident presenting about SGA at new student orientations and other events on campus. As SGA president for the 2016-2017 school year, I have worked to get more students involved with our activities on campus as well as our meetings and other events such as trips to USC sporting events and other education activities. I have also spent time bring SGA into the 21st century with social media! As a result of this effort, students are now able to follow SGA on Facebook, Instagram, and Snapchat. This has helped students be able to see what is going on around campus. As a result of my coursework at USC Salkehatchie and being president of SGA, I feel more confident in my leadership skills, as well as acting professionally in settings where I am called to lead.
Chase, Holly  
Mentor(s): Dr. Jay Patel  
Effect of Arch Height Index with ACL Reconstruction Patients

The medial longitudinal arch (MLA) is the primary arch of focus when fitting shoes in athletic populations. A collapsed MLA will induce pronation of the foot and increase load transfer through kinetic chain to the knee causing internal rotation and knee-flexion, and increased risk of ACL tear. To determine the relationship of arch height index (AHI) in patients who have experienced an ACL tear. Thirty-eight male and female patients (23.8 ± 5.2 yrs., 175.99 ± 8.46 cm., 76.47 ± 15.46 kg.) volunteered and were categorized as Controls (uninjured) or ACL (prior ACL tear). Participants completed the following 6 total bilateral measurements: Foot length, truncated foot length and arch height, all weight-bearing. AHI was calculated using the previously stated measurements. Differences between groups were assessed by paired samples t-test and descriptive statistics assessed the relationship between variables. There was a significant difference in the AHI in the control and ACL groups (.386±.044 vs. .369±.048, p=.01). Interestingly, 57.9% of patients who suffered an ACL tear were males and 57.9% suffered from a non-contact injury. The findings demonstrate a relationship between arch height and ACL tear, indicating that certain foot architecture may increase risk of ACL tear.

Chen, Anna  
Mentor(s): Dr. Linda Shimizu, Ms. Baillie DeHaven  
The effects of halogen bonding on urea-urea hydrogen bonding interactions

The interactions of molecules through non-covalent forces such as hydrogen bonding and ionic interactions are essential for assembling the building block of the universe and give rise to the helical structure of DNA as well as the large three-dimensional structures of proteins (1). In recent years, scientists have been exploring how these interactions impact the overall properties of materials using co-crystallization. Co-crystallization affords scientist the ability to alter physical properties of active ingredients, such as solubility and melting point, by taking advantage of the non-covalent interactions already present (2). One type of these interactions is halogen bonding. While similar to hydrogen bonding, halogen bonding is a unique concept that has been proven to occur between a halogen and a nucleophilic region of another molecule, most preferably at a one hundred and eighty-degree angle (3). The purpose of this project is to explore the effects of halogen bonding on predictable urea-urea self-assembly by attempting to co-crystallize urea-based building blocks covalently attached to halogen bond acceptors with activated halogen bonding co-formers. The urea-halide co-crystals were first synthesized by slow evaporation and/or vapor diffusion technique, which were then characterized using x-ray diffraction (XRD). The structural properties were then analyzed using techniques such as infrared spectroscopy (IR), melting point, and simple electrostatic computations. This property analysis allows us to make inferences about the predictability of intermolecular interactions between the two components of the co-crystal.


Chen, Shujie  
Mentor(s): Prof. Jiajia Zhang, Prof. Xuemei Sui  
Validation of non-exercise estimated cardiorespiratory fitness: The NHANES Study

Introduction: Cardiorespiratory fitness (CRF) is an independent health predictor of circulatory and respiratory systems and can be measured using non-exercise fitness assessment equations. However, the accuracy of such equations is unknown. The objective of this study was to validate the CRF equations, developed by Jurca et al (2005) and by Jackson et al (2012), among a United States representative population.

Methods: The study included 2607 participants from the NHANES (1999 to 2004), aged 18 to 86 years (1403 men, 1204 women) whose maximal oxygen consumption (VO2 max) was available. There are seven non-exercise algorithm estimated CRFs. The relationships between CRFs-predicted and laboratory-measured VO2 max values were analyzed.

Results: The results of this investigation indicated that all of the equations resulted in significant (<0.0001). The correlation coefficients for the equations were similar to the validation values reported by Jackson (1990). They reported the following: Jurca (0.56 and 0.61), Jackson (2012) %fat (0.70 and 0.72) and Jackson BMI (0.66 and 0.66).

Conclusion: Overall, the present results support the validity of the equations for predicting cardiorespiratory fitness. The Jackson %fat model was a better predictor than the Jackson BMI model. Therefore, the Jackson %fat equations provide an alternative method in situations where exercise testing is not available.

Chisholm, Renada  
Mentor(s): Mr. Drew Newton  
Cultivating my Leadership Experience Platforms

During my time at Carolina, I have accomplished and overcome so much that I am proud of. Without these profound experiences, I would not be the transformational and civic-minded leader that I am today. Over the past four years, I’ve gotten the chance to interact with numerous types of people in many different settings which was such a gratifying experience. The leadership positions that shaped my success and diversity of thought has played a major part in promoting my academic success, cultivating personal growth, developing lasting friendships and fostering leadership. As a journalism student at the university, I have use my internship experiences to connect the dots between the real-world industry and classroom concepts. I have had the opportunity to write contributions and proclamations for the mayor of the City of Columbia and his constituents. Engulfing myself in my internships has infused my passion for journalism and the public relations discipline.

My most significant contribution to the University of South Carolina has been my commitment to improving and impacting the lives of first-year students and breaking down social stigmatisms. Becoming a University 101 Peer leader, a resident mentor along with a litany of other leadership platforms, it has greatly enhanced my collegiate experience and allowed me to hone in on my leadership skills, grow socially and professionally and become a more well-rounded individual. Through the service of giving back to my university, I have learned to think critically and to solve complex problems, immerse myself in diverse efforts and communicate effectively. My presentation will discuss the three key insights that I have learned and cultivated my ability to be a leader in so many ways.
Ciarlone, Max
Co-Presenter(s): Liliann Pineda, Justin DuRant, John David Rhinehart
Mentor(s): Mrs. Hayley Efland, Ms. Laura Galloway
Green Office Certification

The Green Office Certification team continues to expand our process and better promote sustainability on campus. Our mission is to educate and certify offices all over campus to become more sustainable. In the past, we have simplified the process so that any office can become certified. We have created two training manual presentations and have hosted Lunch and Learns in order to inform offices across campus about our certification process. This year's primary focus has been ensuring that offices maintain their sustainable practices after certification through an auditing system. In addition, we are designing more resources to best assist offices through the process and are incorporating more aspects from the 3 Pillars of Sustainability. Most prominently, we are designing a Human Health Benefits document to explain the positive social (human) consequences from certification. This goes along with the other two pillars of Economic and Environmental. Through Discover- USC, we want to reach more people to explain the impact we are having on campus.

Claffy, Haley
Mentor(s): Mr. Ryan Lloyd
I Am Globalization: The Importance of Global Learning

In the spring of 2016, I studied abroad through AIFS at Richmond University in Rome, Italy. I balanced my time between traveling, taking courses on Italian and globalization, and interning at the Joel Nafuma Refugee Center in the heart of the city. I experienced three converging, yet very different cultures within European society: life as a tourist, life as a local, and life as a refugee. Being able to live, study, and work within Rome while also traveling to other nations exposed me to a variety of people who lived and thought very differently than I did, sometimes drastically so. Since returning to the University of South Carolina, I have actively worked to integrate the lessons gleaned from my time abroad into my classes, work, and everyday life. I hope to encourage others to realize that we cannot restrict ourselves by trying to avoid the process of globalization in our society, or by thinking only in terms of absolutes. Instead, we must embrace change, and open ourselves up to global understanding and communication if we wish to succeed in the world as individuals, communities, and nations.

Clark, Jamie
Mentor(s): Ms. Larisa Avens, Ms. Jen Bess
Characterizing hawksbill sea turtle (Eretmochelys imbricata) size-at-age relationships and growth dynamics using skeletochronology

Sea turtle age and growth is difficult to characterize, since they have slow growth and high variability. However, it is crucial to study age to maturation and individual growth dynamics of hawksbill populations because of the need to conserve this endangered species in different regions. Skeletochronological analyses provide a detailed record of skeletal growth marks found in long bone cross sections that are used to estimate age and growth rates in many marine turtle species. To obtain age and growth data for hawksbill sea turtles in the western North Atlantic, humerus bones and carapace length measurements were obtained from 87 wild hawksbill turtles found stranded and dead on beaches along the Atlantic and Gulf of Mexico coasts of the US. Juvenile hawksbills were found to have higher growth rates and variability among individuals than adult turtles. Growth rates for this sample population were comparable to those of similarly-sized turtles from the east coast of Florida reported by Wood et al. for size classes 40-50, 50-60, and 60-70 cm SCL, as well as those from Puerto Rico and the Virgin Islands. However, growth rates yielded by this study were found to be lower than those from the British Virgin Islands and the Bahamas, but higher than samples from the Barbados and the Cayman Islands. As several nesting populations contribute juveniles in different proportions to these foraging areas, it is possible that genetic differences could potentially be the cause for the differing growth rates among sample populations within the Caribbean. The growth rates for the study population were also found to be higher than for Pacific populations in Hawaii and the Australia. The relationship between size and age was also characterized and age at maturation was estimated using minimum and mean maturation size ranges from the literature. Because the available sample contained few humeri from turtles of adult size, it was not possible to estimate ages associated with mean size of nesting females for the population. However, results indicate that mean ages to maturation at minimum female nesting sizes for this population (i.e., 67.0 to 71.8 cm SCL) range from 14 to 17 years of age.
Clark, Matthew  
Mentor(s): Dr. Anselm Omoike  
**pH quantification capability of solution-phase and immobilized tetrakis(4-carboxyphenyl)porphyrin**

Due to acid error, traditional glass electrode pH probe methods of quantifying pH in acidic medium (e.g. acid mine waste) provide inconsistent and inaccurate results. Porphyrins can provide an answer to this problem, as they are sensitive to changes in pH, ionic strength, and cannot be fouled in metal ion-rich medium at highly acidic pH. In this study, 0.02 mM tetrakis (4-carboxyphenyl) porphyrin (TCPP) solution was exposed to different ionic strength (1, 10, 100 mM of sodium chloride) and pH (0.92, 1.83, 2.84, 4.39, and 6.18) solutions, then characterized by UV-Vis and fluorescence spectroscopy. The pH-sensing behavior of TCPP for acid solutions was studied. A consistent hypsochromic shift in the Q-band of the porphyrin in both UV-Vis and fluorescence spectra indicated increasing tendency for J-aggregation via chloride ions. The Q-band shift was utilized for further pH quantification studies. The most sensitive band shift occurred between pH 1-2 for both spectroscopic methods. Utilizing fluorescence spectroscopy, a standard calibration curve was constructed between pH 1-2 at 10 mM ionic strength to determine the linear relationship between pH and hypsochromic shift in the wavelength of maximum absorption and a r² of 0.9936 (n = 4) was obtained. Though the solution-phase porphyrin provided viable as a pH sensor from pH 1-2, its lack of reusability is a major limitation. To ensure sensor reusability, two methods were used to immobilize the porphyrin on a (3-aminopropyl)triethoxysilane functionalized glass slide, through formation of amide bonds catalyzed by crosslinking agents, and through metal ion chelation by Cu²⁺. Fluorescence spectroscopy, ATR FT-IR spectrometry, and x-ray photoelectron spectroscopy (XPS) were utilized to characterize the slides and tested as a pH sensor.

Clark, Jamie  
Mentor(s): Dr. Daniel Speiser  
**Regeneration of the Eye of the Florida Fighting Conch (Strombus alatus)**

Conch (Family Strombidae) are marine gastropods notable for having prominent camera-type eyes at the ends of flexible eye-stalks. The eyes of conch are enclosed in a capsule within the eye stalk epithelium that measures about 1 mm in diameter. The eyes of conch are sophisticated eyes for a gastropod, including features such as a light-focusing lens, densely-packed photoreceptors, and innervation by an optic nerve at the bottom of the capsule that runs to the central nervous system. An interesting characteristic of conch eyes is the ability to regenerate: if an eye was removed, i.e. by a predator, it can regenerate to its original size. Regardless of conch eye complexity, the visual performance these camera-type eyes exhibit and how visual performance recovers as eyes regenerate after amputation is not well detailed. For future studies to learn more about the restoration of visual performance, the regeneration process of the eye of the Florida fighting conch, Strombus alatus, was documented under laboratory conditions. Eight Florida fighting conch were anesthetized before the anterior part of the eye stalk just above the sensory appendage was amputated and the eye capsules were dissected out. The regeneration process was documented by photographing the conch every week and measuring eye capsule diameter (mm). The presence of an eye spot occurred 2 weeks post-amputation and the eye capsule was mostly regenerated within 6 weeks post-amputation. The average eye capsule growth rate over 8 weeks post-amputation was 0.013 mm/week. Eye capsule growth rates were greatest between 3-6 weeks post-amputation but began to decrease once the diameter reached 0.51 mm during the 6th week. At 8 weeks post-amputation, the eye capsule was only about 75% regenerated compared to the full grown eye capsule diameter. The time scale for conch eye regeneration is important for when the conch can regain the ability to perceive their visual environment following the loss of an eye. The ability to determine the difference between objects and shadows (spatial vision) is greatly affected by the loss of an eye. The restoration of this particular ability during the regeneration process will be further investigated in upcoming studies.
Clayton, Colleen  
Mentor(s): Ms. Maegan Gudridge  
**Interning is the New Learning**

While attending the University of South Carolina, I have had the opportunity to complete two internships. My beyond-the-classroom experiences at Textron Specialized Vehicles and WishboxUSA have thoroughly enhanced my educational experience. I have been able to connect theories and concepts I learned within the classroom to experiences I’ve had in my internships. The combination of the two has strengthened my understanding in some areas and has led to new discoveries in others. These experiences have transformed me from a confused freshman, with no idea what she wanted to do, to a confident [almost] graduate ready to start a career in Sales and Marketing. Balancing school, internships, and Graduating with Leadership Distinction in Professional and Civic Engagement came with its challenges, but the preparedness I feel for the future is worth every single one of them.

Clemmer, Dillon  
Mentor(s): Dr. Amber Fallucca  
**Applying the Overall Material Balance to Carolina Productions and in Life**

Early in the chemical engineering curriculum, I was introduced to the overall material balance, which is used to analyze chemical processes. In order to perform a balance on a chemical process, one has to consider the inputs, outputs, and what is being produced or consumed. It was not until I served as the Vice President of Internal Affairs for Carolina Productions that I realized the material balance could be applied to non-chemical processes. As Vice President of Internal Affairs, I was responsible for creating and balancing the budget, the recruitment and retention of student members, as well as tracking the progression of the coordinators. By analyzing the ins and outs of the organization in an effort to advance the organization in a positive direction, I realized that an organization is no different than a chemical process. I learned the importance of finding the appropriate balance between running a business organization and leading a social organization is essential for running a successful organization that students want to join. I look forward to building on this realization about the overall material balance as I try to balance the load of Medical School and the many other processes in my life.

Coleman, Kevin  
Mentor(s): Dr. Kate Flory  
**The Effects of Gender, Age, Race, and Parents’ Levels of Education on the Relationship between Academic Self-Efficacy and Anxiety Symptoms in Adolescents**

In recent psychological research focused on students in American public schools, a great number of studies have examined the Academic Self-Efficacy (ASE) of students, as well as the frequency of students exhibiting symptoms of anxiety. However, the relationship between the ASE and anxiety symptoms of students has scarcely been studied. While the relationship between ASE and test anxiety has been studied extensively, general anxiety symptoms have rarely been studied in their relation to ASE. This study aims to seek whether or not a relationship exists between these two variables, and if so understand the nature of the relationship between ASE and anxiety symptoms in adolescent students. Also, this study aims to find any potential effects that certain factors including gender, age, race, and the student’s parents’ levels of education may have on this relationship. All data was collected as part of the Project to Learn About Youth-I study, whose principal investigator was Kate Flory, PhD., USC. The study consisted of 119 participating students, ages 12-18. Data concerning ASE was measured using the Satisfaction and Self-Efficacy Scales, and data concerning symptoms of anxiety was collected using the RCADS survey. All demographic information was collected through self-report surveys completed by the student and one of their caregivers.
Stimulating canonical WNT signaling in pituitary progenitors inhibits differentiation of hormone cell types

The mouse pituitary secretes hormones that regulate many physiological processes including growth, stress response, and reproduction. The canonical WNT signaling pathway, which results in nuclear accumulation of β-catenin and transcription of target genes, is crucial for proper development of the pituitary gland. Pituitary progenitors that lack β-catenin at embryonic day of development 8.5 (e8.5) cannot form three of the six cell types of the anterior pituitary that produce growth hormone (GH), thyroid stimulating hormone (TSH), and prolactin (PRL). Additionally, stimulating canonical WNT signaling through creation of degradation-resistant β-catenin at e9.5 causes pituitary tumors and results in a reduction in the number of GH and TSH secreting cells. However, if canonical WNT signaling is stimulated in differentiating pituitary cells at e14.5, there is no loss of hormone cell types or tumor formation, demonstrating that the timing of the signaling is critical. Based on these results we chose to stimulate canonical WNT signaling at e11.5 to determine if stimulating this signaling pathway at an intermediate time point would result in tumor formation. We found that stimulating canonical WNT signaling at e11.5 resulted in epithelial-like structures in the pituitary suggestive of tumor formation and a complete loss of hormone cell types, a more severe outcome compared to stimulating canonical WNT signaling at e9.5. These results demonstrate that proper regulation and timing of canonical WNT signaling during pituitary cell specification is critical for proper differentiation of pituitary progenitors into hormone cell types.

Effects of diabetes on working memory

According to the CDC, diabetes has become the seventh leading cause of death in the United States. It is widely known that diabetes has many negative physical effects on the body, including vision loss and peripheral neuropathy. Cognitive effects of diabetes, however, are less clear, and to date have focused on older adults already diagnosed with the disease. The goal of this study is to determine whether risk factors that are known to cause vascular disease, such as high blood pressure and obesity, can predict cognitive performance in young adults. Specifically, we looked at working memory capacity, which reflects the ability to hold and manipulate information in one’s head for a brief amount of time. We tested working memory using an n-back task, which requires participants to identify a stimulus that matches what was presented n terms back. Accuracy rates from the n-back task were subsequently compared with blood glucose levels, BMI and blood pressure to observe which had the greatest effect on performance. These results can provide beneficial information and emphasize the need for a healthy lifestyle.

The Gullah Project: Recording the Land, Water, and People of St. Helena

Professor Denise McGill's long-term project is to create an hour-long documentary for a national PBS audience about the land, water, and Gullah people of St. Helena Island, South Carolina. Over the past several months I have assisted in recording video and audio on location, I’ve helped edit the film here on campus, and I’ve been responsible for promoting the film on social media. During this process I have contributed to the creation of a feature length film and learned how to communicate efficiently and visually with a multitude of audiences near and far. I have even travelled to St. Helena as a member of a production crew and met several people passionate about their Gullah heritage. We are eager to release this film that delves into generations worth of Gullah culture because the Gullah people are critical to American history. As the descendants of plantation slaves, they tell a remarkable story of survival, and through the use of multimedia storytelling those stories can be shared across America.
Conklin, Ashley  
Co-Presenter(s): Matthew Haslinger, Collytte Cederstrom, Sara P. Puckett  
Mentor(s): Dr. Elaine Clanton Harpine  
Helping Students for the Years to Come

The program is designed to help elementary-school age children learn to better read and write through the use of tutors and interesting activities.

Conner, Allie  
Mentor(s): Dr. Johannes Stratmann  
Does sensitivity to FACs result in higher resistance against herbivory?

Nicotiana sylvestris, N. knightiana, N. tabacum and N. benthamiana are members of the tobacco family, two of which have displayed sensitivity to fatty acid-amino acid conjugates (FAC’s) present in the salivary secretions of herbivorous insects, including the tobacco hornworm, Manduca sexta. We have determined through mitogen-activated protein kinase (MAPK) assays that N. benthamiana and N. tabacum, but not N. sylvestris and N. knightiana, have MAPK activity when exposed to FAC’s and we will test the hypothesis that FAC- sensitive species are better defended against herbivory. M. sexta larvae on N. benthamiana and N. tabacum are expected to be smaller with a higher rate of mortality due to the plants’ ability to detect FAC’s as danger signals and then produce anti-digestive proteins that inhibit growth. Inversely, we expect M. sexta larvae on N. sylvestris and N. knightiana to grow faster and have a lower rate of mortality as they lack sensitivity to FACs and thus a means to induce a defense response.

Cooney, Caroline  
Mentor(s): Mr. David DeWeil  
Discovering My Passion: An International Career

From the moment I stepped foot on the USC campus, I have been challenged. Challenged to think outside of the box, explore new opportunities and most importantly, lay the foundation for my future career. As a public relations major and a French language minor, I have had the unique experience of learning the importance of communication in not one, but two languages. A semester long study abroad experience in Paris, France taught me how to navigate cultures completely different from my own while simultaneously requiring me to use the concepts I learned from in-the-classroom discussions at USC. A professional internship with EuroKera, an international glass-ceramic company, taught me the importance of overcoming cultural barriers and balancing internal communications worldwide. As a team leader for CreateAthon@USC, I learned the value of creative leadership in the communications field as well as how to be an effective leader. It is because of all of these incredible experiences that I have discovered my future career: international public relations. I hope to use my experiences at USC, time abroad and in the workplace to teach others about the value of cross-culture communication. I believe that I have a unique perspective and understanding which will aid me in navigating the complex field of international public relations and the world around me.

Cooper, Courtney  
Mentor(s): Ms. Hayley Efland  
An Investigation of Sustainability in Costa Rica

The purpose of this project is twofold: to explore sustainability in Costa Rica and to promote study abroad for STEM majors. As a Public Health undergrad pursuing a Bachelor of Science degree, I had the unique opportunity to study abroad in Costa Rica last semester. While there, I was able to use my experience as an intern at Sustainable Carolina to look at the country through the lens of sustainability. This project is a compilation of studies done surrounding sustainability in Costa Rica, my own experiences with sustainability there, and conclusions about the applicability of Costa Rican sustainable practices to areas in the United States.
Corrigan, Mallory  
Mentor(s): Mrs. Ashley Schryer  
Community Service through the Make-A-Wish Foundation

As an avid philanthropist, I was chosen to be philanthropy chair for my sorority for the 2015 year. Through this experience, I planned two events that raised funds and awareness for the Make-A-Wish Foundation. For the events, I organized the overarching plans as well as led a team of seven women. Through my work with these events, I have fallen in love with the work the Make-A-Wish Foundation does and the value that it gives to children in need. I headed the cabinet for these philanthropy events as a way to give back to an organization that provides the medicinal benefits of allowing a child to just be a child. The experience of leading a team taught me the importance of finding a place for everyone and giving a voice to those in need. I have been able to see how one can take service in different ways. From this experience I have learned how I want to continue to serve in the future, including creating a blog to help individuals in various communities find service opportunities to fit their lifestyles. I have learned the value of service to one’s personal well-being and how giving back to the community can make an individual feel a renewed sense of gratitude and fulfillment.

Cowan, Hanson  
Mentor(s): Mr. Luis Sierra  
Community Service Ambassador at Good Samaritan Clinic

During the 2016-2017 academic year, I served as a Community Service Ambassador for the Leadership and Service Center at the University of South Carolina. For this program, I was partnered with the Good Samaritan Clinic. The Good Samaritan Clinic is a free medical clinic that serves the Latino population surrounding Columbia. The Good Samaritan Clinic provides a general, gynecology, obstetrics and dental clinic. At the clinic, I performed a variety of everyday tasks such as triaging patients, helping to incorporate an electronic medical record system and keeping the clinic running efficiently. Additionally, I am working on creating a program to provide immunizations for patients. While volunteering at the clinic, I have learned the details of operating a free medical clinic, such as recruiting medical professionals, creating contracts with the surrounding healthcare system and ensuring healthcare is provided to as many people as possible. Additionally, I have been exposed to the challenges the undocumented Latino population faces when trying to access healthcare in the United States. This presentation will discuss the barriers that the Latino population faces when trying access healthcare and how healthcare providers can better understand Latino culture and thus provide better healthcare for the growing Latino population in South Carolina and across the United States.
Mutations in the exocytosis regulatory gene RAB3GAP1 are associated with Warburg Micro Syndrome (WARBM), a rare disorder that causes severe intellectual disability and postnatal microcephaly, or failure of the brain to grow after birth. Alterations in the autophagy pathway are related to developmental processes and neurological disorders, making it of interest in the study of Warburg Micro Syndrome. Autophagy is the process of degrading abnormal cellular components through the formation of autophagosomes. RAB3GAP1 has been found to play a role in autophagy in human primary fibroblasts, due to its role in vesicular transport. Defects in autophagy have been linked to failures in axonal growth; therefore, it is possible that postnatal microcephaly in WARBM patients arises from altered neuronal morphology that is caused by impaired autophagy mechanisms. The overall objective of this project is to understand the function of RAB3GAP1 in neuronal development by investigating its role in autophagy in human neurons. In order to accomplish this goal, embryonic stem cells were differentiated into neurons through the use of neuronal induction media. Differentiation to neuronal fate was confirmed via immunostaining for neuronal markers. Neurons have low levels of basal autophagy; therefore, autophagy was induced through treatment with rapamycin, a known inhibitor of mTOR. A variety of markers for autophagy were tested in these cells and their expression under autophagic conditions was confirmed, indicating that rapamycin is necessary and sufficient to induce autophagy in differentiated neurons. To study the role of RAB3GAP1 in autophagy in neurons, we conducted colocalization experiments to compare the localization of RAB3GAP1 in human neurons to that of different autophagy markers including LC3B, ATG12, ATG5, and ATG16L1. Future studies will investigate changes in the localization of autophagy markers when RAB3GAP1 is knocked down in neurons. This project provides essential information for uncovering on a potential mechanism of postnatal microcephaly in Warburg Micro Syndrome.

Marissa Crum GLD: Professional and Civic Engagement

GlobeMed is a network of chapters across 55 campuses that seeks to improve health equity through one-on-one partnership between University chapters and Non-Governmental Organizations abroad. I joined GlobeMed my freshman year, with an interest in healthcare. Within GlobeMed, as Global Health U Coordinator my sophomore year and as President my senior year, I’ve gained transferable skills that can be applied to my future professional pursuits. The summer after my junior year, I visited the partner organization, Alternative for Rural Movement in rural Orissa, India to build partnership with staff and develop a framework for the support provided this year. The partnership allowed me to learn about the inner workings of an NGO and to better understanding of the causes and solutions to poverty in the surrounding villages. Through my experiences on campus and in India, I’ve gained a global knowledge of the issues surrounding public health, insight into how I can be an advocate for a specific population, and immersion in a foreign culture. My experience with rural populations in India will provide a unique contrast as I begin my career in the American healthcare system, and the lessons learned about advocacy and leadership through my involvement with this organization will propel me forward in my future pursuits.

A path to surgery

As students with an interest in medicine and surgery, we have decided to take the course SCHC 392 (Perioperative Environment: Basic Survival Skills). Through a course assignment, we had the opportunity to interview a surgeon in our area of interest, GYN-oncology. The course has familiarized us with the operating room. Additionally, the course offered the opportunities to scrub, gown, and glove in a surgical environment, as well as the opportunity to learn basic surgical suturing. Shadowing the surgeon, we learned about the disease process of cervical and ovarian cancer and we learned about the surgical interventions to treat them. We also learned that this field is unique among oncology specialties because the physician both prescribes his patient’s chemotherapy and performs surgery. These opportunities have reinforced our support for this path.
Culler, Ashley  
**Mentor(s): Ms. Theresa Harrison**  
**Health is Multifaceted: Promoting a Spiritual Perspective of Health among College Students**

While at the University of South Carolina, I have had the privilege to disciple women on Summer Leadership Project (SLP) via Campus Outreach, a non-denominational Christian organization whose aim is to “glorify God by building laborers on the campus for the lost world”. I applied to be a discipleship group leader on SLP because I wanted to grow in my walk with God, and discover what it means to live a life of servanthood. My role as a leader on SLP was to serve my disciples and walk deeply with God through bible study, prayer, stewardship, and evangelism. After leading women in discipleship for two months, I found spirituality and exercise to be inextricably linked in the balance of health. As an Exercise Science major, I have seen that collegiate culture has elevated body image to the level of idolization, often resulting in depression, eating disorders, or overall dissatisfaction among college students. However, I am convinced that promoting health through a spiritual lens will eliminate the negative perspectives of health among college students. SLP changed my perspective on health by showing me that spiritual health is the root of endurance in each aspect of health. Health is so much more than just exercise, but is a cultivation of individual and communal efforts of spirituality, mentality, nutrition, and exercise. This holistic perspective of health is the foundation for my future as a Physical Therapist.

Cunningham, Sheri  
**Mentor(s): Mrs. Ashley Schryer**  
**Effective Communication in a Global World**

During the Spring Semester of my junior year I studied abroad at the Universidad Torcuato di Tella in Buenos Aires, Argentina. I had previously studied Spanish throughout high school as well as college. Studying abroad gave me the opportunity to improve upon my Spanish language skills. As an International Business major my abroad experience allowed me to gain experience while living and working with various cultures and people. While studying in Buenos Aires I was able to take courses in Spanish on international issues and courses related to the economic trends of Argentina. These courses, and my overall time abroad, gave me a new perspective on different economic trends as well as various ways to communicate across cultures and backgrounds. I also was given the opportunity to travel to other South American countries including Chile, Uruguay, and Brazil which enhanced my abroad learning experience. This overall experience was even more important to me because as a twenty year old college student I had never travelled outside of the US. Therefore, the experiences which make up my time abroad gave me the opportunity to see parts of the world that I had never seen before while experiencing cultures that differed from my own I was also able to apply the principles that I learned throughout my college career to different cultural contexts and environments.

Curl, Melissa  
**Mentor(s): Mr. David DeWeil**  
**Two Heads Are Better Than One**

The Capstone Scholars Program promotes active engagement both inside and outside the classroom in an effort to get students involved and to create well-rounded individuals. This two-year educational enrichment program encourages personal growth through leadership, service, social, and academic events that provide opportunities for engaged learning and interaction with faculty and peers. After graduating from this program and becoming a Capstone Scholars Fellow, I knew I wanted to stay close to the program, so I joined the first ever Capstone Scholars Programming Council. As the Vice President of Academic Affairs, I coordinated with other academic offices on campus to provide scholars with exclusive, personalized experiences. It was through this experience that I gained insight into the value of building relationships and working together to create something much bigger than myself. As a team, we had to learn how to communicate effectively, manage our time, and prepare for the unexpected. As a team, we had to figure out how to become one functional, efficient unit so that we could leave our legacy and truly impact the lives of the scholars we set out to help. The skills I developed as a member of the Programming Council will carry forth as I continue my education and begin my career.
Curlee, Wade  
Mentor(s): Dr. Bihter Padak  
Synthesis Techniques for CLC and CLOU Catalysts

Currently, fossil fuels are the most cost-effective way to generate electricity. However, the inherent release of carbon dioxide following their combustion has many long-term negative effects on the environment. One of the ways to combat this is by CO2 sequestration, but the high energy costs of separating CO2 from the flue gas typically makes sequestration not cost-effective. Recently, two new methods for combustion have been introduced, Chemical Looping Combustion (CLC) and Chemical Looping with Oxygen Uncoupling (CLOU), which allow for inherent separation of CO2 from flue gas without any additional energy cost. This is possible because in each of these methods, oxygen carriers supply pure oxygen for the fuel instead of the combustion of the fuel occurring in air. This allows the flue gas only to contain CO2, making a separation step unnecessary. The oxygen carriers, which are typically a combination of metal oxide and a support, are a vitally important component of this process, and the best elements and synthesis techniques for these carriers are still being determined. In this presentation, the synthesis techniques of mechanical mixing and dry impregnation for CLOU and the synthesis of core-shell structures for CLC will be displayed, along with a description of how these catalysts effectively administer CLC and CLOU processes.

D’Agostino, Gabriel  
Mentor(s): Dr. Thomas Makris, Ms. Courtney Wise  
Redox, Substrate- and Ligand-Binding Properties of a Nonribosomal Peptide Synthetase-Modifying P450

Nonribosomal peptide synthetases (NRPSs) are multi-domain protein complexes responsible for the construction of antibiotic natural products. These peptides often contain chemical groups that are not observed in proteins formed by the vastly more common ribosomal machinery. These unique functional groups are produced from reactions catalyzed by specialized tailoring enzymes, and impart pharmacologically-important activities. The simple didomain NRPS, NikP1, and cytochrome P450 tailoring enzyme, NikQ, of the nikkomycin biosynthetic pathway present an interesting model system for studying tailoring enzymes that act on NRPS-tethered substrates during peptide maturation. Specifically, NikQ performs a β-hydroxylation reaction on a NikP1-linked L-histidine residue (L-His-NikP1). Previous studies of NikQ have revealed several intriguing features atypical of most P450s, including a lack of change in the optical spectrum upon substrate-binding, unusually low affinities for common heme-iron ligands, and an abnormally low reduction potential. In order to investigate the structural source of these anomalies, site-directed mutants were generated at residues proximal to the NikQ heme. Differences between wild type NikQ and the I338G and I338G/I345G mutants were probed using spectral binding titrations, size exclusion chromatography, and spectroelectrochemistry, revealing the important role of this region for controlling ligand access and binding.

Dale, Zoe  
Mentor(s): Prof. Jennifer Pournelle  
Best Management Practices Review for Constructed Wetlands Wastewater Treatment in Iraq and UAE

In Persian Gulf countries, there are growing concerns about water quality, wastewater treatment and wetland management. Work is ongoing to establish constructed wetlands for wastewater treatment throughout the Basra Governorate in southern Iraq. In neighboring UAE, there are examples of wastewater treatment wetlands and functioning aquaponics systems. The goal of this project is to develop a best management practices review using an evaluation matrix developed by Research Planning Inc., which does work in the region, measuring fish farm bioproductivity, water amount, level of training, and input costs at facilities in UAE in order to estimate the effectiveness of wastewater treatment and aquaponics systems in Iraq. This project includes a literature review on interactions between coastal wetlands reconstruction and fish agriculture in the Persian Gulf region—focused on regional and local policy regarding connecting effluent streams to marine systems—which will be used to develop interviews. The interviews will be given to managers, researchers and other stakeholders at wastewater treatment and aquaponics facilities in Abu Dhabi.
Experience is an invaluable asset in today’s workforce. Without it, we have no credibility and no way to justify our training and education. Like many industries, the field of Computer Science relies heavily on job and research experience as a metric for an individual’s qualifications. From what initially began as a small interest in aviation has become intertwined with my career path. Leveraging my passion in aerospace and technology has led me to the Federal Aviation Administration (FAA) where I completed a Computer Science internship. The FAA is one of the world’s foremost leaders in aviation, governing and safeguarding our skies from commercial air traffic to drones. While working for the FAA, I gained a better understanding of the major lines of businesses ranging from Air Traffic Control to the upcoming advancements in the NextGen program. I participated in training sessions and tours of various programs that introduced me to the diverse culture and technologies within the industry. In addition to this internship, I was a Magellan Scholar for Ward One, a predominantly African American voting district in Columbia, SC. Along with a research partner, I helped develop an iOS app that will preserve the history of a community impacted by urban renewal and eminent domain. Furthermore, I was a Supplemental Instruction (SI) Leader for three semesters. My time as an SI Leader has enabled me to give back to the Carolina community while advancing and solidifying my own knowledge in Computer Science. Graduation with Leadership Distinction in Professional and Civil Engagement will be a measurement of that accomplishment along with my achievements and successes from the past four years. The confidence, courage, and mentorship that I gained from these experiences have prepared me for a path with no limits on my success.

Davis, Ashley
Mentor(s): Dr. Kathryn E. F. Shamberger, Dr. E. Brendan Roark, Dr. Amy R. Baco, Ms. Jahna Brooks, Ms. Kelci Miller
Characterization of Carbonate Saturation Horizons Near Deep-sea Coral Beds in the Northwestern Hawaiian Islands

Increasing anthropogenic carbon dioxide (CO2) production has led to a decrease in ocean pH and carbonate ion concentration ([CO3^2-]) in a process referred to as ocean acidification. Ocean acidification negatively impacts marine calcifiers, including deep-sea corals that utilize CO3^2- to build their calcium carbonate (CaCO3) skeletons. Deep-sea reefs provide crucial habitat for commercially important fisheries and house several endemic species. Carbonate saturation horizons represent the depth in the ocean where CaCO3 begins to dissolve and have been shown to be shoaling since preindustrial times due to ocean acidification. This shoaling threatens deep-sea corals and the valuable ecosystems they support by making coral skeletons vulnerable to dissolution. Here, the aragonite and calcite saturation horizons (ASH and CSH, respectively) were examined near the locations of deep-sea coral beds at nine locations along the Northwestern Hawaiian Island chain. Carbonate chemistry data were collected at these sites between 2014 and 2015. The depths of the ASH and CSH increase moving from southeast to northwest along the island chain. By comparing these data to those of the World Ocean Circulation Experiment (WOCE), our calculations indicate an increase in shoaling rates when compared to previous studies of the region.
Davis-Martin, Haley
Mentor(s): Mrs. Moryah Jackson
The Journey to Leadership

Throughout my undergraduate experience, I have tried to take advantage of the opportunities to learn how to be a leader offered by the University of South Carolina. I have held various leadership positions such as the President of Alpha Lambda Delta and a University 101 Peer Leader. I have also participated in leadership training programs offered by the Leadership and Service Center. Each time I tried a new form of leadership I always learned something new.

Slowly I began to realize that leadership isn’t something you can just learn and easily implement; it’s a journey. In order to be a good leader, I have had to learn when to step aside and let others take the wheel and when to step up myself and give a project direction. I have had triumphs and failures that have all helped me learn and grow into the leader I am now.

As an anthropology major I have learned the importance on embracing the diversity around me and the importance of leaving a legacy I can be proud of. These ideas have helped me grow as a leader and actively work hard to make sure I collaborate with those around me and make sure I try to leave USC having made it, even slightly, better than when I first came here. I intend to take these lessons and use them to prepare, execute, and revolutionize education at all levels.

Day, Michaela
Co-Presenter(s): Rachel Saxon
Mentor(s): Dr. Kristina Ramstad, Mr. Larry Bryan
Remote monitoring of nest attendance and fledging success in threatened wood storks

Michaela Day1*, Rachel Saxon1, Larry Bryan2, and Kristina Ramstad1
1University of South Carolina Aiken, Department of Biology and Geology, 471 University Parkway, Aiken, SC 29801
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An efficient method of nest monitoring has yet to be developed for the threatened North American wood stork (WOST; Mycteria americana). Monitoring WOST nesting activity and documenting patterns of parental nest attendance and fledging success are essential to understanding WOST behavior and restoring their populations. In this study, we are testing the accuracy of unmanned video nest monitoring against manual monitoring from an observation tower with binoculars. High definition digital trail cameras will be mounted in trees at multiple distances to approximately 20 WOST nests at Chew Mill Pond in central Georgia and will monitor activities on nests through when chicks fledge in July. The data we expect to collect from the cameras will allow us determine (1) how often parents are present on the nest, (2) if patterns of parental attendance relate to fledging success, and (3) the efficiency and efficacy of remote camera nest monitoring of WOSTs. Results from this work will aid in the determination of WOST population recovery and potentially provide a new method to monitor WOST colonies throughout their range.

Day, Michaela
Mentor(s): Dr. William Harpine
Life through an Unfamiliar Lens: The Underwater Photography of Charlie Hamilton James and Paul Nicklen

Humanity has learned to capture a single moment in time through a camera’s shutter. As our intelligence of technology opens new avenues, the depth of documenting life under the surface expands. National Geographic’s biologists and conservationists capture life from every angle. Charlie Hamilton James and Paul Nicklen each produces underwater photography emphasizing different areas and scales of natural aquatic scenes. Employing diverse photographic techniques, they each depict life beyond the horizon, revealing unfamiliar sights to the world. Whether viewed as aesthetic, educational, or both, their work frames a second of life that will last for years.
DeAngelis, Kelly  
Mentor(s): Dr. Jill Stewart  
Brain Activation During Movement Choice In Older Adults

People are often required to choose movements to perform everyday functional tasks. Making these choices has been shown to activate the supplementary motor area (SMA) of the brain. However, this has not been fully investigated in older adults. The purpose of this study was to determine brain activation among older adults performing a joystick movement task that required choice. Sixteen participants (10 female, mean age 65 ± 9.56 years) who were right hand dominant completed the task with the right hand. The task involved making a movement with a joystick during functional MRI under two conditions: Choice and No Choice. During the Choice condition, participants could choose to move the joystick to the right or left. Under the No Choice condition, participants were directed to move the joystick in a specific direction on every trial. Brain activation was compared between conditions using a paired t-test. Reaction time in the Choice condition (0.555 ± 0.136 sec) was faster than the No Choice condition (0.756 ± 0.106 sec) (p<0.001). Movement time did not differ between conditions (p=0.968). Brain activation was greater in the pre-SMA, putamen, dorsal lateral prefrontal cortex (DLPFC), and inferior parietal lobule (IPL) during the Choice condition than in the No Choice condition. Making choices regarding movement results in greater activation in brain regions involved in movement decisions (pre-SMA) and cognitive function (DLPFC) in older adults. This increase in activation corresponded to faster reaction times. Changes in task conditions during motor practice may allow targeted engagement of specific motor regions.

DeKold, Shawn  
Mentor(s): Mr. Alex Blauvelt  
Cultural Awareness in Business and Applications of Analytical Thinking

The diversity of today's business environment may “flatten” the world to some extent, with hundreds of countries actively participating in the global market. However, this high level of international operation has caused many companies to grow too quickly and to develop a complex organizational structure that is difficult to manage. From my internships in the manufacturing and accounting industries, I've seen many of the challenges that these companies face firsthand. The ability of these organizations to approach their growth pains analytically, to communicate effectively with their diverse employees and partners, and to be able to prioritize opportunities for improvement will determine whether they keep their seat at the table.

Denney, Kirstyn  
Mentor(s): Dr. William Jackson  
Cloning an anti-HIV vif siRNA to prevent vif association with APOBEC3G

The Human Immunodeficiency Virus (HIV-1) infects and destroys CD4+ T-lymphocytes which results in Acquired Immunodeficiency Syndrome (AIDS). HIV-1 expresses a gene known as vif, viral infectivity factor, which functions to ensure viral replication by blocking the function of apolipoprotein B mRNA editing enzyme-catalytic polypeptide-like 3G (A3G) using the ubiquitin-proteasome pathway (Rose et al. 2004). In the presence of vif A3G will be tagged with ubiquitin and degraded by proteasome. In the absence of vif, A3G will be packaged in the virion and cause hypermutation of the viral genome in the secondary cell. The use of a siRNA can inhibit the interaction between vif and A3G, allowing for hypermutation of the retroviral genome. The purpose of this study is to create an anti-vif siRNA that will target the sequence located at nucleotide 5111 (si5111) on the vif gene for degradation through the siRNA interference pathway. The si5111 was cloned into the shuttle vector, pSRNG, in order to acquire an H1 promotor for si5111. The H1.vifs5111 cassette will be removed from pSRNG and inserted into pLGN in order to test for siRNA interference of vif.
Desai, Shivali
Supervisor(s): Claire Aucoin
Mentor(s): Dr. Kate Flory
Developing Research Skills and Experience with the Project to Learn about Youth

Psychological research is critical to understanding not only human behavior and sensory perception, but also mental illness and how those afflicted are affected by it in their daily lives. As students, we were intrigued by psychological research and the various processes involved. Therefore, after receiving funding from the Exploration Scholar Grants from the Honors College, we joined Dr. Kate Flory’s lab in order to better understand these processes and to gain valuable skills for our future. We began working on the second stage of the Project to Learn about Youth, a project funded by the CDC which explores the prevalence of mental health disorders among children in grades K-12 in a large community sample. Since August 2016, we have been actively involved in data processing and analysis of numerous surveys, data collection while meeting with participants of all ages, and participant recruitment. Throughout our time on the project, we have learned how to practice confidentiality and how to follow specific protocols. We have also improved our skills in effective communication, teamwork, and professionalism. This project has not only helped countless individuals in the community, but also has helped us immensely by introducing us to the unique processes of research with human subjects. Our presentation will discuss the overview of the project and its current progress, our experiences with this project and what we have gained from our time.

Desai, Shyam
Mentor(s): Dr. Minsub Shim
Effect of Aspirin on Cellular Senescence

Cellular senescence is a phenomenon in which the proliferation of cells is brought to a halt. It has been known to act as an effective natural tumor suppressant; however it also comes with side effects that compromise the cells’ physiological role. Phenotypic changes that occur in senescent cells include increased lysosomal content, enlarged cytoplasm and the addition of Senescent Associated-Beta-galactosidase activity. Although senescent cells aid in preventing tumor growth, recent research has shown that the aggregation of these cells also promotes rapid aging which results in an escalated loss of metabolic activity, as well as an increased risk for organ failure. In order to further study if these phenotypic changes can be reversed, aspirin, a non-selective COX-2 inhibitor was used to observe changes in the senescent cells which might indicate phenotypic reversal. We hypothesize that treatment of senescent cells with aspirin will result in the loss of senescent characteristics.

Desai, Shyam
Mentor(s): Prof. Drew Newton
The Dual Nature of Community Service

National Healthcare Corporation is an inpatient and outpatient assisted living facility in my hometown of Greer, South Carolina. It is also where I obtained one of my first significant leadership roles as a volunteer in the Therapeutic Recreation department. I had the full intent of not only participating in this role for the sake of giving service to the community, but putting forth a genuine effort to truly make an impact on the residents as well as the institution. My main role was to engage with the residents each day in activities that promoted healthy behavior, and combating the sedentary lifestyle that is so easy to fall prey to, especially during old age. Specifically, I worked with them to make sure their minds remained somewhat agile and that they received some form of physical exercise. This experience was one of tremendous importance as it played a pivotal role in my future career goals. This community service experience not only provided me with the opportunity to back to my community, but it also allowed me to undergo significant personal development which I can continue to foster. My goal in this presentation is to provide my story of how I was able to make an impact on the members of my community, as well as share information that will help others realize the powerful impact of service.
DeSerio, Dominic  
Mentor(s): Ms. Theresa Harrison  
**Effective Leadership: How To Use It In Your Everyday Life**

At the Department of Juvenile Justice (DJJ), thousands of volunteers and teachers do their best to help shape the lives of those incarcerated. A huge hurdle that they had to overcome is the tendency of the juveniles to form segregated groups. There are countless circumstances where juveniles from different backgrounds/beliefs argue and even fight because of crude and harmful things they said to each other. Although there is not a class that the DJJ offers in terms of helping the juveniles set aside their differences, each volunteer and teacher do their best to help break down that barrier. I helped the juveniles create their own ‘elevator pitch’ and empowered them to stand up in front of the class and present their pitch. After everyone presented and without any help from the teacher or myself, the juveniles began to discuss what they wanted to do when they get out and how they could do it. Even for just one class, the juveniles put aside their differences and discussed something they all cared about: getting out of the DJJ. That experience, along with many others, has helped shape me into the leader I always wanted to be. When entering the retail industry, I hope to create the same environment that was created at the DJJ.

Desjardins, Brittaney  
Mentor(s): Dr. Dan Freedman  
**Describing the Impact of the Midlands Mediation Center on the Midlands Community**

This presentation will highlight the Midlands Mediation Center, a non-profit organization that provides low-cost mediation services to the Midlands community. This organization offers a variety of assistance, events, and activities to support the delivery of effective mediation protocols. Examples of these activities include the following programs: A Taste of Mediation, Conflict=Opportunity Project, as well as multiple trainings. What I will demonstrate are the benefits of participating in the organization's programs, and the positive impact that the organization's resources have on our community, including the ability to mediate in Magistrate’s Court for lower court costs, less wait times, and a decreased docket schedule.

Desloge, Allissa  
Mentor(s): Ms. Theresa Harrison  
**The Fight for Women's Rights: Change through education, empowerment, and advocacy**

The Women's Rights and Empowerment Network (WREN) is a non-profit organization that aims at advancing the health, economic well-being, and rights of South Carolina women and their families. WREN focuses on education, empowerment, and advocacy. The network has done a lot of work to develop and introduce different bills aimed at improving the lives of South Carolina women. These bills address topics like a shift in sex education, pregnancy accommodations in the workplace, and increased access to contraceptives. As a public health major who is hoping to pursue a graduate degree in Health Policy, the work that WREN is doing seemed especially interesting to me. Through my position as a Community Service Ambassador for the Leadership and Service Center, I was able to start volunteering at WREN for six hours a week. While volunteering at WREN I assisted with event preparation, blog writing, and data entry, but the tasks that I completed were not as important as what I learned. Not only did I become more educated on the women's rights issues that South Carolinian's are facing, but I learned a lot about the policy development process. Witnessing all of the hard work WREN has put into gathering support and introducing new bills has made me very excited about my future career and goals. I hope to use the knowledge and experience that I have gained at WREN to help me succeed in a career focused on lessening a wide array of health disparities.
Desloge, Allissa
Mentor(s): Ms. Theresa Harrison
A Healthy Company is a Happy Company: The importance of Corporate Wellness

Watlow Electric and Manufacturing Company is a family-owned engineering company based out of St. Louis, Missouri. While my knowledge within the field of electrical engineering is limited, I was able to complete an internship at Watlow in the Human Resources department. As an intern, I completed essential HR tasks like updating employee flowcharts and tracking employee training, but I focused the majority of my time on improving employee wellness. This included planning a site-wide wellness week, initiating team-bonding activities, and working with the on-site clinician to administer lunch-and-learns. Throughout my internship, I learned about the importance of effective communication and health education. The classes that I had taken within my major of Public Health prior to this internship provided me with the skills and knowledge necessary to really make an impact on Watlow's employee wellness. Watlow was able to make changes in their work-environment and at a policy-level to improve overall wellness and morale of their employees. Since my summer internship, I have kept in touch with my boss and have been back to visit Watlow. Some of the programs that I initiated are still in place and Watlow's Wellness team is continuing to strive for better health of their employees.

Deutsch, Ashley
Mentor(s): Dr. Adam Hartstone-Rose
Bite Force Estimation and the Fiber Architecture of Primate Masticatory Muscles

The Order Primates represents a group of species with a particularly diverse range of diets with varying mechanical properties, making them ideal for the study of masticatory apparatus. For instance, Cercopithecus ceph us consumes a diet consisting primarily of soft fruits, whereas, Cercocebus torquatus consumes a particularly obdurate diet, which includes hard seeds and nuts. This dietary diversity also includes folivorous, insectivorous, and gumivorous species. The role of the musculoskeletal masticatory apparatus in chewing suggests that its morphology is evolutionarily shaped by the mechanical properties of the diet. These morphological adaptations can be examined through the evaluation of soft-tissue in terms of muscle fiber architecture and the osteological components of the masticatory system. In particular, an analysis of bite force will provide further insight into the adaptive value of bite force relative to the mechanical properties of primate diets. We dissected the masticatory muscles of 59 specimens, representing 24 species from 14 different genera in order to examine scaling of muscle fiber architecture and bite force variables with body size as well as diet. The masticatory muscles dissected were the superficial masseter, deep masseter, zygomaticomandibularis, superficial temporalis, deep temporalis, and medial pterygoid. The fascicle lengths, measured after separation through a chemical cooking process, along with measurements of the cranium and mandible were statistically analyzed to regress bite force, average fiber length, muscle mass, and physiological cross-sectional area against body mass, geometric mean of cranial measurements, and mandible length, which act as proxies for body size, as well as dietary categories produced by grouping diets based on mechanical requirements. These results will determine how bite force scales with body size and diet across different families of the Order.
Dewey, Kristen  
Mentor(s): Mrs. Stuart Hunter  
The World in One Week

Five countries, seven cities, one week. In the Fall of 2015 as part of the Global Learning Leadership Distinction Pathway, I studied abroad in Viterbo, Italy and took this exact trip. Viterbo, a small city in the Lazio region of Italy, became my new home for the semester and provided new friendships, international coursework, and language immersion. With Rome as our neighbor, Viterbo also acted as a gateway to many other countries. Two friends and I took advantage of this and planned to explore Italy, Germany, England, Ireland, and Spain in just one week. We ate every delicacy, visited every monument, and walked every city until our feet were sore. I knew that this week of travel would be one I would not soon forget, but I never imagined the impact it would have on me and my future endeavors. I learned effective communication skills, self-confidence, and adaptability and problem solving in crisis situations. I also saw discrimination and prejudice in new ways as current events unfolded around us. Looking back at this trip and the invaluable skills I gained because of it, I can now see how life-changing it really was. The experiences I have had throughout my undergraduate career, and especially during my time abroad, have manifested themselves in a passion for social work that I will continue to pursue in graduate school next year. Thanks to the Global Learning Pathway and my time abroad, I feel confident in my abilities to create change in an intercontinental world.

Dib, Tatiana  
Mentor(s): Dr. Lara Ducate  
Looking, Asking, Connecting

Although I did not begin my studies at the University of South Carolina as a civil engineering major, I have been fortunate enough to have had inspiring experiences that make me passionate about the profession. I have learned countless insights through my in-class and out-of-the classroom experiences which have made me aware of the change I am capable of making in the world. My experience in Ecuador with Engineers Without Borders taught me to be resourceful and to make connections between things that seem to be disconnected. My hydrology internship has strengthened my ability to ask appropriate questions to make more informed decisions. From my internship in the Middle East, I have learned to look at the environment in order to better understand the implications of a decision. These key insights have prepared me to become a well-rounded engineer, ready to find efficient solutions to life’s most difficult challenges. Additionally, my experience as President with the American Society of Civil Engineers has greatly developed my leadership and teamwork skills in which I hope to use in the future as an engineering project manager.

Diepholz, Darian  
Mentor(s): Ms. Theresa Harrison  
Field Experience Essential for Career Understanding

When beginning my college career, I did not know what my future held. I hopped from degree to degree uncertain of where I belonged. Instead of relying solely on classes to show me where my interests lie, I decided to gain knowledge through my volunteer work. My junior year I began to volunteer with the local Compassionate Care Hospice (CCH), working both with patients in their homes and clerical tasks in the office. Due to my involvement with this company, I was able to examine and understand the different roles within health care. In the beginning, I sat with patients to provide them company and help them with any small activities, which allowed me to also observe nurses and physicians. Eventually, I moved on to working in the office, helping the directors by filing documents electronically and in folders. After years with CCH, I have come to realize my purpose in life is to use my Public Health Degree to become a social worker. I loved visiting with the patients as well as being a part of the “behind the scenes” work to help them gain the best experience while in hospice. But mainly I wanted to be the voice for the patient to assure they were correctly cared for, which embodies the purpose of a social worker. This involvement became pertinent for me to find my drive to finish college and continue on to graduate school.
Dirr, McKenzie
Mentor(s): Prof. Cindy Flach
Methodology and Benefits of Dance and Movement Therapy for Individuals with Disabilities

As a way to integrate dance training and service, I researched dance as a form of movement therapy for individuals with disabilities. Additionally, I conducted a research project in which I created a training curriculum for adults with a spectrum of disabilities in the art of dance. I utilized appropriate teaching methodologies and created dance syllabi that I taught at a local center for adults with disabilities. The main goal of my project was to create a curriculum that improved the mental, physical, and spiritual wellbeing of disabled individuals while also providing an avenue for communication and inclusion within the community. The main focus of my research project was the effectiveness of the syllabi that I created, and I continuously made necessary adaptions. I was able to incorporate both the scientific and artistic aspects of my education to create a well-rounded project. As a dual-degree Biological Sciences major and Dance Performance and Choreography major at the University of South Carolina, I have had a multitude of learning experiences about how to effectively approach a research project and how to design suitable content. This project also taught me a great deal about how to structure a curriculum and how to create necessary adjustments for a specific audience. The field of dance therapy is becoming more relevant in society, making it important for the field to be able to adapt and grow while becoming more available to a larger group of people.

Dobson, Jordan
Mentor(s): Prof. Elise Lewis
Lessons Learned through Community Engagement

In May 2017 I will be graduating with Leadership Distinction in Community Service. I spent majority of my volunteer time volunteering with Palmetto Animal Assisted Life Services (PAALS). PAALS is an organization that trains canines to assist people who have various disabilities, in order to live their lives more independently. While at PAALS, I fostered puppies and helped to train them. One way I helped to train these dogs is by bringing them out into the community in order to expose them to different environments. The other part of my volunteer experiences was conducted at Hand Middle School. While volunteering at Hand Middle School I worked to improve vocabulary and test scores of children from low income families. Between beyond and within classroom experiences, one of the important lessons that I have learned is how to look at strengths instead of weaknesses. I have also learned the importance of getting to the root of issues in order to fix them instead of just treating the symptoms of the problem. Lastly, through my experiences I have learned to look at problems from unique angles. These lessons have helped to shape my future career pathway, as well as the person I have become today. In the future I plan to attend graduate school at the University of South Carolina for social work. These hands-on experiences will also assist me in my future hands-on career.

Dobson, Jordan
Mentor(s): Dr. Mark Weist
Student Mobility and Academic Achievement

Changing schools sets students behind academically as well as interferes with their achievements. In my research, I plan to use literature reviews as well as peer reviewed journals found on databases such as Academic Search Complete and Google Scholar, to look at how student mobility effects a child’s academics and levels of achievement. I will be focusing on children between elementary and high school ages. I will also be looking at what schools can be doing to address this issue and what are some programs that are already implemented or could be implemented to help lessen the side effects that are seen through students that change schools often. I am hoping that by researching student mobility, we will better be able to address the problem in the future as well as lower student dropout rates since that is a major side effect of student mobility.
Doll, Corinne  
**Supervisor(s):** Lauren Buckingham, Payton Florence, Alexis Monroe, Cari Speed  
**Mentor(s):** Prof. Ernie Grigg  
**Changing the Direction of Military Mental Health Awareness**

As part of the 2017 PRSSA Bateman Case Study competition, we launched the Campaign to Change Direction in South Carolina, which focuses on mental health education. Secondary research revealed that the military community composes the largest South Carolina population suffering from mental illness. Primary research revealed that ability to recognize emotional suffering and knowledge of available resources are the two biggest barriers to ensuring that veterans and service members obtain proper support. To address both challenges, our campaign launched the South Carolina Coalition of Military Mental Health Awareness. Through creating a network of organizations with established ties to the military community, the coalition serves as a central resource of existing support programs around the state. Working through the coalition partners, the campaign educates active duty service members, veterans, and military family and friends about how to recognize the signs of emotional suffering. Per Bateman Competition rules, the campaign execution phase can only take place from February 15 to March 15. Evaluation metrics include number of coalition partners and tracked reach of their audience as well as analytics of social media, traditional press, and events surrounding the campaign.

Donato, Kathryn  
**Mentor(s):** Mrs. Stuart Hunter  
**Applying Leadership to the World of Engineering**

Starting at about half way through my undergraduate career, I began work as a Supplemental Instruction (SI) Leader. This is a peer leadership role here at the University of South Carolina that strives to push students to perform to the best of their abilities and, hopefully, even better. Each semester, I was assigned to a section of Introduction to Psychology students to work beyond the classroom and help them understand the material, improve their study habits, and promote a deep-learning environment. As a mechanical engineering major, leadership roles always interested me due to my desire to act as a leader in my own future career. Being an SI Leader enabled that fire to grow within me even more because it pushed me outside of my comfort zone and allowed me to learn how to work with people on an entirely different level. Since I was working with a program that focused heavily on academic success and collaborative learning, I quickly adapted to the needs of my students in order to adequately help them for so long as I was their peer leader. Having that skill of adaptability will give me the strength I need to push forward and pursue higher levels of leadership within my engineering career.

Donovan, Bridget  
**Mentor(s):** Mr. David DeWeil  
**P.S. I Love You**

In the spring semester of 2015, I had the opportunity to study abroad with the Academic Studies Abroad (ASA) program at Griffith College in Dublin, Ireland. My passion for photography and design pushed me to become a Visual Communications major at the University of South Carolina and I wanted to supplement my undergraduate experience by allowing myself to study communications, journalism and media in Ireland in order to understand the journalism profession in another country. I also wished to explore my own Irish heritage. Griffith College offered a wide assortment of courses specifically tailored to journalism students and the courses I took allowed me to enhance my journalism coursework at USC. This experience was personally meaningful because I learned how to be a better global citizen, how change is only possible with the aid of the masses, and how my camera lens could become a prism for the eye of a third-party's perspective. Throughout my five months abroad, I became a better photographer, journalist and critical thinker. Throughout this period of growth, my global awareness increased significantly, I gained vast cultural and historical knowledge, and my photography skills improved drastically and I was able to apply the knowledge I gained to my most advanced visual communications classes when I returned. Between my international experiences and my diverse coursework at USC combined, I was able to apply these lessons and insights to become a more global citizen.
For six months I was barely known as anything other than “Gringa.” To the locals it was a practical substitute because that’s what I was, a foreigner, but to me it was the first sign that living in a new country meant embracing a new culture. 
In spring 2016 I studied in Chile. I had chosen Chile to enhance my Spanish fluency and take advantage of the outdoor activities and hiking opportunities. To ensure I was fully immersing myself in the culture I spent the semester with a host family and attended a university that only spoke Spanish, except in select classes. My travels abroad also exposed me to many other South American countries, including Chile, Argentina, and Brazil.
It was apparent early on that I was no longer a student at the University of South Carolina majoring in Marketing and Management, but a spectacle. I stood out for being the tall, blonde girl with pale skin and with a name as difficult as Courtney, I was immediately rebranded “Gringa.” The term followed me for the duration of my trip and contributed most to my global learning and understanding of cultures outside of the United States. It was constant reminder that I was not where I belonged, but also an opportunity to learn. All in all, I did not let my “Gringa” status define my identity abroad. Instead, I embraced the best experience of my life and outlined it for you in my Graduation with Leadership Distinction e-portfolio.

Cocky’s reading express is a program at USC where students can volunteer and travel to different schools within the state to increase reading literacy. They get to partner with Cocky, read interactive books to children in the grades of kindergarten to sixth grade. After getting the crowd pumped with the books each child must make the cocky promise in order to get a sticker, a book and the most exciting prize of a picture with cocky. As a volunteer, you can read a book aloud, pump up the crowd, read out the cocky promise, pass out books and stickers or take the pictures. I have done each position to see the different reactions of the children. With doing each position its makes the experience so much more worth it to me and the children.
I learned that many students in different counties don’t have outside motivation to help them increase their reading intake levels. Therefore, once they experience the cocky reading express and get a reward of a book, sticker and picture they will remember this experience and use it as motivation to read. We use it as a tool to excite the children so they can explain to others what they did to get the book and the sticker. This is the first step of increasing the child reading levels. I want others to learn that it’s the little things that matters to get others involved and to help those in need. I never would have thought just from acting out a funny character, mad, sad or boring character in front of children would help motivate them to read more. Passing out books and stickers and seeing the excitement on their faces and expressing their gratitude make you feel better about yourself as a person. Reading out the cocky promise to ensure they will keep this promise makes a world of difference. The future for cocky reading express can continue to grow as it is currently doing. They have family nights at different schools, they have celebration nights to celebrate all of the accomplishments they gained during the year of increasing reading levels and how many books they passed out. I think once more people are aware and get involved in this great opportunity it can really go to the next level.

I became a public relations students without any understanding of what a career in this field might entail. My internship with Palmetto Health Foundation gave me insight into and experience with the work of public relations professionals. I learned social media, branding, event coordination, campaigning and much more, and in this internship I created a portfolio that showcased my abilities in social media and InDesign. From gaining valuable technical skills and interacting with professionals, I have gained appreciation for and a greater understanding of my chosen field.
Downes, Michaela  
Mentor(s): Dr. Patrick Hickey  
Personal Growth Through Globalization

The moment I was accepted into the International Business program, the University of South Carolina began to shape my education, opinions, and even behaviors on a global platform. The dynamic coursework advanced my knowledge of risk and opportunity in global business as well as enhanced my skills in a foreign language. Per requirement of the IB Program, I studied abroad in the spring semester of my junior year at the Université Paris Dauphine in Paris, France, where I adapted the curriculum I was apart of at USC to my courses abroad in international marketing and business culture. It was the principles and takeaways from my coursework at USC that prepared me to be able to adapt to foreign situations and be able to develop relationships with international professors and students. By spending five months abroad, I not only was immersed into the French culture, but I had the opportunity to travel to eleven countries which further expanded my mindset of the global landscape. I was able to enrich my sense of independence and deepen my appreciation of differences. My GLD Global Learning Portfolio illustrates the insights I have extracted from my coursework over the past four years, as well as my experiences both home and abroad. I have always had a thirst for knowledge of new cultures, new behaviors, and most importantly new people, and my undergraduate career at USC made that possible.

Drauschak, Andrew  
Mentor(s): Ms. Moryah Jackson  
Travel to Explore not to Escape

I applied to the University of South Carolina as a civil engineer thinking I would work in an office the rest of my life. I will graduate this May as an International Business student working for IBM Consulting internationally. This discovery led to my unforgettable experiences backpacking Europe and studying abroad in Switzerland, opening my eyes to the diversity and opportunities that exist worldwide. Alongside my study abroad and schooling I was given the opportunity to intern at the South Carolina Department of commerce where I got a sneak peak into what it takes to improve a small scale economy. I now want to bring that knowledge to help in a larger scale. My leadership roles in the International Business Fraternity SOU and the ability to found the organization Sigma Phi Epsilon gave me the ability to grow my leadership during my time here at USC. The aim of my Discovery Day presentation is to convey my journey during my time at USC, resulting key insights, and future career plans in an effort to more broadly inform students about the positive impacts of pursuing undergraduate degrees.

Dreyer, Delanie  
Mentor(s): Dr. Sabra Custer  
Pressure Ulcer Prevention on Inpatient Infants and Toddlers at Palmetto Health Children’s Hospital

Pressure ulcers can easily take place on inpatient children during a hospital stay if the proper assessments and precautions are not taken. Many infants and toddlers at Palmetto Health Children’s Hospital are suffering from chronic illnesses and have long stays in the hospital; making them extremely susceptible to pressure ulcers. Pressure ulcers can be caused in a variety of ways. Palmetto Health’s Infant and Toddler floor is at risk for pressure ulcers from children not being turned in bed, nasal cannulas, tracheostomy collars, nasogastric tubes, pulse ox probes, casts, IV lines, electroencephalogram electrodes, foley catheters, etc. All of these devices can lead to a pressure ulcer that is preventable with the correct care and accurate assessments. My research will primarily focus on what ways nurses can prevent pressure ulcers from occurring on the children on this specific unit at Palmetto Health Children’s Hospital. My focus will also include what to do in the case a pressure ulcer begins to form and specific treatments necessary.
Dufford, Eliza  
Co-Presenter(s): Christine Cobb, Elizabeth Karnavas, Jacquelyn Schoener  
Mentor(s): Ms. Laura Galloway, Ms. Hayley Efland  
K-12 Garden Club  

The K-12 Garden Club Team is a student led initiative within the Office of Sustainability at the University of South Carolina. The K-12 team creates and teaches lesson plans to local school children in the Columbia community that relate to the three pillars of sustainability. We collaboratively teach children to be environmentally and socially conscious through fun activities, crafts, and gardening. Whether the children are potting new plants for our refugee garden or making environmentally friendly bird feeders, they are learning to care for themselves and the world around them. Our goal is to use our knowledge of sustainability to instill our passions and excitement for the environment in the younger generation. Together with local educators and the children of Columbia, we hope to spread the message of sustainability.

Duncan, Kelsey  
Co-Presenter(s): Clare Chiarolanza  
Mentor(s): Dr. Deb McQuilkin  
Culturally Competent Nursing

As future health care professionals, student nurses often enter their college career with values, beliefs and practices unique to themselves. While such traits are important in personal development, it is vital that one also recognizes the individualized morals and ideals presented by others, specifically patients. In the nursing field, these individual principles must be respected in order to provide culturally competent care. In August of 2016, eight University of South Carolina nursing students, led by two nursing faculty, traveled to Australia to explore the implication of cultural differences on societal healthcare. Through a two-week program exploring the cities of Sydney, Cairns, and Melbourne, students were able to have experiential learning opportunities exploring power differences in healthcare, ecological practices in healthcare and shadowing in multiple clinical settings. Australia has a dual system of nationalized healthcare supplemented by private insurance. Their health outcomes surpass that of the United States. Each clinical opportunity enhanced student perspective of a universal system that provides healthcare for all. Some of the topics discussed included how to provide healthcare inclusive to all populations, along with difficulties that arise in trying to provide culturally competent care. With the help of the Australian Catholic University, UofSC nursing students were able to gain a greater understanding and appreciation for another country's effort to provide culturally inclusive nursing care.

DuRant, Justin  
Mentor(s): Dr. Timothy Mousseau  
Radionuclide Emissions from Nuclear Power Plants in South Carolina

The goal of this project is to measure radiation doses around NPPs and compare those data to the annual averages reported by utility companies. Even if no discrepancies are found, the results, in a GIS framework, will add to our understanding of the behavior of radioactive particles after they have been released into the environment, including possible correlations with meteorological data.
**Dussault, Alexander**  
**Mentor(s):** Ms. Theresa Harrison  
**Alexander Dussault’s GLD Abstract on Justice 360**

During the summer of 2016, I had a legal internship with Justice 360. They are a non-profit organization in Columbia, South Carolina, that performs research, advocacy, and direct legal representation for people facing the death penalty within the entire State of South Carolina. As an intern, I had substantial involvement in all three branches of purpose that the organization possesses. I assisted staff attorneys with their duties in representing clients across the state of South Carolina. This included visiting clients, preparing case transcripts, and researching legal history. I also performed Genealogical research about historic death penalty cases in South Carolina in order to find living relatives and learn about family lore regarding their history.

I learned that it is extremely important to understand that a human being is not the embodiment of their worst moment. I learned that it is necessary that people battle for justice in our legal system as we are confronted by a system that has historically attempted to commit state sanctioned murder against the uneducated and the poor. I hope that through my experience that others can learn the significance of advocating for those who do not have the same opportunities as us. People's sympathy towards the backgrounds other people come from and understanding of mercy can be paramount in changing the injustices that our society currently faces. While I currently remain at Justice 360, I hope to take what I have learned and make a profession out of it. After I graduate from the University of South Carolina, I plan to study public interest law and then return to the type of work I started with this organization. It is my hope that these experiences will continue to serve me as I go down this path.

**Dwyer, Logan**  
**Mentor(s):** Dr. Alexander Ogden  
**Stalinist Language Policy in Moldova**

This project examines the underlying political and ideological principles of Soviet language policy in the period immediate following the Great Patriotic War (World War II), following specifically the Stalinist linguistic conferences of the early 1950s and the ramifications throughout the 1960s and 1970s in the Moldovan Autonomous Soviet Socialist Republic and its successor the Moldovan Soviet Socialist Republic. Of particular interest is the overarching linguistic policy of Russification, which in the case of the “Moldovan” language was achieved through not only the addition of russified political terminology—although the language of communist propaganda undoubtedly played a central role in the republic’s assimilation—but through a concerted effort among Stalinist linguistics of the 1958 Linguistic Conference to delineate the “Moldovan” language from the Romanian language—and thus the Soviet Moldovan people from the rest of Greater Romania” by means of shifting the official alphabet from the recently establish Romanian Latin alphabet to the preexisting but newly reformed Moldovan Cyrillic alphabet. This process placed “Moldovan” squarely within the Soviet camp, differentiating it visually and, at the urging of the Soviet linguistics, ideologically from Romania. This project will highlight the unique circumstances of this particular Soviet policy on orthography, noting early Leninist Latinization in its political heritage and comparing it to the linguistic policies of Soviet Republics considered less susceptible to outside cultural influence, combining recorded testimony of the Stalinist linguistic conferences carried out in Chisinau, Moldova with the modern official commentary the Government of the Republic of Moldova to further remark on the political and social consequences of these Soviet policies.
Dyck, Melaina  
Mentor(s): Dr. Jennifer Pournelle  
Assessing Potential Bioproductivity of Constructed Wetlands Wastewater Treatment in Iraq

The city of Basra, Iraq, was once the thriving economic center of a vast marsh-dwelling community in the Tigris–Euphrates river delta, a region that has sustained civilization for 6,000 years. Over the last several decades, damming and draining have decimated those wetlands and the communities that depended on the ecosystem services they provided. “MaRSHil” (Maintaining and Restoring Sustainable Hydrology in Iraq), a collaborative project under the Memorandum of Cooperation between UofSC and the University of Basra (UB), studies the sustainability impacts of wetlands collapse and the possibility for wetland restoration. Work is ongoing to establish constructed wetlands for wastewater treatment throughout the Basra Governorate, beginning at UB. However, questions remain about how bioproductive this system could be, how long it would take to be economically viable, whether fish so raised would comply with health standards, and how regulation will influence the development of wastewater aquaculture. This project addresses those questions through an extensive literature review of the productivity of mature constructed wetlands along the same latitude as southern Iraq, analysis of restored wetland and aquaponics systems in the Gulf region, and a proposed experimental design to assess bioproductivity of such marsh systems.

Dyer, Selena  
Mentor(s): Mrs. Stuart Hunter  
Sink or Swim: Lessons from the Swimming Pool

During the first three years of my undergraduate education I worked as a head lifeguard and a swim instructor for both the USC Aquatics Department and the Aiken County Family YMCA. As a head lifeguard I supervised teams of lifeguards, taught practical skills, led crisis response drills, and created and implemented hands-on training materials for newly hired guards. Teaching swim lessons to both children and adults was a challenging and rewarding process as I learned to capitalize on the strengths of each student to help them make progress. I began lifeguarding as a part time job, but as my physical skill at swimming and rescue techniques improved I began to see other benefits. Lifeguarding taught me to work in a team, respond quickly under pressure, and to take responsibility for my actions and those of the team I was supervising. After writing and teaching a practical curriculum to train newly hired lifeguards, I was thrilled that performance on test drills improved dramatically when the guards had experienced my training procedures. I applied the techniques from this training, namely having students learn a concept and then physically rehearse it contiguously, when I started teaching swim lessons the next year. Watching my students gain so much confidence and useful skill was very rewarding, and has made me want to incorporate physical movement into all of my teaching in the academic field as well. I believe that the lessons I learned from the pool will extend to my teaching career and will help me in all areas of Professional and Civic engagement.
Dys, Gabrielle  
Mentor(s): Dr. John Grady  
You're Your Best Community Project

Throughout my time at USC I have discovered the importance of an inclusive community. This meaning that in order for a community to thrive, everyone must feel included, equal, and accepted. In a euphoric society and in ideal circumstances this would be the case, however, as I have learned over the past four years through classroom education, research, and personal experience that our communities, which can be specifically the USC campus, the city of Columbia, the United States, or the entire world, has a lot work to do in terms of inclusiveness. I have concluded the fact that every person involved in the community is responsible for the well being of every person in the community. I have worked on research grants both at the University of South Carolina as well as outside non-profit organizations that promote the wellness of citizens through community resources to obtain this conclusion. Studying abroad in Spain and my volunteer work with the Sexual Trauma Services of the Midlands has enlightened me on the benefits of giving back and acknowledging the inequalities that exists. In my academic career, numerous classes from all fields have taught me that every subject intersects, whether it be the sciences or the arts, that uplifting others leads to the overall prosperity of the community. With everything I’ve learned, I would have to say that my research experience has influenced me the most. Working on mostly qualitative research, I interact with lots of different individuals from the community hear in Columbia. My research focuses mostly on the sexual and reproductive health of women and their intake and experiences regarding those subjects. These women have taught me a lot about community inclusion and access to resources. I have observed that research and community service intersect drastically. Research is the way to uncover the needs of the community, while accessing the solutions to create a prosperous society. Community service is the action input after the solution has been discovered. To fix a problem there must be an acknowledgement of the issue and then the initiative to fix it. In order to obtain equality, there must first be an acknowledgement that in terms of a society, people must take responsibility for one another. My experiences have taught me that inputting energy into the community benefits everyone.

Eason, Michael  
Mentor(s): Dr. Scott Decker  
Predicting Cognitive Deficits in Children using EEG

Electroencephalography (EEG) is a non-invasive, relatively inexpensive and easily implementable neuroimaging device used in research and clinical practice. It can provide measurements with superior temporal quality, sample rate being 256 sample per second. The current study aims to use EEG activity recorded at a resting-state to identify patterns of cognitive ability in children.

Eddy, Sarah  
Mentor(s): Mrs. Chrissie Faupel  
Iceland Isolation: The Effect of Technology on a Study Abroad Experience

My project focuses on how technology can effect a study abroad experience. I researched this by studying abroad on a Maymester to Iceland for two weeks with fellow peers from the University of South Carolina. I decided to research technology because my generation is more addicted to their technology than ever before. I was intrigued to see how technology could have an impact on an opportunity to immerse in a new culture, whether it would be beneficial or detrimental to have technology on a study abroad trip. In order to collect data, I observed my fellow peer's technology usage daily as well as administered surveys throughout the trip. This way I obtained both qualitative and quantitative data to analyze. My quantitative and qualitative results were contradicting, my observations showed that technology hindered student’s ability to socialize and completely immerse in a new culture while the majority of students reported technology as having a positive impact on their trip. These results however could be due in part to the generations impression that technology is always positive and they refuse to acknowledge the detrimental effects technology is having on their lives. This project impacts not only students but all technology users. It challenges them to think about how they are using their technology and what they are missing out on when they do.
Edwards, Vincent  
Mentor(s): Dr. Svetlana Shinkareva  
The Side Affects of Music

The purpose of this study was to (1) generate and (2) validate a set of auditory stimuli for future experiments that utilize the theory of Core Affect. The music stimuli used were four second instrumental pieces including strings, wind, and percussion categories. The video stimuli were four second silent naturalistic clips including human, animal, and scene categories. Fifteen participants were presented with either a music clip or a video clip, followed by a 9×9 affective grid varied on valence (positive or negative) and arousal (high or low). Results showed that both videos and music were distributed across the valence dimension, however, videos exhibited a wider distribution than the music clips—especially on the negative level. Neither stimuli exhibited high variability on arousal compared to valence. The videos are dynamic and naturalistic; they have high ecological validity remedying the shortcomings of static stimuli used in prior literature. The instrumental music clips lack semantic features. Thus they can mitigate potential semantic confounds. This study provided stimuli sets for further experiments.

Edwards, William  
Mentor(s): Dr. Jason O’Kane  
Semi-Boustrophedon Coverage with a Dubins Vehicle

This project addresses the problem of generating coverage paths—that is, paths that pass within some sensor footprint of every point in an environment. Coverage paths are useful for robotics tasks such as lawn maintenance, floor cleaning, agriculture, environmental monitoring, humanitarian demining, and numerous naval applications such as mine sweeping and search and rescue. Our work focuses on generating coverage paths demonstrating coverage paths for Dubins vehicles, i.e. vehicles with a minimum turning radius, such as aircraft or surface water vehicles. We extend previous work that solves coverage as a traveling salesman problem (TSP) by introducing a practical heuristic algorithm to reduce runtime while maintaining near-optimal path length. Furthermore, we show that generating an optimal coverage path is NP-hard by reducing from the Exact Cover problem, which provides justification for our algorithm's conversion of Dubins coverage instances to TSP instances. Extensive experiments demonstrate that the algorithm does indeed produce path lengths comparable to the previous state-of-the-art in significantly less time.

Eggenberger, Harli  
Co-Presenter(s): Brooke Clark  
Mentor(s): Dr. Brian Parr, Prof. Ginny Southworth  
Candy and Soda for Breakfast: Developing visual communication tools to promote healthy eating

The purpose of this project was to develop a series of infographics and videos to help explain confusing nutrition information and clarify common misunderstandings about food to help consumers make healthy choices. Proper nutrition is essential for promoting growth and development, preventing disease, and supporting an active lifestyle. However, Americans tend to adhere to recommendations for a healthy diet less than 60% of the time. Communicating nutrition information through infographics and videos may be helpful for explaining nutrition concepts and lead to healthier choices. We identified eight foods that have similar characteristics that are commonly confused by consumers and created infographics to compare their nutritional values. For example, orange “juice” drinks, which contain little actual juice, are commonly used as a substitute for real orange juice. When you look more closely at added sugar, the nutritional value of the orange drink is more like orange soda than an actual orange. For each, we photographed the items against a plain backdrop using a digital camera, incorporated pictures and nutrition information from food labels, manufacturer websites, and nutrition databases into infographics, and created videos explaining each comparison. The infographics and videos present nutrition information including calories, added sugar, and other nutrition facts on a spectrum from healthy to less healthy to help consumers make smarter choices.
Elliott, Mary  
Mentor(s): Ms. Karen Patten  
Finding My Passion through Peer Leadership

One of the most influential experiences I have had during my time at Carolina has been serving as a University 101 Peer Leader for four semesters. What began as a fun extra curricular activity sparked a fire that developed into my passion for teaching and my desire to enter the field of education. I applied for this position as a means to expand my horizons as a leader and a mentor, and have gained so much more. Through this experience, I have built strong relationships with faculty and my students, and have learned about myself along the way. I found that being a mentor to others has impacted my life in a positive way, and I have gained an incredible mentor as well. From this experience, I have found that I wish to pursue a career in education, either as an educator or counselor. I would have never come to this without the help of the University 101 program and my experience as a Peer Leader. In this presentation, I am excited for the opportunity to discuss all that I have learned from my experience. I will use what I have learned in EDLP 520: The Teacher as Manager, and will display the scrapbook I created as a final project for this course.

Ennis, Caitriona  
Mentor(s): Mr. Alex Blauvelt  
Caring for Others and Myself Through Professional and Civic Engagement

My experiences the last four years at the University of South Carolina, including those beyond the classroom, have sculpted my career and personal goals and provided me with the knowledge achieve them. In the classroom, the most important concepts I have learned that I will keep close to me are the importance of equity and acceptance, how self-care can influence how I care for others, and how I can create my own definition of success instead of going by someone else's. I was able to apply my knowledge and skills I gained from in the classroom to outside involvements. Through my internship at Palmetto Health Physical and Specialty Therapy, I have learned so much about what I want to do with my future and what I need to do to get there. During my time as an Everyday Living Specialist at the Arc of South Carolina I made an impact on children and young adults with developmental disabilities by leading them in group activities that teach safety, inclusion, and life skills. These leadership, professional, and service opportunities I will forever be grateful for.
A comparison of energy expenditure between motorized and non-motorized treadmills.

Non-motorized, arced treadmills are becoming more popular in fitness settings and are thought to require greater effort than walking or running on a traditional motorized treadmill. However, little research has been conducted to evaluate this type of exercise equipment.

PURPOSE: The purpose of this study was to compare the energy expenditure (EE) required to complete one mile on a non-motorized, arced treadmill (AT) and a motorized treadmill (TM).

METHODS: Nine recreationally trained healthy participants (4 male, 5 female) ages 26.1±9.6 years walked or ran 1-mile at a self-selected speed on a motorized treadmill (TM) and a non-motorized arced treadmill (AT) while VO2, EE, and heart rate (HR) were measured. The EE in kcals•min-1 and kcals•mile-1 was calculated from VO2 measured after subjects achieved steady-state. The tests were counterbalanced so half of the subjects completed the TM trial first and half completed the AT trial first.

RESULTS: Nine participants completed the 1-mile effort at an average speed was 125.1±32.6 m•min-1 (range: 88.4–160.8 m•min-1). The mean VO2, EE, and HR were significantly higher during the TF trial compared to the TM trial:

<table>
<thead>
<tr>
<th></th>
<th>TM</th>
<th>AT</th>
<th>p</th>
</tr>
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<tbody>
<tr>
<td>VO2 (L•min-1)</td>
<td>1.6±0.9</td>
<td>2.2±1.1</td>
<td>0.0006</td>
</tr>
<tr>
<td>EE (kcals•min-1)</td>
<td>7.9±4.6</td>
<td>10.9±5.4</td>
<td>0.0005</td>
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<tr>
<td>EE (kcals•mile-1)</td>
<td>98.4±35.4</td>
<td>144.8±32.2</td>
<td>0.0001</td>
</tr>
<tr>
<td>HR (beats•min-1)</td>
<td>152.0±29.3</td>
<td>164.9±23.3</td>
<td>0.005</td>
</tr>
</tbody>
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Values expressed as mean±SD

CONCLUSION: Use of a non-motorized arced treadmill resulted in a significantly higher VO2, EE, and HR compared to a traditional treadmill at the same speed. This could be due to the unique design of the arced treadmill that requires a different movement pattern and additional effort to propel the non-motorized belt. This may have implications for fitness applications in which EE is of interest.
Esposito, Vincent  
Co-Presenter(s): Ashley Perkins  
Mentor(s): Dr. Susan Richardson, Ms. Amy Cuthbertson, Ms. Hannah Liberatore, Dr. Susana Kimura-Hara, Dr. Sarah Riemel  
Disinfection By-Product Removal Efficiency of Activated Carbon Filters for Home-Use

Water disinfection has led to a dramatic decrease in infectious diseases since the 19th century, but the formation of disinfection by-products (DBPs), caused by the reaction of naturally occurring organic material with popular modern water disinfectants such as chlorine, ozone, chlorine dioxide, and chloramine, is a major issue facing water treatment plants today. The U.S. EPA regulates 11 DBPs, but more than 700 DBPs, many of which are more toxic than those regulated, have been identified from these four disinfecting agents. Activated carbon filters have been studied for removal of EPA-regulated disinfectant by-products, but their ability to remove unregulated DBPs of emerging concern is currently undetermined. Our objective is to determine how efficiently point-of-use activated carbon filters remove 57 priority, unregulated DBPs from tap water, including halonitromethanes, haloacetamides, haloacetonitriles, haloacetaldehydes, and iodo-acetic acids. Preliminary data suggests that the removal of iodo-acetic acids, for any concentration, was between 38% and 78%, although the efficiency decreases with increasing concentration of DBPs. Data also suggests that removal of iodo-trihalomethanes at all concentrations approaches 100%, with the exception of bromo-diiodo trihalomethane (BDIM). The removal of BDIM is more efficient at low concentrations than at high concentrations. At the end of this project, we will have a better understanding of the impact activated carbon filters for home-use have on the safety of public drinking water. If the filters prove effective at remove these toxicologically important DBPs, this research will produce valuable health and safety information for the public, and could potentially lead to improved removal strategies for drinking water treatment plants. On the other hand, if the filters are found ineffective, it can be concluded that new methods of filtration should be developed. Results will be presented for Brita® filters at various stages (at the beginning, middle, and end of their lifetimes) for samples of tap water and samples of ultra-pure water spiked with a high and low concentrations of DBPs to determine how well point-of-use activated carbon filters perform over their lifetime at different concentrations.

Eta, Ayi  
Mentor(s): Dr. Chuanbing Tang  
Sustainable Polymers from Plant Oils

Biomass extracted from sustainable resources may be a substitute of petroleum chemicals in the synthesis of bio-based polyamide. Using methyl 10-undecenoate, a renewable derivative from castor oil, a monomer with two amide groups and two terminal double bonds was prepared after base-catalyzed amidation reaction with 1,3 diamino-2-propanol. The monomer was then polymerized in a poly-condensation approach via thiol-ene addition with di-functional thiols. The hydroxyl group in the monomer could then be capped via a reaction with a number of different anhydrides after the polymerization. By using this method, properties of bio-based polyamides, such as degree of crystallization, thermal and mechanical properties, could be finely tuned.

Evans, Maya  
Mentor(s): Mrs. Courtney Worsham  
¡Pura Vida! Volunteering Abroad in Costa Rica

When people ask me what I like to do in my free time, the first activity that comes to mind is volunteering. Since starting college, I have completed approximately 750 hours of community service. Throughout the past four years, the majority of my volunteer work has assisted in efforts within three sectors: education, poverty, and Hispanic outreach. This past summer, I decided to step out of my comfort zone and combine all three sectors, taking my first trip out of the country to volunteer abroad in San Ramón, Costa Rica with a local non-profit community education center. For four weeks, I facilitated reading and math tutoring to young, Spanish-speaking students living in the poorest neighborhood of the city. I was able to assess the needs of at-risk and impoverished children as well as gain a greater multicultural competency of the Hispanic culture. I made efforts to enhance the students’ educational experience, and I made strides to less the academic achievement gap. Through this experience, I learned the true “profit” or gain of non-profit organizations is not monetary, but it is to positively impact and change the lives of individuals. This impact affects the volunteers just as much as the people the volunteers are helping.
Fargalla, Mary  
Mentor(s): Dr. Elizabeth Easley, Dr. Sarah Sellhorst  
Difference in average daily step count between male and female college-age students

A sedentary lifestyle has been associated with a variety of lifestyles. Previous studies have shown that physical inactivity is higher in females and that college-aged students have inadequate levels of physical activity. Although increased health risks have been identified in students that live off-campus, there are no known studies that have examined physical activity of students on a two-year commuter campus. Purpose: To determine if a difference in steps per day exists between male and female full-time traditional-aged college students (18-25yr) at a small rural commuter campus. Methods: Subjects were asked to wear an accelerometer (Actigraph GT3X, Pensacola FL) around their waists at the anterior axillary line of the right hip during all waking hours for seven consecutive days. An independent sample t-test was used to determine whether a difference existed in average daily step count in men and women (IBM SPSS Version 24). Results: There was a significant difference in average daily step count between men (n=29; 7876.00 ± 3200.18 steps/day) and women (n=37; 6313.42 ± 2751.01 steps/day), p = 0.037. Conclusion: These results support the previous studies on college-aged students showing that women averaged less daily activity than their male counterparts. This is even more concerning considering that the women were classified into the low active category based on their average number of steps. Furthermore, the data showed that both sexes are failing to achieve activity levels recommended by established guidelines. 

Supported by a Research and Productive Scholarship Grant from USC Lancaster.

Farley, Megan  
Co-Presenter(s): Kendall Bond, McKenzie Cass, Hannah DiBernardo, Adam Spoone  
Mentor(s): Dr. Sanjay Ahire  
Capstone Consulting for McLeod Health

Supply Chain Project aimed at streamlining processes and decreasing lead times in McLeod Health’s coding department.

Farmer, Melissa  
Mentor(s): Ms. Amber Fallucca  
GLD Presentation: How My Semester in Italy Created My New Perspective

One of the most impactful experiences during my college career was studying abroad in Torino, Italy during my Spring 2016 semester. I spent four and a half months living and studying business and Italian culture in northern Italy. I choose Torino because I wanted to step outside of my comfort zone and experience a way of living different than my own. My semester abroad taught me how important it is to value other cultures and gave me a more rounded and global perspective on my life. I was able to relate my lessons learned abroad to my hospitality career, specifically in the concept of how food can bring people together across different cultures and backgrounds. Moving forward in my hospitality career upon graduation, I am hoping to share the importance of cultural appreciation and how having a global perspective on the world can open up your eyes to some amazing things.

Fassnacht, Michael  
Mentor(s): Dr. Joe Jones  
Taking Advantage of Enriching Experiences

Growing up I was never a risk taker was perfectly content to stay in my “bubble”. During my time in college I was afforded many opportunities that I didn’t take advantage of but fortionatley I did take advantage of a study abroad opportunity. I never wanted to leave the U.S. to study abroad because I was never planning on working outside the U.S. I spent a mayme-stemt studying in Germany and it was more than I could’ve ever asked for from a trip. I now realize how important it was to not only my major, global supply chain operations, but to me as a person.
Tumors consist of cancer cells and stroma which interact via soluble factors. CCL8, a chemoattractive cytokine (chemokine) that belongs to the Monocyte Chemoattractive Protein (MCP) cluster, mediates tumor-stroma interactions by promoting the dissemination of the cancer cells. In tumors, the stromal fibroblasts are in an activated form which induces cancer cell invasion, migration and metastasis. CCL8 is stimulated in stromal fibroblasts by signals elicited by the breast cancer cells and stimulates invasion and metastasis. Thus, understanding how CCL8 expression is regulated in stromal fibroblasts is of high value. In this study, we developed a reporter plasmid for human and mouse CCL8 promoters in order to study the regulatory regions of the CCL8 gene that are responsible for its activation in the stroma. We used promoter prediction software and potential promoter sequences were found and specific oligonucleotide primers were designed. These genomic regions were then amplified by PCR and subsequently subcloned in pGL3-based luciferase reporter plasmids which were then used to transform bacterial cells. Finally, plasmid DNA from the bacteria was transfected into mouse 3T3 fibroblasts and luciferase activity was evaluated. For our initial studies we tested the responsiveness of the plasmid constructs we have generated to breast cancer cell-conditioned media and also used IL6 which our lab established that stimulates the expression of CCL8 at the RNA level. Knowing the regulation of CCL8 is vital because from this information we could understand basic aspects of tumor stroma biology and potentially develop agents and therapies to block tumor growth and metastasis.

Fay, Christian
Mentor(s): Dr. William Jackson
siRNA mediated downregulation of HIV-Tat in anti-Tat siRNA protected Lymphocyte populations

The Human Immunodeficiency virus (HIV-1) targets and kills CD4+ T-lymphocytes. The gradual destruction of CD4+ cells causes a generalized loss of immune function, eventually leading to increased infections by a number of opportunistic pathogens, which is characterized as Acquired Immunodeficiency Syndrome or , AIDS. HIV-1 is a lentivirus that expresses a number of regulatory and accessory genes, which function in virus replication. One such gene encodes the regulatory proteins called the transactivator of transcription (Tat). Tat is a small protein that is among the first expressed during virus replication and functions to upregulate RNA Polymerase II transcription from the viral promoter through its interaction with the viral transactivation response element (TAR), which is responsible for upregulation of virus production. In the absence of Tat, viral transcription is poorly initiated and viral replication is inhibited. One way to inhibit Tat is through the use of a retroviral vector to express small interfering RNAs (siRNA) that target and direct mRNA cleavage through the RNA Interference (RNAi) pathway. To test this hypothesis, we have designed short hairpin RNAs (shRNAs) to target three Tat sites within the HIV-1 NL43 genomic clone (Accession number M19921). Each of these shRNAs were synthesized as dsDNA and cloned into the retroviral vector pLGN, in which they are expressed from the RNA Polymerase III H1 promoter. In order to assess the anti-Tat activity of these shRNAs, recombinant retroviral particles will be generated and used to transduce CD4+ T cell lines. Following selection of stably transduced cells, HIV challenge assays using a Renilla luciferase expressing HIV-1 genomic clone (pNL43.T2A.Luc) will be carried out using the siRNA-protected CD4+ T cell populations. The ability of each siRNA to inhibit HIV replication will be assessed by luciferase assay, quantitative polymerase chain reaction, and p24 assay.
Fayyaz, Habiba
Mentor(s): Dr. Jim Fadel

Therapeutic Role of Intranasal Orexin-A Administration in Age-Related Cognitive Decline

Orexin neurons, originating in the lateral hypothalamus, are key physiological integrators of homeostatic and cognitive function, with specific roles in appetite, arousal, reward, and stress response. Degeneration of the orexin neuropeptide system has been shown to exist in aged brains, suggesting that orexin plays a central role in age-related cognitive decline and the development of neurodegenerative and metabolic conditions, such as Alzheimer’s disease. The intranasal route of drug administration has shown promise as a potential non-invasive, therapeutic tool with the advantages of bypassing the blood brain barrier and minimizing systemic exposure. This study aims to assess intranasal orexin-A (inOX-A) administration as a strategy for treating cognitive dysfunction, particularly in aged animals. Following either intranasal saline (inSaline) or inOX-A administration, immunohistochemistry was performed on brain stem and hypothalamic tissue from young (2-3 months) male rats to stain for markers of neuronal activation (c-fos) and phenotypic markers of specific neuronal populations. In young male rats, inOX-A administration moderately increased activation of neurons in brain stem regions, namely the pedunculopontine tegmental nucleus, which is important for arousal and wakefulness, and dorsal raphe, which regulates mood, indicating some beneficial applications of inOX-A. Immunohistochemistry on brain regions from aged rats receiving intranasal administration will also be used to examine differences in neuronal activation between rats given inSaline or inOX-A treatment. Ultimately, these differences will be compared to the changes observed in young rats.

Feldman, Brian
Mentor(s): Dr. Karen Patten

Navigating Abroad without Technology

A student is often perceived only as someone who is actively engaged in taking courses taught by an instructor, but frequently first-hand experience proves to be a better teacher than isolated instruction. This proves to be especially true when learning another culture, whether it is through talking with natives or actually travelling to a foreign destination. Even while immersed in another culture, it is typical for someone to hold onto what is familiar rather than more directly relating to others to alleviate some of the difficulties present when communicating with others who have a background significantly different than their own. During my time in China through the Confucius Institute, I had to develop a different mindset to understanding what was around me as I had to navigate my way without technology, a key resource in how I was accustomed to finding my way and communicating with others. While I was in a group, because of my technology-free situation I had to shift my mentality from one which was technology focused to a more humanistic one, where I relied on those with me and my surroundings as a guide. Through this opportunity, I made use of my environment, rather than readily available digital information, as a guide that led me to talk to new people, communicate across language barrier, and build a spatial mindset in navigating cities.
Field, Kevin  
Mentor(s): Dr. Minsub Shim  
The role of cyclooxygenase-2 in the late effects of chemotherapy

Childhood cancers have grown increasingly prevalent in the United States over the past 40 years. With this increase in incidence, the survival rate has also risen, climbing above 80% in 2015. However, increased survival rates bring with them an unfortunate consequence: the late effects of cancer treatments. The late effects of cancer treatments are varied, but often resemble signs of aging, including frailty, memory impairment, infertility, and early onset of chronic diseases. Expression of COX2, an inducible isoenzyme of cyclooxygenase, is increased in tissues of aged humans and in age-related diseases. We have recently found that transgenic expression of cyclooxygenase-2 (COX2) in mice leads to phenotypic signs of early aging. COX2 is well-known to be highly induced in response to chemotherapy treatment and in the aged human body. Our lab has previously shown that transgenic COX2 overexpression in mice leads to phenotypic signs of aging, including increased cellular senescence. However, the role of COX2 in the late effects of chemotherapy is as of yet unstudied. Our studies have shown that treatment of juvenile mice with doxorubicin, a common chemotherapeutic agent, leads to increased COX2 expression in the tissues of adult mice and causes late effects. Some of these late effects were attenuated by treatment with aspirin, a COX inhibitor. These findings suggest a novel role of COX2 as a mediator of long-term side effects of chemotherapy and have important implications for alleviating the late effects of anticancer treatment on non-cancerous tissue.

Filos, Rebekah  
Mentor(s): Dr. Sarah Miller  
Who’s That Girl?

When I began my education at USC Salkehatchie, I felt that I would always be a follower, never a leader. I lacked confidence, communication skills, and the time management skills necessary in leadership. During my time at Salkehatchie, there have been many experiences which have molded me into the leader I have become today. One of the most prominent experiences is my involvement as a Student Ambassador during my sophomore year. Through my work as a Student Ambassador, I have gained experience as a leader in my school, which has helped me to become a leader in other areas of my life, including my church. My experience at USC Salkehatchie—and especially my work as a Student Ambassador—has helped me grow more than I would have ever imagined. If the girl I was two years ago were to meet the girl I am today, she wouldn't even recognize me—she would probably ask herself “who's that girl?”

Finley, Serena  
Mentor(s): Mr. Michael Crowley  
Improving the Future of Student Health through Peer Leadership

Peer leadership programs at the University of South Carolina are extremely important in both service to students and in the development of student learning. Changing Carolina Peer Leaders is an organization based around campus wellness, with special interest groups in mental health, sexual health, general wellness, and healthy relationships. Initiating health programs through Changing Carolina Peer Leaders was beneficial to my development of peer leadership skills to design and deliver programs to the University of South Carolina student community. This experience has taught me how to design a successful intervention plan by identifying health issues in a population, a skill that I used to further my contribution to the University of South Carolina when helping to design health intervention plans for USC students on campus. Part of a Peer Leader’s role is to make modifications to existing programs and help design new health initiatives. This means that current Peer Leaders make a significant impact on the future of campus health programs which will further be modified and improved by many generations of students to come to fit the needs of our changing student body. My personal experience as a Changing Carolina Peer Leader has thoroughly prepared me for a future career in health management by modeling a setting where I will identify problems in the delivery of patient care, and develop proposals to improve the lives of patients and community members.
Fischer, Maximilian  
Mentor(s): Dr. Sarah Miller  
Living the Adapted Dream: More Than a Player?  

Living the dream is the childhood expectation of life for most of us but life rarely turns out the way we dreamed about it. So how do we stay faithful towards our dream when life changes and paths that we intended to follow are closed now? We need to see the new way that opens with the blocking of our old one. Just like the saying “When one door closes several others are opening”. During my presentation, I will show how I adapted my childhood dream of becoming a professional soccer player into a career plan as a manager of a professional soccer club. I work on the execution of the plan which involves my attendance of the University of South Carolina, the Graduation with Leadership Distinction in Global Learning, and other international experiences discussed in my Insights and my Leadership section of my portfolio since early 2010.

Fleming, Michelle  
Mentor(s): Mrs. Ashley Byrd-White  
Taking the Leap  

During my time at the University of South Carolina, I have expanded my horizons and changed my view of the world through travel. Studying abroad in both Switzerland at the Zurich University of Applied Sciences as well as in Italy at the Sant’anna University has given me an unparalleled college experience and has altered my outlook on the world to a global perspective. Traveling peaked my interest about the business world and has enabled me to apply my knowledge from both of my majors into my life abroad. Studying International Business and Finance has allowed me to learn about topics that interest me in both business as well as culture. My classes throughout my undergraduate experience, both challenging and interesting, have guided me to have an international mindset as well as an empathetic one. I have been able to take my college experience throughout my time at USC and apply it to other parts of my life from internships, to travel, to my future. Studying abroad has shaped me into a more independent and courageous woman and I hope to continue growing as a businesswoman and leader in the future as I embark on my next journey to teach English in South Korea.

Fleming, Jory  
Mentor(s): Ms. Jennifer Bess  
Crafting a Meaningful Story for National Fellowships and Beyond  

Everyone has a story that’s worth sharing. The ability to do so effectively is important for achieving the next step, whether that’s a national fellowship, research grant, or your next job application. Looking back to freshman year, I realized my journey has taken many unexpected turns along the way. Learning to navigate these turns successfully is a challenge everyone will face, and I’ve discovered that putting your foot out there is a risk well worth taking. While everyone’s story is different, I hope to share tips and tricks I’ve picked on my journey of applying to national fellowships including the NOAA Hollings, Udall, Goldwater, Truman, and Rhodes. Approaching a personal statement or interview can be an interesting and engaging experience, and doesn’t have to be stressful. Inspiration is found everywhere, and national fellowships can inspire excitement rather than anxiety. The most challenging part is getting started, why not start right now?
Fleming, Jory  
**Mentor(s):** Dr. John Kupfer, Dr. Joe Jones, Dr. Joe Quattro  
**A Remotely Operated Vehicle Expedition in Congaree National Park**

Congaree National Park is unique. It serves as the largest remaining track of old growth bottomland hardwood forest in the United States and the only national park in the state of South Carolina. Water is one of the most important elements of this ecosystem. The entire floodplain is connected by a network of water that varies in spatial and temporal scale, and can be carried vast distances when up to 90% of the park is inundated at peak flood times. Weston Lake is anomalous in that it is a large and permanent source of water in an environment full of change. Questions surrounding Weston Lake go back generations, as local folk tales suggest the lake is “bottomless.” Biogeographic and geomorphologic questions about Weston Lake remain unanswered as well: including how environmental parameters change throughout the lake, why the fish assemblage in the lake is unlike its surroundings, and if underwater springs are the reason for the lake’s permanence. In this research project, a remotely operated vehicle (ROV) was constructed to serve as a field tool to explore the lake and elucidating the answers. ROV’s offer the chance to spatially explore aquatic environments from many vantage points and are a useful field instrument to begin answering these questions. The Marine Technology Society at USC worked to construct the ROV from nuts and bolts, and partnering with Congaree National Park has led to possible additional applications of ROV data, such as education and scientific interpretation for the visitor center.

Floegel, Courtney  
**Mentor(s):** Ms. Lisa Camp  
**College Is What You Make Of It**

It is no secret there exists a strong correlation between a student’s level of campus involvement and that student’s academic success. Taking into account my experiences while at the University of South Carolina, I believe the link extends much farther than this, affecting key factors such as career preparation, cultural participation, and even satisfaction of life. During my four years, I have been involved with and worked just about everywhere and with everyone on this campus including serving as an Orientation Leader, University 101 Peer Leader, and Telecounseling Team Member, all while working as an Intern in the Moore School Office of International Activities. In these roles, though each unique to itself, I essentially served as an aid/guide to students by working with them in their decision-making processes and steering them towards previously unidentified and undiscovered opportunities. Not only did these opportunities allow me to propel others to succeed, but they have in turn shaped me into a self-assured leader who embraces change and sees obstacles not as points to avoid but rather as opportunities to uncover new solutions. In my presentation, I will discuss how, through these key roles and positions, I am graduating with a set of leadership and communication abilities that extend far beyond what I’ve learned in my classes, and thus confirming the age-old statement that college is what you make of it.

Fludd, K’Shanna  
**Mentor(s):** Dr. Patrick Hickey  
**The Pathway to Wanderlust**

Wanderlust is the passion to travel or explore the world. During that journey most search for their purpose and existence. My decision to studying abroad in Barcelona, Spain encouraged me to apply the meaning of wanderlust. Using the knowledge I gained through my studies at the University of South Carolina and life lessons I learned growing up, I set forward to learn as much about the world as I could. I wanted to understand the people, the culture, and the history. I used my skills in Spanish to communicate with my peers as well as develop my language abilities. I traveled to as many countries as my money and time allowed me in order to immerse myself into other’s experience. Through this journey, I learned people are different. However, society chooses to let culture, language, and travel divide rather than strengthen us. I know that it’s possible to empathize and connect with different cultures. This requires change for both individuals in order to truly be able to bond with each other despite the differences. Therefore, when I returned to the U.S, it was my responsibility to lead my peers to the discovery of wanderlust. I plan to educate my community on the importance of travel, culture, and language in the hopes of connecting people rather than dividing them.
Depression affects 17% of adolescents and approximately 35% of adolescents are overweight or obese nationally (NIMH, 2014). However, few investigators have examined how parent factors relate to both mental and physical health outcomes in youth. This research evaluates the relationships between parent factors on understanding depression and obesity outcomes in African American adolescents. Specifically, this study evaluated the associations between adolescent z-BMI, adolescent depressive symptoms, and parent's BMI in the Families Improving Together (FIT) for Weight Loss Trial. Project FIT is a randomized controlled trial testing the efficacy of a motivation plus positive parenting intervention on weight loss in African American adolescents (Wilson et al., 2015). A total of 51 African-American adolescents (Mage=13.2 years; BMI%=96.6) and their parent or guardian (Mage=43.9; MBMI=37.5) that were enrolled in Project FIT participated in this study. Depressive symptoms were assessed using the Center for Epidemiological Studies Childhood Depression Scale (CES-DC), while height and weight were measured objectively in both guardians and adolescents to calculate BMI and z-BMI, respectively. Although a significant relationship was not found between adolescent depression and adolescent z-BMI, correlation analyses revealed a significant positive association of adolescent depression and parent BMI (r=0.30, p<0.05), suggesting that higher parent BMI was associated with greater levels of adolescent depression. Furthermore, adolescent z-BMI was also positively associated with parent BMI (r=0.28, p<0.05). These findings suggest that parent BMI may be an important predictor of adolescent mental health and obesity. Further research is needed to better understand the mechanisms underlying these effects.

Foulk, Ashley
Co-Presenter(s): Jamie Clark, Michelle Sidwell, Anna Boring, Tyler Eye
Mentor(s): Dr. Tammi Richardson
Research conducted by SEAS (Student Engaged in Aquatic Sciences) at the Belle. W. Baruch Marine Lab

SEAS (Student Engaged in Aquatic Sciences) club conducts research at the Belle. W. Baruch Marine Lab twice a semester when possible. The club teaches undergraduate students about research methodology in the marsh and beach environment of Georgetown, SC while simultaneously exploring the Baruch marine lab and property. The club has performed various research methods to learn more about marsh ecology and planktonic diversity within the area. The research SEAS is conducting and presenting on will ultimately help SEAS members develop research skills and provide them hands-on experiences within marine science.

Fountain, Julia
Mentor(s): Dr. Sheryl Wiskur
The Thermodynamic Resolution of Silicon Compounds: Optimization of Reactions Conditions to Achieve High Enantioselectivity

Abstract
In kinetic resolution, the goal is to separate or distinguish one enantiomer from the other. This project utilizes the thermodynamic properties of the chiral silane molecule to achieve high enantioselectivity from a racemic structure. Thus far, the starting material has been synthesized by a three step process with multiple purification techniques. With this chiral silane, experiments have been run with a racemic mixture and a 65:35 enantiomeric ratio for comparison. The results of these experiments have shown that the parameters are not yet fully optimized to bring a racemic structure to an enantiopure state. With this data as guidance, further studies are being conducted on the catalyst ((-)BTM) along with other experimental conditions to further optimize this reaction.
**Freiter, Meaghan**  
**Mentor(s): Dr. Morgan Adams**  
**Analysis of Time in Therapeutic Range (TTR) and Antiplatelet Dose Correlation to GI Bleeding in Patients with Continuous Flow Left Ventricular Assist Device (LVAD) Support**

A left ventricular assist device (LVAD) is a mechanical heart pump that supports and prolongs life in patients with end-stage, NYHA Class IV heart failure with reduced ejection fraction. LVADs are implanted as either destination therapy (DT) or bridge-to-transplant (BTT) therapy. Long-term dual anticoagulation with warfarin and aspirin is recommended to prevent thrombotic events in these patients. Anticoagulation is not without risk in these patients. Approximately 30% of LVAD patients nationally report bleeding events each year, with gastrointestinal (GI) bleeding accounting for the majority of events. Patients typically receive warfarin therapy with a target international normalized ratio (INR) goal of 2.0 to 3.0 along as well as aspirin 81 to 325 mg based on the International Society for Heart and Lung Transplantation (ISHLT) guidelines. The gold standard for monitoring warfarin therapy is time in therapeutic range (TTR) calculated using the Rosendaal method. The purpose of this study is to determine whether TTR and aspirin dose are predictive of GI bleeding in these patients. Complications include reduced heart transplant potential, decreased mortality, and overall decreased quality of life. We hypothesize that lower TTR and higher aspirin doses will be predictive of gastrointestinal bleeding events.

This study has been submitted to the Palmetto Health IRB for approval. This retrospective chart review will include data from all patients cared for by the LVAD clinic at the Palmetto Health Advanced Heart Health Center from January 1, 2015 to December 31, 2016. Patients will be excluded from the study if they do not have a defined INR goal or if they are not on warfarin at the time of the bleeding event. Data collected will include patient demographics (including age, gender, and ethnicity), INR results, and aspirin dose. Date of implantation and date of bleed will be used to calculate TTR prior to bleeding event and time with LVAD prior to bleeding event. Severity of bleeds will be stratified by the hemoglobin levels, hospitalization requirement, transfusion requirement, and number of units transfused. The INR and aspirin dose will be correlated to the frequency and severity of GI bleed events.

**Freshwater, Lauren**  
**Mentor(s): Prof. Moryah Jackson**  
**Going Global: Creating Cultural Cognizance**

As a triple major in International Business, Marketing and Management, my time at the University of South Carolina along with my international experiences have developed my global mindset and prepared me for future success as an international businesswoman. The summer after my sophomore year, I embarked on my first independent journey to Europe, where I took an intensive French language course in Aix-en-Provence, France. Although I had traveled to Europe before as a child, this experience allowed me to dive deeper into my cultural awareness; I lived with a French host family and spent my time outside of the classroom exploring the beautiful city and cultural roots of France. This increase of cultural cognizance was further solidified when I studied abroad a second time on exchange at Université Paris-Dauphine in the spring semester of my junior year. By learning in multi-cultural classrooms, interacting daily with locals, and traveling throughout Europe, I was able to truly put the different cultural frameworks and international business perspectives that I had learned to practice. Through these experiences, I’ve had the opportunity to learn from and about a variety of cultures and develop friendships with people from all over the world. More importantly, I realized how essential it is to truly understand other cultures, especially through the lenses of marketing and management. What I learned both inside and outside the classroom has allowed me to growth personally and professionally, which has ultimately led to my pursuit of graduation with Leadership Distinction in Global Learning.
Friendly, Christopher  
Mentor(s): Mrs. Christine Palmer, Ms. Samantha Truman  
The Associations Between Physical and Psychological Abuse and Health-Risk Behaviors in Heterosexual, College-Aged Males

Physical and psychological abuse in heterosexual, college-aged males is a rising public health issue. One area that is largely unexplored is the association between health-risk behaviors and abused males. Recent research suggests that abused females exhibit key health-risk behaviors. Moreover, other research identifies common health-risk behaviors exhibited in young adult males. This study explores the associations between health-risk behaviors and physical or psychological abuse utilizing survey research methods with heterosexual males (n = 187) at a large southeastern university. We identified significant odds ratios between experiencing an abuse factor and engaging in corresponding health-risk behaviors. We compared the found associations with previous research including common health-risk behaviors observed in non-abused, young adult males and to female abuse victims’ health behaviors. We found not only multiple similarities in our comparison but also identified health behaviors not present in previous research, specifically self-harm and binge or restrictive eating. The associations found in this study suggest that abused males may react to their abuse differently than their female counterparts. Though further research is needed, this study suggests potential areas for health promotion intervention with abused males.

Frishcosy, Christopher  
Mentor(s): Dr. Fabio Matta  
Stabilized Earth Masonry Blocks as an Affordable Method for Disaster Resistance Housing

Civil Engineers do not typically account for disaster situations because of the extensive cost associated with overdesigning. Stabilized Earth Masonry Blocks (SEMB) are an alternative building material that could provide affordable resistance against these hazards. These blocks are comprised of mixing and compressing local soil with low levels of cement, a corresponding percentage of water, and optional plastic fibers for reinforcement. This research utilizes geotechnical and material engineering principles to characterize the soil and determine the structural capabilities of these blocks. The data collection of individual blocks is accomplished using the Material Testing System while larger scale walls try to withstand an air cannon launched 2X4 that simulates the impact of debris during a hurricane. In the future, the walls will be subjected to vibrations to replicate that of a seismic event. The goal of this work is to quantify SEMB’s ability to serve as a sustainable solution for disaster resistances. In addition, I am expanding the study of SEMB to encompass its effects on air pollution following the implementation of it as a standard building material for my Air Pollution Control Engineering project this semester.

Fry, Austin  
Mentor(s): Prof. Drew Newton  
A Medical Mission to Inspire my Future Mission

In fulfillment of my Graduation with Leadership Distinction in Professional and Civic Engagement requirements, I will be presenting on how my medical mission trip to Nicaragua impacted my view of medicine and my attitude toward my future goals. As a Capstone Scholar, I had the opportunity to travel in March of 2015 with Dr. Patrick Hickey and about thirty other team members to serve rural Nicaraguan communities. On this trip, we set up clinics in Masaya, Nicaragua to provide informational pamphlets, medical care, and medications to local community members. I gained experience in taking patient history, diagnosing, and assigning treatment under the direct supervision of doctors in a local clinic setting. I also observed surgery in local hospital, navigated language barrier, and attended lectures throughout the week. Overall, this experience demonstrated the importance of prevention and education in medicine and solidified my desire to pursue medicine as a physician in the United States Navy.
Gant, Amber  
**Mentor(s): Mr. Ryan Lloyd**  
**The Path to becoming an Educator**

I will be Graduating May 2017 with Leadership Distinction in Professional and Civic Engagement and will be attending Graduate School at the University of South Carolina in May to obtain my Masters in Teaching. As a senior at USC, I changed my major from Nursing to History with an emphasis on Secondary Education. This was and still is one of the most nerve-wrecking and life affirming changes I have made in my life. Tired of feeling stuck and stagnant in life, I repositioned myself to embark on this new journey, which pushed myself back an extra year in school. Nonetheless, I wanted my life to be one of growth and new experiences. I wanted my change in major, and all changes really, to not only inspire growth within myself, but to also positively impact those around me. Education in my eyes presents all those changes and beliefs. Through my Education courses, High School Student Teaching experiences, becoming a Junior Varsity Volleyball Coach and working as a tutor and mentor to underprivileged students I have acquired knowledge on Maslow’s hierarchy of needs, creating an equitable classroom, the importance of research in education, which has significantly impacted me as a person and future educator. From working with students, I have grown my teaching styles and have become more patient and understanding of the needs of the youth in order to best educate my students and prepare them for high achievement within and outside the classroom.

Garcia, Haley  
**Mentor(s): Dr. Karen Patten**  
**How Global Learning Changed My Perspective**

Throughout my four years at the University of South Carolina, I have tried to put myself in situations to grow as a student, as a leader, and as a person. I have always been intrigued by the way the world works and have wanted to know more about different cultures, languages and people. Because of this, I immediately became an international business major thanks to the Honors College here. The most influential experience I have had during my time here happened during the spring semester of my junior year. I was given the opportunity to go on a direct exchange at a top finance university in Madrid, Spain, Colegio Universitario de Estudios Financieros or CUNEF. Throughout my time abroad, I was given so many opportunities to take my experiences and courses and apply them on a global level. My perspective changed with every new person I met and every new culture I experienced. I was able to travel throughout Europe and visited Africa and I loved every second of my experience. Before studying abroad, I figured I would join a marketing firm after graduation but now I have my eyes on a bigger role. The entire semester I strengthened my desire to leave an impact on this world and have found and cultivated a passion for international relations and I hope to pursue this field in the future. Through my experiences in the classroom at USC and abroad and my leadership opportunities my four years at Carolina have truly changed my life.
Gardner, Kayla  
Mentor(s): Dr. Tammi Richardson  
The effect of various macroalgae species on the growth, survival, and toxicity of Karenia brevis

Harmful algal blooms (HABs) caused by the dinoflagellate Karenia brevis produce toxins that result in negative impacts to both humans and the environment. Little is known about the termination stages of these blooms, and few viable control mechanisms have been suggested. Natural, algae derived compounds have been proposed as a way to limit bloom growth and reduce water column brevetoxins. The work presented here examines the ability of macroalgae to inhibit the growth or survival of K. brevis, similar to what has been demonstrated with other red tide species. Additionally, we attempted to determine if macroalgae decreases water column brevetoxins which, to our knowledge, has not been tested with macroalgae but has been demonstrated in other studies with microalgal species. This was accomplished via Indirect Bioassays, Methanol and aqueous extract studies, and LCMS. The macroalgae species Dictyota sp. and Gracilaria sp. caused 100% mortality of K. brevis in under 24 hours. Compared to the control, 7 other species significantly decreased the growth rate of K. brevis. The Dictyota treatments showed significant toxin reduction and increase of the antitoxin brevanol. These results indicate that some combination of compounds produced by macroalgae inhibit growth and survival of K. brevis and possibly limit their toxin production. Future studies will attempt to isolate and identify these compounds and test their effects on other marine organisms such as diatoms. Determining the interactions between HAB species K. brevis and macroalgal species will provide insights on the mechanism of bloom termination and a potential control method.

Gardner, Kayla  
Mentor(s): Ms. Jennifer Bess  
My Fellowship Journey: NSF REU, Hollings Scholar, and Goldwater Nominee

As a Marine Science major with minors in Biology, Math, and Chemistry, I have been heavily involved in research since my freshman year. I partook in a REU at Mote marine laboratory the summer after my freshman year, received the National Oceanic Atmospheric Administration’s Ernest F. Hollings Scholarship my sophomore year, and am a Goldwater nominee this year. The NSF funded REU is a summer research experience for undergraduates. Through this experience, I was exposed to a number of potential career paths that I had never considered: governmental research, state research, nonprofit research. I also got the chance to develop and conduct my own research project dealing with harmful algae blooms. The Hollings Fellowship provides students with a monetary scholarship for their junior and senior years and a ten week internship at a NOAA facility. I will be going to Honolulu Hawaii this summer to conduct education outreach and conservation research relating to the endangered Hawaiian Monk Seal population. Through this scholarship, I will also be funded to attend up to 3 conferences to present my research. I applied for the Goldwater Scholarship my sophomore and junior year. My sophomore year, I was lucky enough to advance to interview rounds, and, although I did not become a nominee, I learned so much about the process and discovered where I could improve. My junior year, I was more prepared and ended up getting nominated. Regardless of the outcome, I know that it was worth going through the process to aid in my interviewing technique, writing style, and planning for graduate school. These experiences have built upon one another and really helped me to figure out the career path I want to take in the future.
Hawksbill sea turtles play a vital role in the ecosystem surrounding their local reef and are critically endangered. Efforts to better understand their biology are difficult to achieve because of their aquatic, slow-growing, and highly migratory lifestyles. Although much attention has focused on regional population structure in marine turtles, little has been done on fine-scale relatedness within rookeries or correlating fitness parameters with genetic relatedness. Determining levels of genetic variance for fitness-related characters is important for understanding the adaptive potential of a population, particularly fragmented and endangered populations. The Jumby Bay Hawksbill rookery contains highly related individuals that have been rigorously monitored for 30 years, presenting a unique opportunity to investigate the heritability of reproductive parameters, such as re-migration interval, clutch number, clutch size and hatching success. Based on knowledge of the energetic costs of reproduction, we hypothesize that re-migration interval and clutch number are largely determined by the environment (i.e. the quality and quantity of food available), thus patterns of variation for these two parameters are not expected to correlate with pairwise estimates of genetic relatedness. However, based on heritability studies in birds, we hypothesize that clutch size and hatching success have a genetic component, demonstrated by patterns of these two parameters correlating somewhat to pairwise relatedness of nesting individuals. We will use a regression-based analysis to estimate the heritability of these four reproductive traits within the JB rookery. We plan to discuss the implications these data have for the management of small, isolated populations of endangered species.

Garner, Sydney
Mentor(s): Dr. Charles Pierce
Emphasizing the

For as long as I can remember I have wanted to become a doctor. In preparation for this career, I became a Public Health major and have pursued many medically related experiences inside and outside of the classroom. Throughout my various classes and experiences I have learned the importance of three key components: the patient, teamwork, and communication. When these three things are combined in medicine, patients can feel valued and empowered. Throughout my studies, I have also learned that information in healthcare is often asymmetric which means that doctors are viewed as the unequivocal experts and decision makers for patients. This information imbalance can leave patients in a vulnerable position. If, as doctors, we emphasize the importance of the three key components then we can level the playing field and work together as a team to reduce the information imbalance that often exists in healthcare. I hope to use my platform as a future medical student to increase awareness of the information imbalance and to improve the way it is dealt with in hopes of creating a better doctor-patient relationship and a better way to care for our patients.
Garzia, Sara  
Mentor(s): Dr. Kara Montgomery  
College Student Health: How Cooking can Promote Nutrition and a Healthy Diet

I wrote my thesis on college student health and created a cookbook specifically for University of South Carolina students who use the Gamecock Pantry, a food bank designed for students who are having financial difficulties. In my cookbook, I included recipes that were relatively healthy and easy to follow. This cookbook was not just supposed to be a book full of recipes; it was created to be guide for people who are new to cooking or uncertain about their skills and includes plenty of pictures, detailed instructions and a separate section that describes how to prepare and cook different types of vegetables. Maintaining a healthy diet is something that is very important for people of all ages. It is especially important to help provide people with the tools to achieve this healthy diet. In my opinion, creating a simple yet healthy cookbook is one way of providing both an incentive and a resource for healthy cooking. One of the things I learned from researching and creating this project is that students are a vulnerable population in terms of their health; initiating preventative programs is very important to keep students healthy, both now and in the future. Chronic diseases are appearing in younger and younger populations, and because of this it is important to look at these younger populations to see how we can help them to prevent the development of such diseases. From this project, I hope students learn how important their health is, even at a young age, and how simple it can be to eat a healthy diet. This cookbook will hopefully remain a resource that future students will continue to use for years to come. Even if that goal does not come to fruition, this project has helped me discover my passions about food and food access, and I hope to continue working in this area after I graduate.

Gates, Justin  
Mentor(s): Dr. Joe Jones  
Litter Along Southeast Georgia’s Coast

Anthropogenic litter is an issue that has plagued many beaches for years. The purpose of this project was to collect litter that accumulated along a 2.5km stretch of coastline on Saint Simons Island, Georgia over the course of 10 weeks. The collected litter was sorted into ten distinct categories: Styrofoam products, sheet plastic, other plastic products, aluminum cans/bottles, paper products, metal products, glass bottles, monofilament, cigarette butts, and other. After being collected and sorted into categories, the litter was then tallied and weighed. During the project, over 6,200 individual pieces of litter were collected, weighing in at approximately 70 kilograms.

Gaughan, Mary  
Co-Presenter(s): Heath Saffer  
Mentor(s): Dr. Jill Stewart, Mrs. Jessica Baird  
Exercise-enhanced performance of a 3-dimensional target task

High-intensity exercise has been shown to enhance motor learning, however past research investigating exercise-enhanced motor learning used 2-dimensional button press tasks. The purpose of the current task was to examine the effects of high-intensity exercise on a 3-dimensional (3D) reach task that utilizes whole arm movements that may better represent real-world actions. Nine young healthy participants (age: 23±3.39, 6 females) were randomized into a high-intensity exercise or a rest group. Individuals in the high-intensity group rode a cycle ergometer at 80% of their maximal resistance as determined in a previously completed graded exercise test. Duration was individually adjusted so that each participant expended 200 calories of energy. The rest group sat quietly for twenty minutes. After the intervention, all participants practiced a sequential target task requiring whole arm reach movements in a 3D virtual environment. Targets were presented in 8-target sequences, and time to complete each sequence was assessed. Regardless of group, performance improved over time (main effect of time F (1,7) =623.2, p=0.03). At the start of task practice, the high-intensity group completed the sequences faster than the rest group (cohen’s d=1.59). Results indicate that individuals in the high-intensity group were initially faster at the motor task. High-intensity exercise increases brain derived neurotrophic factor (BDNF), a protein important in motor learning. Therefore, it is possible that an increase in BDNF post-exercise facilitated the faster movement times. In conclusion, high-intensity exercise enhanced immediate performance of a real-world 3D reach task, when comparing performance of individuals who did not exercise.
Alzheimer's disease (AD) affects 46 million people worldwide with its incidence is expecting to reach 131 million by 2050. The amyloid cascade hypothesis states that amyloid-β (Aβ) protein forms aggregates that induce nerve damage and deterioration. Aβ monomers originate from the proteolytic cleavage of the amyloid precursor protein (APP) via sequential β-secretase-1 (BACE1) and γ-secretase cleavage. The presence of Aβ can lead to an upregulation of both APP and BACE1 mRNA expression, resulting in a feed-forward mechanism for the amyloidogenic cleavage of APP. Alternately, APP cleavage by sequential γ-secretase and β-secretase prevents the amyloidogenic cleavage of APP, presenting a potential therapeutic target. This study utilizes SH-SY5Y neuroblastoma cells to determine whether catechins, including epicatechin (EC), epigallocatechin (EGC), epigallocatechin gallate (EGCG), and theaflavins, including theaflavin (TF), theaflavin monogallate (TFG), could reduce Aβ-induced upregulation of key AD-associated mRNAs, as well as the ability of these compounds to stimulate mRNA expression of putative β-secretases, ADAM9 and ADAM10. When cells were treated with oligomers made in the presence of compounds, all catechins examined reduced Aβ oligomer-induced expression of BACE1 mRNA, and EGCG reduced Aβ oligomer-induced expression APP mRNA. Additionally, oligomers modified by EGC and EGCG upregulated ADAM10 mRNA expression. When cells were treated instead with native oligomers and antioxidant-capable concentrations of compounds, EGC reduced Aβ-induced APP mRNA expression, while EC reduced Aβ-induced mRNA BACE1 expression. These results indicate that both anti-aggregation and antioxidant characteristics of catechins may alter mRNA expression to reduce feed-forward mechanisms and promote non-amyloidogenic processing of APP.

Geurink, David
Mentor(s): Dr. Kenneth Walsh
Development of a Fluorescent Assay for Studying Cannabinoid Type 1 Receptors

Cannabinoids (such as tetrahydrocannabinol [THC]) are the chemical compounds found in marijuana (cannabis plant) that bind to cannabinoid type 1 and 2 (CB1 and CB2) receptors. Previous studies have shown the clinical potential of using cannabinoids in treating glaucoma, nausea, chronic pain, inflammation, multiple sclerosis, and epilepsy. A novel target for CB1 drug therapy is the G protein-gated inward rectifying potassium (GIRK) channel pathway. CB1 activation utilizes a pertussis-sensitive Gi/o protein second messenger system that inhibits adenylate cyclase and regulates GIRK channels. The goal of this project was to develop a cell fluorescence assay for measuring CB1 receptor stimulation using a GIRK channel signaling system. Neuronal AtT20 cells, expressing GIRK channels and CB1 receptors, were cultured in 96 well plates, loaded with the membrane potential-sensitive fluorescent dye HLB 021-152, and measured with a fluorescent imaging plate reader (FLIPR). Application of the CB1 agonist WIN-55 caused a rapid decrease in the fluorescent signal, indicative of GIRK channel activation and subsequent K+ efflux. The GIRK channel fluorescent signal was inhibited by the GIRK channel blocker tertiapin-Q and increased by the putative GIRK channel opener N-(2-methoxyphenyl) benzene sulfonamide. In the future we will use the assay to identify natural products that stimulate the CB1 receptor.
Ghaffar, Muhammad  
Mentor(s): Dr. Ginny Webb  
Examining the relationship between antifungal drugs and the Cryptococcus neoformans virulence factor Antiphagocytic protein 1

Cryptococcus neoformans is an opportunistic, intracellular fungal pathogen that is the leading cause of life threatening meningoencephalitis in immunocompromised individuals. The yeast infects the host through inhalation of spores into the lungs. In order to evade the host’s immune response, C. neoformans employs various virulence factors such as capsule formation, melanin production, and Antiphagocytic Protein 1 (App1). Previous studies have shown that App1, is a key virulence factor of C. neoformans. App1 inhibits phagocytosis by alveolar macrophages in a dose dependent and complement mediated manner. If left untreated, Cryptococcal meningoencephalitis is uniformly fatal within approximately two weeks. Primary antifungal drugs used for treatment are amphotericin B (AmB), flucytosine (FLC), and fluconazole (FLU). It is evident from previous studies that antifungal drugs regulate C. neoformans gene expression and virulence factors. Due to the role that App1 plays in the virulence of C. neoformans, we sought to investigate the effect of antifungal drugs on the expression of App1 as well as the effect of App1 on the susceptibility of C. neoformans to antifungal drugs. To measure the effect of antifungal drugs on App1 we incubated wild type (WT) cells with AmB or FLU for 90 minutes and performed Real-time PCR to measure App1 mRNA expression. To measure the effect of App1 on Cn’s susceptibility to antifungal drugs we performed a killing assay by incubating WT and ΔApp1 (a strain with the App1 gene deleted) cells with varying doses of AmB or FLU for 90 minutes and measured survival. We found that amphotericin B down-regulates and fluconazole up-regulates the App1 expression. We also found that App1 increases the susceptibility of C. neoformans to amphotericin B and fluconazole.

Giacco, Samantha  
Mentor(s): Dr. Christopher Mazoue, Dr. Benjamin Jackson, Ms. Tam Ramsey  
Analysis of Ulnar Collateral Ligament Injuries in the State of South Carolina

It has been highly suspected by the Sports Medicine community that injuries to the elbow are becoming more common, especially in overhead throwing sports such as baseball, softball and javelin throwing. However, definitive data regarding the incidence and prevalence of these elbow injuries is limited. The focus of this research is to examine the incidence and prevalence of elbow injuries in the state of South Carolina over a 10-year period from 2005 to 2015. UCL reconstructions between 2005 and 2015 were searched in the South Carolina Revenue and Fiscal Affairs office database using CPT code and ICD9 code. Patient demographics, case volume per hospital and case volume per year were assessed. The incidence of UCL reconstruction is common among adolescents and is trending up in South Carolina. Identifying the etiology and public education on adherence to pitching guidelines could potentially slow down this trend.

Giacco, Samantha  
Mentor(s): Ms. Maegan Gudridge  
Serving Abroad Serves the United States

Since high school, I’ve wanted to become a physician and thought that all I had to do was be passionate about serving others and learn a whole lot of science. This belief still holds true to some extent, but I’ve learned over my four years at USC that there are many more aspects of being a successful physician. I’ve used these skills locally in different shadowing experiences, but I have also had the opportunity to take these skills to Nicaragua. I traveled abroad with Capstone Scholars my freshman year, and this year as a senior I was able to lead a team of 13 pre-health students. This experience has helped me develop into a more well-rounded leader and future health care professional. I know that the life lessons from these experiences, in addition to many others Carolina has taught me, will carry on into my future career.
Gilbert, Robert  
**Mentor(s):** Dr. Stuart Hunter  
**Vienna Waits for You**

Vienna, the home of the likes of Mozart, Strauss, and Freud, is a musical, political, historical, and cultural hub in central Europe. Once the capital of Europe. The City of Vienna owns one of the most majestic and powerful histories in the entire world. Vienna is known as a welcoming location for intellectuals, from across time and history, to escape from the outside world to allow their minds to conceptualize. By spending a semester at the University of Vienna in Vienna, Austria, I had hopes of standing on the shoulder of giants. Vienna is an august city with limitless opportunities that I was fortunate enough to take advantage of. From exploring one of the world's United Nations capitals to attending La Traviata and a Wiener Philharmonik Orchestra concert, my life was forever changed. I learned how to live and adapt in a foreign culture. I learned to put prejudices aside and to try new things. I learned it is better to live life on the edge than to grow old and have regrets. Culture is not something you can learn in a classroom, it must be ingrained into you through experiences of adversity and adventure. Living in Vienna opened my eyes to opportunities I did not know existed and helped shape my worldview. My experiences in Vienna awakened a sense of wanderlust that will live with me for the rest of my life.

Gilberto, Jamie  
**Mentor(s):** Dr. Crystal Zhan  
**Does socioeconomic status and population density affect how charter schools choose to locate themselves in the Southeast?**

The purpose of this research is to find if there exists a trend between where charter schools chose to locate themselves and the socioeconomic statuses and populations densities of those areas. As private institutions, we expect charter schools to act as most businesses and locate themselves where there is a higher demand for alternative educations options. The results of this project will explain any relationship between these variables and look to explain how and why charter schools chose to locate themselves in certain areas.

The objective of this research is to examine if there are trends between where charter schools are located and characteristics of its surrounding district, including racial composition, population density, and median household income of the area. Through this project we would be able to find if charter schools satisfy the demand for alternate education options in all areas. The overall goal of this project is to see if in satisfying what we expect to be a higher demand for charter schools in urban areas of low socioeconomic status, charter schools are inherently not satisfying or ignoring some or all of the demand for charter schools in more rural areas or areas of higher socioeconomic status in order to maximize funding.

Gilmore, Kyndra  
**Co-Presenter(s):** Cam Branham, Melissa Weisberg  
**Mentor(s):** Dr. Kelly Lynn Mulvey  
**A Study of Youth Interactions and Bullying Phenomena Pertaining to Children with Disabilities**

Bullying has been identified as an epidemic in the United States (Blumen, 2011). Bullying victimization has been linked to academic difficulties. Furthermore, students with disabilities are seldom represented in bullying studies. Though bullying increases during the transition from elementary to middle school, only a few studies have examined this important transition. The research conducted focused on how students responded to their peers with disabilities. Participants were fourth and sixth graders (N=90) evenly divided by gender. Extensive surveys were given to measure the evaluations of acts of bullying, peer groups, and family context. Linear regressions indicated significance in participants' responses to whether their group should include a child with disabilities. Participants' expectations of their group including their peers predicted if the participants thought their group should include their peers. Results were also significant for the likelihood that participants would respond if they saw a child with disabilities being bullied. Participants who viewed bullying as being less acceptable were more inclined to report the bullying. The research examined the important transition from elementary to middle school, which is crucial in understanding bullying. The specific findings from this study can be used to help further develop programs that reduce bullying of students with disabilities.

Cam Branham, Kyndra Gilmore, Melissa Weisberg, Dr. Kelly Lynn Mulvey
Glaeser, Noemi  
Mentor(s): Dr. Gabriel Terejanu  
Generating Geographic and Temporal Heat Maps of Aflatoxin Incidence using Regularized Linear Models

This project aims to decrease the incidence of aflatoxin in corn by developing and testing a mathematical model that utilizes geographic environmental data, such as temperature and humidity, to predict aflatoxin incidence. With interpolation, a heat map can be generated to show in which areas and at what times crops are most susceptible to aflatoxin, allowing farmers to focus their preventative efforts and efficiently address the issue to impede the production and spread of aflatoxin.

Glenn, Kenneth  
Mentor(s): Dr. April DeLaurier  
Generating mef2ca and mef2cb transgenic zebrafish lines using BAC-mediated recombination

The purpose of this research is to study the dynamic role of mef2ca and mef2cb in craniofacial skeletal development and muscle development. We plan to make transgenic lines that will express fluorescent transgenes in an endogenous fashion to both mef2ca and mef2cb, allowing tracking of gene expression in living fish, which can be correlated with connective tissue and heart patterning. The mechanism for this project involves the transformation of bacterial artificial chromosomes containing either mef2ca or mef2cb into DY380 E.coli cells. Then, Phusion PCR products will be electroporated into the transformed DY380 cells. Once integration has been confirmed, the construct will be injected into single-celled zebrafish embryos which will then be screened for the expression of these fluorescent transgenes. The patterning of these areas can be studied because the family of myocyte enhancing factor 2 (Mef2) transcription factors are important regulators of muscle formation. Although both mef2ca and mef2cb are both orthologues of the human MEF2C gene, mef2cb is more closely related to MEF2C. Of the thirteen closest genes surrounding MEF2C in humans, mef2cb is proximal to twelve of them. This is significant because studies have shown that mutations of the MEF2C gene are linked with heart defects in humans and craniofacial defects in zebrafish. Therefore, tracking gene expression of mef2ca and mef2cb could be advantageous for the study of both craniofacial and heart development in zebrafish and in elucidating the cell types and timeframe in which these genes are expressed.

Glenn, Adam  
Mentor(s): Ms. Laura Galloway, Ms. Hayley Efland  
Sustainable Solar Power Bank for Student Use

Solar energy is one of the major alternative energy sources that is reliably used throughout the world in modern times. With the only necessity for electricity generation being sunlight, solar panels can be well utilized outdoors in closed systems which generate electricity for 110V outlets. The goal of this project is to design and implement a Solar Panel Power Bank at Green Quad in collaboration with Sustainable Carolina and the University of South Carolina student chapter of Engineers Without Borders. This power bank will be accompanied by an area for students to sit down to work and study while charging their personal electronics (phones, laptops, etc) with the energy collected by the solar panel and stored in the power bank. Through education and strategic placement, this project is will support and promote the three pillars of sustainability to both the Carolina and Columbia community.
Glover, Daniel  
Mentor(s): Dr. Shay Malone, Mr. Michael Crowley  
Civic Engagement: From Pastime to Career Path

My passion lies in empowering others, and working with them to change unfortunate circumstances. As a member and leader of numerous on-campus organizations, community development has marked my time at the University of South Carolina. Through my various experiences with program planning, training, and coursework, I have familiarized myself with the skills necessary to develop, implement, and evaluate community education programs. Unbeknownst to me, this trend of civic engagement was highlighting my true passion for effective leadership and community building. I thought I was grooming myself for a career as a healthcare administrator, and that my coursework was only applicable to areas involving health. Upon reflection, I have found that lessons taught in the classroom can be applied to a wide range of disciplines, and experiences gained outside of the classroom will often teach life's greatest lessons. Viewing campus as a microcosm of society, I have been able to “practice” utilizing skills that will apply to my future career as an elected official. This presentation will explore how I plan to use the abilities I have gained through civic engagement to effect positive change in communities all over the world.

Goldberg, Zach  
Mentor(s): Dr. Rachel Davis  
Crafting Health Narratives for Mexican Mothers of Preschool Children

Background: Childhood obesity is higher in American minority populations than non-minority populations. About 13.7% Mexican-American children aged 2 to 5 years are obese compared to about 9.1% of non-Hispanic white children. Research suggests that parents of Mexican origin face barriers that obstruct their ability to access and interpret appropriate health information, particularly when they have limited financial resources or literacy levels. Narrative communication uses stories to convey information and may be a particularly effective means of communicating with lower income, lower literacy Mexican American populations. However, more research is needed to identify the features that increase the effectiveness of narratives used in health promotion. The purpose of this ongoing mixed methods study is to explore the effectiveness of specific narrative strategies in promoting childhood obesity prevention messages among Mexican-origin mothers of preschool-aged children.

Methods: The participants consisted of 38 Mexican-origin mothers of children aged 2 to 5 living in Lexington and Richland Counties. Each participant completed a telephone survey and two face-to-face interviews, during which participants were randomized to hear stories with embedded childhood obesity prevention messages. These messages used different narrative strategies, including the influence of low, medium, or high suspense on narrative engagement and first person versus third person narration.

Results: This presentation will describe the types of narrative strategies that were tested and the measures used to examine the influence of specific narrative strategies on message recall, character identification, and narrative engagement.

Gosnell, Hannah  
Mentor(s): Mr. Alex Blauvelt  
Bridging the gap between provider and patient

As we progress in our careers as healthcare workers, it is often easy to become tired or burnt out with the long hours and needy, sick patients. Our attitudes about our patients' situations or requests can often change the way we carry out our tasks. Our attitude and outlook will affect our patient's view of us and make optimizing their health difficult. As nurses we need to be aware of the issues our patient populations face so that we can be sympathetic and compassionate as we treat them. Through good behavior modeling and staff development programs, my aim is to bridge the gap between the healthcare professional and patient. The goal is to decrease frustration and burnout rate on my unit by encouraging staff to get to know the populations we take care of in the hospital so that we can understand their needs and better serve them. Understanding the background, culture, and disparities of our patients' situations can help us to find a common ground and be able to work as a team to enhance their healthcare experience and their wellbeing.
Gough, Reid  
**Mentor(s):** Ms. Tricia Kennedy  
**Immersion and**

My professional goals have been shaped and molded by my time at USC, most especially through my experience as a student shadow with Palmetto Health- USC Medical Group. I’ve had the wonderful opportunity to shadow physician assistants in the clinic and in the operating room and have observed and noted efficient patient-medical professional interaction as well as the delivery of quality, patient-oriented health care. Prior to this exposure, I was unclear what direction I wanted to pursue for my future career. However, as soon as I entered the exam room with the physician assistant to meet with our first patient, I was hooked. I immediately became entranced with the relationship between a medical provider and patient and the degree of trust and partnership I observed. It is impossible to not absorb huge amounts of information through this observational learning and this immersion led to my gaining distinct insights into patient care that I know I will carry with me when I become a practicing certified physician assistant. I noticed the deeply-rooted interdependence that exists to promote efficiency and functionality in a clinic as well as the necessity for empathy to create a meaningful, mutually respectful connection between patient and provider. One of my biggest “aha!” moments from this experience was also the significance and power of holistic medicine in treating patients. My professional engagement has made me eager to jump into the medical field as a physician assistant and serve the public by providing great patient care.

Graham, Ashley  
**Co-Presenter(s):** Jacob Lyerly, William Quant, Haley Sprankle, Samuel Edelson  
**Mentor(s):** Prof. Sara Schwebel, Prof. Erica Tobolski, Mr. Jeff Francis  
**Voiceovers for Channel Islands National Park**

This team of USC Theatre and Music students created voiceovers for a National Park Service website focused on the children's book Island of the Blue Dolphins as well as the historical figure upon whom the book is based. We researched the book, website, and short essays written by researchers on topics related to the science and history presented in the children's book. We then decided which of the researchers' essays would be recorded by each actor for the website. As part of the rehearsal process, we made choices about the performance delivery based on the intended audience: school children with learning disabilities and people of all ages with visual impairments. Prior to the recording process, we tested our acting choices in front of the students of the Saluda School of the Arts and we sent recordings to staff members of the Channel Islands National Park. Because it was the first time for all of us working in a professional studio, we faced a steep learning curve in mastering the recording equipment and editing the audio recordings. Additional challenges included performing for an imagined audience, mastering microphone technique and making adjustments according to the notes from the sound engineer and director. This project has honed specific skills necessary to pursue a wide array of professional work in the audio recording industry.

Graham, Jason  
**Mentor(s):** Dr. Ward Watt  
**Sequencing of 6PGD**

The molecular tools of genomics have great power to reveal patterns of genetic difference within or among species, but must be complemented by the mechanistic study of the genetic variants found if these variants’ evolutionary meaning is to be well understood. 6PGD is an enzyme in the pentose phosphate shunt. Colias butterflies are used as a model system for 6PGD study. The middle coding region of 6PGD has been found to be largely conserved; however, the entire gene has yet to be sequenced. We are close to sequencing the entirety of the gene. Once the gene has been fully sequenced, analysis can be performed to look for any variation or evidence of polymorphism.
Grammerstorff, Heidi
Mentor(s): Dr. Amber Fallucca
Internship at the Barclays Center

A significant beyond the classroom experience that I experienced is my internship at the Barclays Center located in Brooklyn, New York. In this role, I served as the Global Marketing intern marketing concerts and family shows for the arena. This internship was the final internship I did before entering my senior year at USC. I did this internship because working for a renowned company in the industry felt like the next real step towards my goal of being a marketer in music/entertainment field. During this internship, I learned a lot about myself as a professional. I also learned about the challenges of marketing a live event, the current trends in the industry, and importance of networking and professionalism in the field. Overall this internship has given me great insight on how to improve myself as a professional entering the field of entertainment marketing. Upon graduation, I am eager to share my experiences and knowledge about what I learned, along with the challenges I faced during my time in this role.

Green, Spencer
Mentor(s): Mrs. Laura Kissel
Company culture: Creating a better workplace

Throughout my internship experiences, while being a student I have gained a better understanding of the value of company culture for increased productivity and happiness of employees. I had two internships with companies that were very different in size. The first company that I worked for was 4D Engineering, a family-owned civil engineering consulting firm with 4 full-time employees when I was there. The position that I accepted after this one was with Nucor, a fortune 200 company with over 22,000 employees. These two companies are vastly different in terms of their resources, revenue, and corporate structure, but somehow still share similarities in their company culture. Both manage to create a work environment that is friendly and enjoyable to work in, while I could feel comfortable asking anyone a question about what I was working on. The experiences that I had with these companies have had a profound impact on my interpretation of how a company should operate and treat its employees. I look forward to going into the workforce after this semester and bringing this knowledge with me to share with a company to help create a better work environment for its employees.

Griffin, Christopher
Mentor(s): Dr. Kasia Pawelek
Effect of an imperfect vaccine and behavior change due to the symptoms on the spread of influenza

The influenza virus is classified as a major public health issue by the World Health Organization (WHO) and Centers for Disease Control (CDC). Many individuals are vaccinated annually in the hopes of avoiding the influenza virus. However, some of these individuals are unaware that the vaccine efficacy is never 100% and that protection is acquired approximately two weeks following immunization. Understanding the effects of this misconception and connecting it to behavior change allows for improved predictions of an influenza epidemic.

We used an ordinary differential equations model that accounts for behavior change and lack thereof upon receiving an imperfect influenza vaccine. Our model includes four stages of infectiousness that are proportional to the duration, severity, and viral shedding. was calculated using the Next Generation Method and we found that it depends on the parameters associated with behavior change and force of infection. Our model showed that when more than 75% of the vaccinated population is exposed to the influenza virus due to the failure of the vaccine to protect them against the infection, the epidemiological peak is higher and earlier than if the vaccine was not administered. The highest epidemiological peak resulted when the fraction of vaccinated individuals exposed to the influenza virus was 100%, i.e., when the vaccine completely failed and vaccinated individuals thought that they were protected against influenza virus. Our model also showed that incorporating behavior change in addition to vaccination also significantly lowers and delays the epidemiological peak giving more time to develop control and prevention strategies.

This study further shows that behavior change is still necessary during an influenza outbreak even when a given individual is vaccinated. Because of the misconception that influenza vaccines are 100% effective and protection begins immediately, it is likely that some individuals will not change their behavior and contract the influenza virus, leading to an even higher magnitude epidemic.
Transgenerational plasticity (TGP) is a mechanism by which invasive species appear to have adapted to local environments after only a few generations. TGP results from maternal plants interacting with local conditions such that subsequent seeds and seedlings exhibit adaptive traits for that environment. For species with highly restricted genetic variation, estimates of population variation measured under controlled conditions may reflect interactions of maternal plants with local field conditions and not ecotypic differences among populations. If this is true for some invasive species, experiments demonstrating ecotypic variation may exaggerate actual genetic variation. Aegilops triuncialis is a model species for investigating TGP in invasive species because the northern California populations appear genetically uniform and each represents one of only two genotypes. Significant among-population variation has been documented in A. triuncialis despite the apparent genetic uniformity and TGP appears to influence seed and seedling traits. In this species, we predict that the observed variation among populations within a genotype can be eliminated in first generation plants under common garden conditions, that second generation plants will show relatively uniform responses among populations within genotypes, and that field effects related to soil quality can be established in a single growing season. The data are taken from five populations from each genotype, grown for two generations on two low fertility soils, and reciprocally transplanted in the second season. These results would suggest that apparent ecotypic trait variation in invasive species should be tested after seed production in a uniform environment.

Guda, Irini
Mentor(s): Mr. Alex Blauvelt
Finding my Passion “On the Hill”: Growth Begins Here

In today’s society, there is often a discrepancy between politics and doing what is morally sound. As a public health major, it is imperative to understand the importance of balancing health and people's freedom by introducing policies that accomplish the goal of harmonizing the two. Interning for Congress in Washington D.C. has been an overwhelmingly eye-opening experience that has allowed me to better understand the legislative process of formulating and evaluating bills while also understanding the concerns and ideas of constituents. Through writing healthcare memorandums, attending hearings and briefings, and researching topics of concern for constituents, I have gained more knowledge on the issues surrounding and impacting many people. My experience “on the hill” has helped shape me into a more confident and versatile person by allowing me to step out of my comfort zone and interact with both congressmen and vulnerable populations affected by our laws. This internship confirmed my passion for improving health care through policy and advocacy. It’s one thing to educate oneself and endorse healthy behavior on an individual level, but it’s another thing to promote health and well being to a whole population through policies that help address issues bigger than any of us could ever solve on our own.
Guerin, Lindsey  
Mentor(s): Dr. Jill Turner  
Defining the Role of Striatal Oxidative Stress Response During Nicotine Withdrawal

Tobacco smoking is a well-known public health problem that is driven largely by the addiction to nicotine. Chronic nicotine administration and withdrawal from nicotine can cause negative effects and consequently alter brain functions. One of these effects is the excessive production of reactive oxygen species (ROS), which can lead to oxidative stress within the cells. To determine if nicotine withdrawal causes oxidative stress in the brain, the expression of genes known to be involved in oxidative stress regulation were studied. This study was done using striatal samples as well as ventral and dorsal striatal samples for more region specific evaluation. One of the genes of interest was the transcription factor Nrf2, which targets genes that have antioxidant response elements in their sequences. We also looked at the expression of Nrf2 gene targets, which include H01 and NQ01. Another gene we investigated is NOX2, which is the major intracellular producer of ROS. While we expect expression of these genes to increase in nicotine withdrawal we have not yet confirmed these results. It is expected that expression of ROS markers will increase because oxidative stress is associated with nicotine withdrawal. The role of oxidative stress in nicotine withdrawal may help us gain an understanding of the molecular basis of withdrawal phenotypes and how they can be controlled to improve success among smokers who are trying to quit.

Gutierrez, Alondra  
Mentor(s): Dr. F. Wayne Outten  
Characterizing the Functional Role of SufR in the Iron-Sulfur Cluster Assembly Pathway in Mycobacterium marinum

Iron metabolism has been shown to contribute to the pathogenesis of the pathogen Mycobacterium tuberculosis, whose iron-sulfur (Fe-S) clusters may potentially play a vital role in the survival of the bacterium. Hence, altering these iron-pathways could potentially lead to the improvement of new and effective anti-tuberculosis drug agents. This research project intends to characterize a potential regulator of the Suf pathway, known as SufR, in the model organism Mycobacterium marinum. The Suf pathway is the exclusive system that assembles and repairs iron-sulfur clusters, which are fundamental biochemical cofactors, found within Mycobacterium sp.. The sufR gene was purified from the pathogenic organism Mycobacterium marinum and recombinantly expressed into Escherichia coli for further biochemical analysis. Different biochemical experiments will investigate the SufR protein's function and association with the mechanism involved in iron homeostasis.

Habbick, David  
Mentor(s): Dr. Joe Jones  
Never Stop Learning Because Life Never Stops Teaching

As an engineer at the University of South Carolina I had to take a materials engineering class which we learned all about how the cooling process of metals changed their material properties. In this class I learn how to read charts to determine how exactly the cooling length and temperature what effect the material properties of steel. Then the summer following this class I had just started my internship with Nucor Steel South Carolina and after one week of safety training we started touring the plant and learning about the steelmaking process. We went down to the material engineering section and started learning about the different ways steel was cooled and how it affects the quality of the steel. I was then able to have an in-depth conversation with the lead engineer about the hardening process and benefits and uses in the industry. This led to me becoming friends with the lead engineer making a connection and being able to further my knowledge of steelmaking. After the conversation, I realized that I had applied the information I had learned in my materials class to real life. These learning opportunities have shaped my life and taught me lessons that I’ll be able to take with me wherever I go. I have learned about the mill and the environmental side of things and what it takes to be successful. I think that these are life lessons that will help me develop into a better man.
Haggard, Caroline  
Mentor(s): Ms. Lisa Camp  
Professional and Civic Engagement Through Experiential Engineering Education

Experiential learning is a concept that has proven to have positive impacts in a multitude of fields and applications, but is of special interest to engineering students. Through various professional and civic engagements, I’ve had the opportunity to see how experiential learning affects students from elementary school to college classrooms to working in the “real world”. Its effects can be felt in how students choose career paths, how teachers and professors teach and relate to students, students’ actual performance in classrooms, and many other facets of education. My experiences at USC as a Supplemental Instruction Leader and teaching assistant, as a research assistant, and as a structural engineering intern in Columbia have given me key insights into how important experiential learning is, and how we can intentionally design and incorporate it into our lives and education systems.

Haggard, Caroline  
Mentor(s): Dr. Fabio Matta, Dr. Charles Pierce  
Active Learning for Civil and Environmental Engineering Undergraduates in the Context of Novel Nanomaterial Applications

For two consecutive years, part of a civil engineering materials laboratory course was dedicated to create in-class environments for student-centered, problem-based learning. The goal of the active learning exercises utilized was to elicit critical thinking in the complex and increasingly important area of nanomaterials in civil and environmental engineering. Evidence of the development of these critical thinking skills has been extracted from written student responses and schematics, and analyzed by (1) examining how students adsorb, process, and apply new information; (2) examining how group dynamics influence students’ responses and thinking processes; and (3) identifying factors that may influence students’ thinking processes during these exercises, and developing suitable performance measures. Preliminary results indicate that these active learning exercises contribute to modest improvement in students’ performance, according to performance measures established during this project. Analysis of the evolution of students’ responses throughout the exercises have also given insight into how civil engineering-specific learning exercises may be better structured to encourage development of the critical thinking skills essential to the engineering profession today.

Hall, Rachel  
Mentor(s): Dr. Melissa Moss  
Evaluating the role of glycine in amyloid-β aggregate stability

Alzheimer’s disease (AD) affects 5.4 million Americans. Deposition of aggregated amyloid- beta (Aβ) protein is a hallmark in the progression of AD. In order to better understand the role of Aβ in AD etiology, it is important to biophysically characterize the structure and function of the toxic proteins. This effect will be studied through the use of sequence mutations to glycine, a common amino acid found in amyloid proteins and theorized to enhance chain flexibility. Four mutations, L16G A21G, V17G E22G, G251, and G25A were selected to either enhance chain flexibility or reduce it through the use of either a bulky (isoleucine) or more constrained (alanine) amino acid. To explore the role of chain flexibility in aggregation propensity and stability, SDS-PAGE and Western blot were utilized. Results indicate mutations convey SDS resistance to all tested mutants, a characteristic lacking in WT Aβ and all mutants with increased chain flexibility are more prone to aggregation. Mutants were also gridded and stained using uranyl acetate for transmission electron microscopy (TEM). Results indicate that increased flexibility results in longer fibrils with an enhanced mesh network while a reduction yields shorter less defined fibrils. Further research will involve additional characterization of mutants through atomic force microscopy to better understand the function of Aβ in the pathogenesis of AD.
Hammond, Jordan  
Co-Presenter(s): Treymone Singletary  
Mentor(s): Dr. Patrick Hickey  
Anesthesia: Sedation, Not Sleep  

The progression of anesthesia has been integral to the development of modern surgical procedures. Without anesthetics, many of the operations that we consider to be “minor” would not be possible without endangering the lives of the patients. Despite its importance, most people have a simplistic understanding of the effects of anesthetic drugs, believing that the medications merely cause the patient to sleep; however, this is not true. Using knowledge of the effects of specific drugs, anesthesiologists can place the patient into a drug-induced coma, temporarily suppressing the functions of the vital organs. Due to the essentiality of these functions, there is a very narrow margin of error allowed when administering anesthetics; therefore, the Anesthesiologist must assess the overall health of the patient, noting the risk factors that could potentially complicate the sedation process and the surgery itself. For the surgery to be completed successfully, the anesthesiologist must meticulously review the patient’s medical and surgical history and create a unique plan of care for the patient to meet each of his or her needs.

This complex craft is not taught until your second or third year of medical school, but we wanted to get involved now. Dr. Hickey’s Perioperative Environment class has been an integral part of our understanding of anesthesia. We interviewed a cardiac anesthesiologist and have been able to shadow his position. This propelled us to do pursue different opportunities to delve deeper into the realm of anesthesia. This presentation shows our findings and experiences.

Hannah, Miranda  
Mentor(s): Ms. Lisa Camp  
A Servant’s Attitude: How Community Service Impacted Me and My Community  

When I showed up on campus my freshman year at the University of South Carolina, I had no idea what level of impact service would have on me and I could have on the community. As part of my Graduation with Leadership Distinction in community service, I spent about 150 hours volunteering at Harvest Hope Food Bank in Cayce, South Carolina. At Harvest Hope I organized donations for distribution to families of a certain poverty level so that they could concentrate their efforts and funds on providing their families with a good quality of life while not having to worry as much on food. Through this experience, I was able to find the value of serving and realize my passion for it. I continued serving because I felt the need for service was critical to the organization, and if I did not serve, how could I expect others to fill the need? I hope to incorporate a servant’s attitude into my future career to serve wherever possible.

Hamilton, Shacquerra  
Mentor(s): Prof. Courtney Worsham  
A Student to the End of my Days: Lessons from Around the Globe  

Albert Einstein said, “I have no special talent. I am only passionately curious.” This quote has inspired me to travel the world and explore different cultures which in turn led me to pursue a degree in International Business in hopes to become a business person in such a globalized world where we must all overcome many barriers and understand a plethora of issues we may not find the answer to homebound. Through participation, observation, and various personal and academic experiences while studying in Australia at the Queensland University of Technology, in Spain at the Universidad de Rey Juan Carlos, and in the US at the University of South Carolina, this presentation seeks to demonstrate and explain how I came to truly gain an understanding of myself and my passions, I had to move beyond the confines of my world, to break through preconceived notions imposed on me by others' expectations. In order to ‘think outside of the box’, more often than not, we actually have to leave it. We must go beyond the boundaries and confines of generations old generalizations and preconceived notions that may hinder our creativity, innovation, and discovering our passions, potential, and, most importantly, ourselves. It may start with just understanding a simple concept, which in turn, after much thought or reflection may lead a self-actualization or two. My experience has marked the beginning of a promising journey that began with a distance of one hundred miles. Those first miles set in motion my passion for exploring my world and, more importantly, myself.
Hannah, Miranda - Supervisor(s): 
Mentor(s): Ms. Lisa Camp  
More Than A Program: My Experience With the MedEx Academy

For my Graduation with Leadership Distinction in professional and civic engagement I have had many experiences that I feel have shaped me as an adult. One of the most impactful experiences in my college career has been my two summers with the Medical Experience (MedEx) Academy in Greenville, South Carolina. In my time at the MedEx Academy, I had the opportunity to shadow physicians, network with medical school admissions boards, and work on the skills necessary to make me a competitive medical school applicant. A lot of the experiences were specifically tailored to medical school applications but I was also able to gain valuable skills that can apply to more areas of life. For example, I practiced my interview skills through extensive mock interviewing, and I practiced researching and oral presentation through presentation assignments and debates about topics in the medical field. Through the MedEx Academy I was able to prepare for my future while making life-long connections. Throughout my life and career I will be able to look back on my time at MedEx with fondness and maybe even be able to take on future MedEx Academy students in need of shadowing hours down the line when I am a physician.

Hanshaw, Katelyn
Mentor(s): Dr. Patrick Hickey
1 in 4: An Inside Look at Starting a Conversation about Mental Health

During my time at the University of South Carolina, I have learned the importance of addressing the topic of mental health. Many people struggle with mental health issues, with 1 in 4 college students struggling with their own mental health. Through my involvement with Changing Carolina Peer Leaders and serving as President of Active Minds, I have been committed to educating students about the importance of self-care, stress management, breaking the stigma behind mental illness, and being open about discussions on mental health issues. Through my experiences in these organizations, I have learned the importance of social justice, program planning and evaluation and intersectionality. My presentation will discuss the insights I have learned from my leadership positions as well as how they have contributed to my personal growth through college.

Harding, Dominica
Mentor(s): Dr. Julie Hubbert
Tango and Politics

Exploration of the development of tango music in the context of Argentina's political timeline.

Harley, Allison
Mentor(s): Dr. George Roy
Becoming a Life Long Learner

In the professional and civic engagement pathway, I have learned from my professional experiences. There are a few main experiences that have made me successful in my future career. The first experience is my work as an AVID tutor. AVID, Advancement Via Individual Determination, is a program that encourages students to think critically and leads them on a path to becoming successful in college. Another beyond the classroom experience is my internship at a nearby middle school in Columbia. This internship requires both a part time semester and a full time semester in which I pull my experiences from. These experiences along with my core classes has helped me develop insights that I have gained from my education. As a middle level education major, my work focuses mostly on my students and how to make them successful, which ultimately leads me to be a successful teacher. I focus on how students can become life learners through engagement and student interest. A life-long learner is a person who craves knowledge and uses information in everyday life to better themselves as people. This is important for every human being because it increases their quality of life and value. I plan to use the key insights that I have developed to lead a pathway that helps teachers become more focused and create students that can be successful.
Harmon, Dustin  
**Mentor(s): Dr. Anselm Omoike**  
**Degradation of dimethyl trisulfide using slow releasing manganese oxide coated potassium permanganate particles**

Taste and odor compounds create many issues for water quality control. One of the major compounds responsible for water quality problems is dimethyl trisulfide (DMTS). DMTS is produced by cyanobacteria and is typically found in natural water during cyanobacteria blooms. Manganese oxides as well as potassium permanganate (KMnO4) have been shown to degrade organics. This study reports an efficient oxide coating method for synthesizing manganese oxide coated potassium permanganate particles (MOCPs) with slow release properties and demonstrates its application in the degradation of DMTS in pure and natural water. MOCPs were synthesized most effectively with the reaction of KMnO4 with manganese (II) nitrate (Mn(NO3)2) in 1-propanol. The coated particles showed very good slow release of KMnO4 from their cores. Scanning electron microscope images (SEM) of the coated particles showed the oxide coating on the KMnO4 particles with cracks. Major changes in morphology before and after release of KMnO4 in water were also observed. Attenuated total reflectance Fourier-transform infrared spectroscopy (ATR FT-IR), Raman spectroscopy, and x-ray photoelectron spectroscopy (XPS) were used to confirm the oxide coating, complementing the scanning electron microscope images. Oxidation of DMTS using coated particles was tested in pure water and compared with degradation in a lake water matrix. The manganese oxide coated potassium permanganate particles degraded 85 ± 3% and 70 ± 6% of DMTS in pure water and lake water matrix within 2 h, respectively.

Harrington, Amy  
**Mentor(s): Dr. Venkatesh Hegde**  
**Distinctive effects of Resveratrol on Hepatocytes and effector T lymphocytes as a likely mechanism of its action in immune-mediated liver inflammation**

Background: Resveratrol (RES) is a natural polyphenolic compound derived from red grapes. It is a popular dietary supplement known for substantial health benefits and pharmacological effects such as its anti-aging and anti-inflammatory properties. Hepatocytes are cells that comprise the parenchyma of the liver, and carry out normal liver function. Activated T cells are the effector cells, which secrete cytokines resulting in liver inflammation during immune-mediated liver diseases such as autoimmune hepatitis (AIH). AIH affects up to 200,000 people in the US alone every year. Based on the literature and studies from my mentors’ lab, treatment of RES can decrease liver inflammation in a rodent model of AIH, and can cause apoptosis of activated T cells. My objective is to explore the effects of RES on T cells and hepatocytes side-by-side.

Experiments: We used normal BNL CL.2 murine hepatocytes, and primary lymph node-derived T lymphocytes from mice activated polyclonally with Concanavalin A in the lab in culture in replicates at 37°C and with 5% CO2. Cells were treated with multiple dosing of RES (0, 10, 40 micro Molar) for ~16 hours in culture medium. The cultures were analyzed and photographed by light microscopy. Trypan blue dye exclusion method was applied to count viable cells with each dosage of RES using a hemocytometer under microscope.

Results and Conclusion: Activated T lymphocytes showed proliferation and distinctive bunches appearance with medium and where no RES treatment was present. With increasing doses of RES T cell proliferation was visibly and markedly decreased. Comparatively, the treated hepatocytes showed normal and similar appearance with all dosing of RES. Activated T lymphocytes treated with increasing doses of Resveratrol exhibited significant sensitivity to RES as compared to control cells where treatment was absent with 37.99±1.55% decrease in viable cell number with 40 micro Molar dose compared to control. Whereas, the treated hepatocytes maintained a relatively consistent cell count with each dose with no significant decrease in viable cells with RES. These important preliminary findings suggest that RES acts very distinctively on activated T cells versus hepatocytes. It is likely that while RES induces apoptosis in effector T lymphocytes, the compound at similar doses spares, and is safe for hepatocytes. The current results indicate that Resveratrol is likely a promising pharmacological compound for reducing liver inflammation caused by activated T lymphocytes.
Harris, Amanda
Mentor(s): Dr. Suzanne Adlof, Mrs. Alison Hendricks
Developing an eyetracking paradigm to assess morphosyntax in children

Language development is an essential part of a child's development and their performance in school. Children with language impairment struggle with language comprehension and production and are at greater risk for poorer academic outcomes. Standardized measures of language ability have used behavioral tasks, such as sentence completion tasks and sentence-picture matching. These tasks typically use the number of correct responses to differentiate children with language impairment from children with typical language skills. However, such tasks do not measure the cognitive processing prior to the response. In contrast, methods such as eyetracking allow an assessor to monitor cognitive activity in real time. This method can reveal what processes are occurring before a child gives a response in a behavioral task, and can provide a more fine-grained analysis of comprehension. The current project develops a visual world eyetracking paradigm to assess comprehension of morphosyntax in school-age children, with the goal of better understanding the differences in cognitive processing in children with and without language impairment. We will examine typically developing 6-8 year old children's comprehension of morphosyntax using behavioral and eyetracking measures. Overall, this study will contribute to the research aimed at better assessing children's language ability.

Harris, Olivia
Mentor(s): Ms. Jennifer Bess
National Fellowships; Hollings, NSF, Udall

As the winner of national and international fellowships, I have seen many benefits of applying to national fellowships. As a winner of the NOAA Hollings (of which USC is a top producer), the NSF International Research Experience, The Nanyang Technological Summer Internship Program and a nominee for the Udall, I have experienced first hand the diversity of opportunities available to students, as well as the vast and continuing benefits of applying for national fellowships. Through these rigorous application processes, I learned to best showcase my skills and experiences. In order to stand out in a large application pool, I learned how to write powerful essays that communicated my personality and passion for my work. These application and interview experiences deepened my love for science and excitement for my future career, as well as enhancing my connections here at USC with faculty and staff members who helped guide me through the process. Because of these experiences, I am not just more prepared for graduate school applications, I have also made myself a more competitive candidate. There are great educational and professional benefits of applying to national fellowships, and I hope to educate the viewer about the process and expectations.

Harris-Lowe, Bonnie
Mentor(s): Dr. Qiana Whitted, Dr. Todd Shaw, Prof. Rebecca Boyd
Gatekeeping: Women, People of Color, and the Video Game Community

This short film explores the perspectives of real marginalized gamers through dramatization reflective of anonymous survey responses, while the companion essay explores the racist and sexist conventions of games that have influenced their experiences and views. Gamers are a large, diverse group of people, but they are not treated as such within their own community. AAA video games are designed largely by and for white men at the expense of women and racial minorities. These groups are grossly underrepresented in video games and are often poorly depicted when they do exist in virtual spaces. Stereotypes and other negative attitudes towards these groups are exacerbated and furthered by their portrayals in video games. The wide quantitative and qualitative gaps between female characters and characters of color compared to white male characters has contributed to a toxic culture that privileges the white male voice above all others, dehumanizes women and people of color and erases them as members of the gaming community, and allows hate speech and threats to personal safety on the basis of race and gender to flourish.
Hartmann, Christine  
Mentor(s): Dr. Keri Weed  
The Influence of Perceived Control over Task Difficulty on Coping with Math Anxiety

The purpose of this study was to examine the relationship between self-reported math anxiety and performance on an addition verification task (AVT). The sample for this study consisted of 19 right-handed female undergraduates, with a mean age of 18.76 (range = 18-23). We employed a 2 (math anxiety level: high, low) by 2 (condition: choice, no choice) between subjects factorial design. Participants in the choice condition chose the difficulty level of their AVT, those in the no choice condition were not given a choice. Participants were assigned to the high or the low anxiety group based on a self-report math anxiety rating scale. Dependent variables were monitored through emotional, physiological, and behavioral measures. We hypothesized accuracy would be greater and reaction time shorter in groups that perceive they have control of their AVT difficulty because participants who perceive they have control of their AVT difficulty will be able to better allocate psychological coping resources during the math task. Through analysis of perceived difficulty of the AVT between the choice and no choice conditions a nonsignificant trend in support of our hypothesis which showed that the no choice group felt that the AVT was more difficult (M = 3.71, SD = 1.98) than the choice group (M = 2.43, SD = 2.15). Participants with high math anxiety reported more perceived anxiety than those with low math anxiety on the AVT, F(1, 11) = 14.77, p = .05. Preliminary analysis of EDA was insignificant. Data collection for this study is ongoing.

Haslup, Sienna  
Mentor(s): Prof. Tricia Kennedy  
Florence Through My Eyes

In the spring semester of my sophomore year at the University of South Carolina I studied abroad in Florence, Italy at Florence University of the Arts. As an International Studies major I wanted to study abroad to improve my knowledge about our global community and immerse myself in a different culture. Since I had a limited background in the Italian language I chose to live in Italy to truly push my boundaries and encourage my personal growth. I did not know much Italian because most of my previous studies had focused on learning Spanish and German. I had recently began studying Italian and wanted to further my education by immersing myself in the Italian culture. This diversity helped me reach my academic and professional goals. Not only did I take classes to improve my proficiency in Italian but about the culture, history and society of Italy, and specifically the city of Florence. While living in Italy I also traveled to other Italian cities and countries. This helped improve my understanding on other cultures, which I can apply to my future goal of becoming an international lawyer. My time abroad improved my confidence, encouraging my adventurous side and increasing my understanding of different cultures.

Hatchell, Brianna  
Mentor(s): Dr. Nina Moreno  
Learning the Strength of Teamwork at the University of South Carolina

During my last two semesters at the University of South Carolina, I served as a University 101 Peer Leader, meaning I was a co-instructor to a class of approximately 19 first-year students to assist them with transitioning to life in college. I helped students with any problems they might encounter, co-facilitated lessons with my co-instructor, provided knowledge of resources, and modeled the behaviors of a successful student. This has been the most memorable and valuable experience at USC because through this position, I learned many valuable lessons, including the importance of teamwork. As a peer leader, teamwork was apparent in various aspects of my role including working with my co-instructor, my class, other instructors, as well as other peer leaders. I learned to depend on and collaborate with others, while being exposed to a variety of perspectives and beliefs. I became increasingly aware of how different opinions improve my ability to lead others. Additionally, I have seen teamwork not only appear, but be a central component in my chose career path, the health professional field of Occupational Therapy. Teamwork can only lead to growth personally and professionally, increasing the strength of a leader, which I have experienced because of my role as a U101 Peer Leader.
Hawcroft, Meredith  
Mentor(s): Dr. Todd Hatzette  
The Battle of Bachelorhood and Domesticity in William Gilmore Simms’s Castle Dismal

The American poet, novelist, and editor William Gilmore Simms (1806-1870) was one of the South’s most prolific writers and helped foster the region’s participation in the national Gothicism movement. Simms’s reputation dwindled at the end of the nineteenth century after his death. In the early twentieth century, however, he rose from obscurity due to a renewed interest in his texts portray the identity of the country. Scholars who are familiar with nineteenth-century American literature, especially southern literature, recognize Simms’s centrality. Castle Dismal; or The Bachelor’s Christmas portrays multiple issues of this time period, especially the conflicting ideas of bachelorhood and domesticity. Bachelorhood, which was a reaction against the increasing influence of domesticity, was reflective of shifting economic demographics with the rise of the middle class. In Castle Dismal, the concept of bachelorhood is challenged when bachelor Ned Clifton visits an old friend and his wife during the Christmas season. Contrasting with his friend’s idyllic marriage is the nightly reenactment of infidelity and murder performed by a ghostly love triangle. Ned Clifton is caught in the middle of these conflicting ideas about matrimony. This contrast demonstrates the growing uncertainty over the place of the bachelor in a society dominated by domestic concerns.

This research, which I am currently conducting for my Magellan Scholarship, consists of two main components. The first part is to research the social, political, and cultural context of Castle Dismal, specifically the competing spheres of bachelorhood and domesticity to understand how ideas of marriage, class, gender, and masculinity impacted one another. It is important to note that Simms wrote about these critical nineteenth-century issues from a Gothic standpoint, a novelty for fiction of the bachelor mode. I aim to illustrate the connection between these two spheres and the way they inform Castle Dismal.

During my research, I have investigated the societal concepts of both bachelorhood and marriage during the nineteenth century. Negative stereotypes were placed upon bachelors, and they were forced to occupy ambiguous social positions. However, being a bachelor simultaneously suggested increased freedom for men. I am exploring this complex issue through analysis of Simms and his characters. After amassing this information, I am creating a presentation that allows for the understanding of these connections as informed by characteristics of American Gothicism.

Simms was one of the most prevalent nineteenth century American writers, and he undoubtedly had a lasting impact on southern American literature. Edgar Allen Poe even remarked that Simms was the “best novelist which this country has, on the whole, produced.” Yet he is so prolific that even some of his finest works have had little written about them from an academic standpoint. Castle Dismal is noteworthy because it demonstrates multiple aspects of nineteenth century thought and the changes that were occurring. The novel combines thematic issues of the time to create a complex text that demonstrates the intersectionality of gender roles, marriage, masculinity, and feminism. Simms deserves increased research not only for his talent and prevalence as a writer, but also because studying his work will give us more knowledge about society and literature as a whole during this period. Simms was a participant in the Young America movement where he worked alongside notable authors such as Nathanial Hawthorne, Herman Melville, and Poe to create social reform. Young America attempted to unite the fragmented country through its nationalistic design. Simms’s emphasis on unity is further demonstrated by his literary efforts to help the South engage in the broader American literary culture.

Hayes, Kristen - Supervisor(s):  
Mentor(s): Prof. Moryah Jackson  
Small Towns and Big Dreams: How Higher Education Shaped My Future

Kristen Hayes, Accounting – Senior

Emerging from a small southern town to a large and diverse university challenged me in ways that I never would have imagined. The move was not far, but the culture of a University was something that neither I nor my family had ever experienced before. I learned practical business concepts such as budgeting and valuable lessons on the importance of communication and ethics. These insights have helped shaped me in my personal and professional life by connecting my classroom experiences with my involvement on campus and work experience. I gained a deeper understanding of the importance of my generation in the work force and how to overcome the upcoming challenges that are associated with the rise in the need for accountants. This knowledge will challenge me further to step out of my comfort zone again to use my skills in my professional work.
Hayes, Kennedy  
Mentor(s): Mr. Jason Halterman  
How to lead when facing adversity.

In my experience as a leader in multiple student organizations here on campus, there are many times in which hard decisions had to be made even when they were not the most popular decision. In this presentation, I will focus on the best and most effective ways to go about peer leadership with simple steps that lead to organization cooperation and respect. It starts with building strong relationships with members of the organization. We are all students and all have the same goal. It continues with complete transparency and unwavering enforcement of the decisions made. To complete the effective steps to lead, there just needs to be a constant flow of love and support. By following these steps combined with a passion and fuel towards a common goal, there is no way the aspirations of any organization can

Heckel, Georgia  
Mentor(s): Dr. Karen Worthy, Dr. Joynelle Rivers Jackson  
Can We Make Progress with Progression?: Analyzing the Traditional BSN Upper Division Application Process

Bachelor of Science in Nursing (BSN) programs are typically divided into two segments: a lower division, consisting of general education requirements and basic nursing courses, and an upper division, comprised of clinical rotations and hands-on learning in hospital settings. Colleges and universities with BSN programs use different types of application models in order to determine the likelihood of success for students progressing from lower division to upper division. The application for upper division can include the applicant’s grade point average (GPA), hospital experience, community service hours, leadership experience, extracurricular activities, and/or an interview. The purpose of this descriptive study is to conduct a national best practice search to find the most effective model for upper level progression standards in traditional BSN programs. Utilizing the Carnegie Classification for Institutions of Higher Education, the following inclusive criteria was determined to be the most appropriate for sample development: large, four-year, public institution with doctoral programs, a high undergraduate enrollment profile, and the highest level of research activity. The colleges and universities that met the inclusive criteria were then cross-referenced with the American Association of Colleges of Nursing in order to determine which of those schools had accredited traditional BSN programs. Using the cross-referenced list of institutions, two schools were randomly selected from each of the five major regions of the United States. The upper division application models of 9 traditional BSN programs will be compared in a best practice search with the goal of finding the most effective progression process.

Hedrick, Lauren  
Mentor(s): Mr. Simon Tarr  
Life in the Land Down Under

During the spring semester of my junior year, I studied abroad in Newcastle, Australia. I have always had a desire to travel the world, explore new places, and meet new people. So, studying abroad seemed like a perfect opportunity for me. I wanted something other than the typical European study abroad experience, so I decided to go half way around the world, to Australia. From the accents, to the animals, and the laid-back culture, I knew it was something I wanted to be a part of. Going into this experience I had no idea what to expect, but I learned how to work with people from different cultures, how to overcome language barriers, and how to push myself out of my comfort zone and even became comfortable using exchange rates in six different countries. I gained more confidence in myself and my abilities than I could have ever imagined. I would encourage anyone who has the desire to study abroad, to follow through. Don't think about the obstacles, just do it. Pushing yourself outside of your comfort zone can be scary, but the things you learn are priceless. I plan on pursuing a career in public accounting, and even though the laws of accounting are different all over the world, the key concepts of conducting business are all the same. I plan on taking what I learned from my time abroad, to pursue my desire to work for a multi-national company, and eventually to work for a global non-profit.
Heller, Sara  
Mentor(s): Mr. Alex Blauvelt  
What Community Service Taught me About Nursing

Through this presentation I want to discuss how my time spent doing community service outside of the classroom while completely my degree in nursing in the classroom helped to enhance my education and understanding of culture sensitivity, viewing my community as a client, and mental health. Through my community service with CURE international and my clinical hours in Columbia I learned many lessons that I will carry into my nursing career. It is important for nurses understand culture and socioeconomic classes other than their own for them to be able to provide the best care possible. As a nurse I need to be able to recognize barriers to healthcare in my community and my patients. Through my presentation I plan to share my experiences that taught me these valuable lessons.

Henson, Marie  
Mentor(s): Mr. Alex Blauvelt  
How Do We Improve Health Maintenance For Patients With Little Access to Resources?

Has healthcare access truly expanded to the people? Overwhelming evidence indicates many are still unable to afford health insurance in the U.S. contradicting the government's claims that anyone can access it. In a small non-profit medical clinic in Wake County, NC, whose mission is to provide free healthcare to these overlooked populations, I spent nearly 200 hours discovering the real meaning of healthcare access and the interdependent relationship between socioeconomic status and quality of health. I saw how rarely patients showed up to appointments or chose to opt out of the free services made available to them. In order to understand why someone would do this, you have to take into account their financial backgrounds, their family history, and their present lifestyles. Additional information from the medical team members also helped me conclude my final recommendations. Through various observations and conversations (community surveys, staff meetings, and interviews with community members and doctors) I constructed three proposals that could help improve health maintenance. These include: provide free health education classes, create a shuttle system for travel to nearby health facilities, and mandate “pro bono” for healthcare providers. I learned a great deal about the complexities of running a non-profit clinic whether it be the massive language barrier and the patient's poor understanding of their health quality. This project had a significant impact on the way I view my role as a nurse and a citizen in this community – it was a proactive experience allowing me to discover ways to bridge a community.

Herrygers, Ronald  
Co-Presenter(s): Harrison Engoren, Caleb Simmons  
Mentor(s): Prof. Joshua Cooper  
Sudoku Spectrum

A Sudoku puzzle is an incomplete Sudoku board, which is a 9x9 matrix of numbers 1-9 placed so that no number appears twice in any row, column, or one of the nine 3x3 blocks; the numbers in the puzzle are referred to as clues or givens. A determining set, also known as a fair puzzle, is a Sudoku puzzle with exactly one unique solution. Of these determining sets, critical sets are the determining sets with a minimal number of givens, or a minimal cardinality. These minimal cardinalities vary among the critical sets. The question we are posing is: What are the different possible cardinalities (i.e., the “spectrum”) of the critical sets? More specifically, we consider the following question: Over all determining sets, what is the smallest/largest cardinality of the smallest/largest critical set it contains? We address these questions by first observing the spectrum of critical set cardinalities of 4x4 puzzles. Sudoku boards of orders other than 9x9 can be defined as long as their dimensions have the form (n2)axay(n2), such as 4x4, 16x16, and 100x100. After studying the 4x4 and 9x9 critical set spectra, we investigate the same for general (n2)axay(n2) puzzles. We analyze these critical set cardinality spectra by converting Sudoku puzzles into Boolean satisfiability problems -- i.e., determining the existence of satisfying variable assignments in a Boolean formula -- and running them through a cutting-edge satisfiability solver. The satisfiability solver allows us to generate all minimal fair puzzles and compute their cardinalities for statistical analysis.
Hetherington, Austin  
Mentor(s): Dr. Jill Stewart  
Effect of Practice on the Use of Motor Planning for Reach Movements with the Dominant-Arm

Individuals who have had a stroke experience many motor deficits, including a lack of motor planning to perform reaching tasks. Training may help improve this deficit, although, it is not known if the use of motor planning changes over practice. Understanding how planning changes with practice in healthy adults will help determine the stability of this behavior for future studies in stroke. Therefore, the purpose of this study was to examine the effect of practice on the use of motor planning in young adults. Twelve right-hand dominant, young adults reached to targets in a 3-dimensional virtual environment with the right arm over three days of practice. Targets were located in two directions (contralateral, ipsilateral) and three distances (7, 14, 21 cm). Kinematic data were used to describe how reach movements scaled to target distance: acceleration amplitude scaling, a measure of motor planning; and, acceleration duration scaling, a measure of feedback control. Results found no effect of direction or days on the control of reach distance (p>0.05); furthermore, there was no change in acceleration amplitude or acceleration duration scaling (p>0.05). However, reach performance improved over practice (p<0.05). Reaches were faster and more accurate by day three. Overall, these results suggest that the control of reach distance with the dominant arm in young adults is a stable movement behavior. Since young adults have extensive experience making movements similar to reaches in this study, the use of motor planning and feedback control may not change with practice.

Heuker, Jacob  
Mentor(s): Dr. Swapan Ray  
Flavonoid for prevention of calcium ionophore induced apoptosis in astroglial cells

Astroglial cells play very important roles in normal function of the central nervous system (CNS). Injuries and diseases are associated with increases in intracellular calcium (Ca2+) concentration and induction of delayed or apoptotic cell death in different neurons and glial cells, including astroglial cells, leading to neurological dysfunction in the CNS. There are many neurological injuries and diseases which are associated with unwanted apoptosis. So, prevention of apoptotic cell death is an important goal for the treatment of the neurological disorders. As mentioned above, one reason for apoptosis is the large influx of Ca2+ into the cells during CNS disorders. In a cell culture model of CNS injury, this influx of Ca2+ can be created through the use of calcium ionophores. Calcium ionophores facilitate this influx by allowing the transportation of Ca2+ into the cells. In our current investigation, we decided to use a calcium ionophore to increase the intracellular Ca2+ concentration, thus inducing an increase in apoptosis in the C6 astroglial cells. Polyphenolic compounds, called flavonoids, are commonly found in fruits and in teas. These compounds have recently been shown to have potential to act as inhibitors of apoptosis in the CNS cells. The purpose of our current project is to use a calcium ionophore (e.g., ionomycin) to induce apoptotic cell death in C6 astroglial cells. Then, a flavonoid (e.g., genistein) will be used for prevention of calcium ionophore induced apoptosis in the astroglial cells. This study is designed to understand the flavonoid mediated inhibition of morphological and biochemical features of apoptosis in C6 astroglial cells exposed to a calcium ionophore.
Higgins, Georgia  
Mentor(s): Dr. Bobby Donaldson, Dr. Gabrielle Kuenzli  

The years surrounding the turn of the 20th century in the American South are defined by white efforts to preserve white supremacy in a post-emancipation, post-Reconstruction world through law, social custom, and violence. The era is equally defined by black resistance to these efforts as black citizens carved out a place for themselves in American society. In perhaps no other city is this dynamic better encapsulated than in Columbia, South Carolina, and nowhere is there a better representation of black resilience and success in the face of Jim Crow. My paper focuses on examining the lives of three members of Columbia’s black citizenry during the late 19th and early 20th centuries, who as businessmen, politicians, and community leaders helped to assert the agency and power of African Americans in a society that hinged its success on black subjugation. These men are the brothers Charles H. Simons and John Lucius Simons, associated with Columbia’s Mann-Simons historic site, as well as their mentor R. J. Palmer, a Reconstruction era congressman and wealthy businessman. Through examination of primary historical sources, this paper explores overlooked accounts of the injustices personally faced by these men as they navigated life in Columbia, such as police abuse, involuntary commitment, the indignity of segregation, and the threat of white violence. The resulting portraits of their lives are case studies of not only the insidious ways that white supremacy permeated life in Columbia, but a record of how black Columbians resisted through deliberate activism and by simply living their lives.

Hildebrand, Claire  
Mentor(s): Prof. Danny Sauceda  
The Unexpected Value of Course Learning  

This past summer, while shadowing physical therapist at various locations in Myrtle Beach, South Carolina, I realized that I was actually connecting my developing personal skills such as communications with specific learning’s from my various courses quite often. I set up different shadowing sessions and jobs throughout the summer to get exposure to as many different types of physical therapy as possible because I needed hours for Physical Therapy school. I was able to observe at pediatrics, elderly, neurological diagnosis, and orthopedics. However, I discovered that the psychology, exercise science, and anatomy classes are more important than I originally valued them while I was enrolled in the classes. For example, learning about the development of children and the age group certain skills should be present by were very helpful when shadowing at the pediatric location. I even discovered that some of the basics I was learning in exercise science classes would be necessary to create the platform I will be performing on for the rest of my career. The realization that the connections I was making from my classes in my real world experiences and vice versa led me to pursue the Professional and Civic Engagement GLD pathway.

Hill, Alyssa  
Mentor(s): Dr. Melanie Palomares  
Scene Recognition in Williams Syndrome  

Williams Syndrome (WS) is a genetic disorder that causes cognitive impairments with a unique profile. WS individuals are excessively social with relatively good language skills, but they have difficulties integrating visuospatial information. Neuroimaging data suggest that the brain region responsible for faces is relatively larger in WS individuals than in control participants. The current study examined how well people with WS detected people in a scene and how they categorized scenes. Due to their social nature, it is possible that WS individuals will be relatively better than typical participants in the people detection task. Three groups of participants (WS individuals, typically-developing children, typical adults) were asked to identify whether a black-and-white image was indoor or outdoor (scene categorization task) and if it did nor did not have people (people detection task). Each image was presented for either 40, 120 or 360 ms. Notably across all groups, results showed that people detection was worse than scene categorization. Performance of WS individuals were similar to those of typically developing children, but worse than those of typical adults. Because the underlying neuroanatomy of scene perception is atypical in WS individuals, it is remarkable that scene perception abilities in WS may be typical, albeit delayed.
Hilyer, Taylor  
Mentor(s): Mr. Alex Blauvelt  
From Student Nurse to R.N.: The Path in Between

I am pursuing Graduation with Leadership Distinction in Civic Engagement, and would like to share how my practices in the clinical setting as well as my job as a Student Nurse Tech, have shaped me into the soon-to-be Registered Nurse I am today.

The work and knowledge that I have been able to acquire in my clinical rotations as well as my Nurse Tech position in the Pediatric Emergency Department, has not only shaped me into becoming a better nurse, but also a better person. There is nothing like having that on the job training and being able to see how a unit functions, especially before graduation. The experience is truly unparalleled. These opportunities have humbled me, and opened my eyes to the world that we live in today. The patients that walk through our doors come from every walk of life, and all have a different story to tell. We as nurses, have a duty to listen to these patients, and to show them the care and respect we'd desire for ourselves and our own families.

Hiser, Alexandra  
Mentor(s): Ms. Asheley Schryer  
What My Residents Taught Me

There are truly no limits to the opportunities to become an active member of the USC community. Coming to college so far from home without any friends was a daunting challenge but the countless opportunities to become involved made my transition so much easier than I anticipated. Over the last four years, I have held various leadership positions and taken classes that forced me to think outside of the box. I grew the most during my two years as a Resident Mentor in the Women's Quad. Both years, I was responsible for a hall of 24 female first-year students. I thought that I would be the one teaching them about college but I learned so much from them instead. Constantly meeting and working with people so different from myself, I learned the importance of an open mind. I found that I enjoyed meeting new people as often as possible and hearing their stories. I developed in interest in giving back to the community and advocating for others. At first, it was not easy to balance academics, my sorority, additional extra-curricular activities and community service but I quickly realized the importance of being proactive in managing my schedule. These three key lessons have guided me through my college career and will continue to guide me in my future.
Hodges, David
Mentor(s): Dr. Kristina Ramstad, Dr. Larry Bryan
Are wood storks polygamous nest parasites?

Are wood storks polygamous nest parasites?
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Abstract
Wood storks (WOST; Mycteria americana) are a species of large wading birds found throughout wetlands of the southeastern United States, the Caribbean, Central America, and South America. They are the only stork that breeds in North America and are listed as threatened under the Endangered Species Act. As a species of concern, understanding the mating system of WOST is essential for predicting the magnitude of genetic erosion in WOST populations and predicting their long-term viability. WOST are thought to be seasonally monogamous, but there is also likely polygamy (parenting offspring with multiple partners) and/or nest parasitism (females laying eggs in nests of other females) among these birds which often nest in dense colonies. In this study, we assessed if there is evidence of either breeding strategy by asking if all chicks in the same nest have the same mother. Pin-feathers and whole blood samples were collected from 58 chicks from 20 individual nests at 5 WOST breeding colonies in South Carolina, Georgia, and Florida. Individual chicks were sequenced at the mtDNA control region and nest-mates were compared to determine the number of haplotypes per nest. Preliminary results suggest one mother per nest and thus do not support the presence of polygamy or nest parasitism among WOST. More intensive genetic testing is underway to expand on this work and estimate relatedness among nest-mates.

Hoffman, Blakeley
Mentor(s): Ms. Jennifer Bess
Don’t Even Read the Qualifications, Just Apply!

Perhaps the luckiest sentence I ever read in my academic career was the following one, from an Atlantic Article entitled “The Confidence Gap”:

“A review of personnel records found that women working at HP applied for a promotion only when they believed they met 100 percent of the qualifications listed for the job. Men were happy to apply when they thought they could meet 60 percent of the job requirements.”

It was this quote that inspired the title of this talk: don’t even read the qualifications, just apply. In this talk I’ll discuss how one rule: apply anyways - led me to working with Google, getting accepted to over a dozen REU programs, being named a national GEM Fellow, and accepting an offer for graduate studies at Massachusetts Institute of Technology. Additionally, I’ll focus on techniques I’ve found useful in handling rejection as well as ways to make the most of any application process.

Hope, Madison
Mentor(s): Ms. Theresa Harrison
Growth in eCommerce

In the summer, I received an internship with Belk at their corporate headquarters in Charlotte, North Carolina. In my internship, I was able to analyze sales performance and metrics that were taken from the website to identify customer’s wants and needs as well as discover and identify new business opportunities. I worked daily with a team that identified and executed plans based on the market trends and competitor research. Throughout this internship, I was able to strengthen my analysis skills and learn how to thrive in an unpredictable environment. As an IT major at the University of South Carolina, I have been able to directly apply knowledge from the classroom to my workplace. With my understanding of IT, I have been able to apply my skill set to other areas of business without any hesitation. Because of my experience at Belk, I have realized that my degree can take me much further than expected.
Hope, Charlotte  
Mentor(s): Prof. Elizabeth White  
Beyond Boundaries

I was able to study abroad in Madrid, Spain, because of the Beyond Boundaries Scholarship. The experience I gained from my time in Europe was life changing. Studying abroad let me apply the knowledge I gained through my time in Europe. I am a public relations major, with a cognate in international marketing. I was able to learn how international publics connect differently with organizations. This helped me expand my knowledge on how to target international audiences. This inspired me to focusing public relations agency that work on a global scale. When I graduate I plan to work for a global public relations agency, and use the communications skills I gained abroad to target international audiences. I was able to experience how the differently people interact in other countries. I would have not been able to study abroad without the Beyond Boundaries Scholarship, because I am a Pell Grant and Need-based Grant recipient. I could not financially afford to go to Europe without Beyond Boundaries. I was able to represent students that are not traditionally represented in the study abroad program from the University of South Carolina. Beyond Boundaries helped me experience Europe, something my family has never been able to experience. I was able to represent people how are not as fortunate and gain a life-altering experience.

Hope, Charlotte  
Mentor(s): Prof. Elizabeth White  
Community Relations

During my time at the University of South Carolina, I interned at the Sexual Trauma Services of the Midlands. Through my time at Sexual Trauma Services I gained experience that connected with the classroom knowledge I gained as a public relations major. As public relations major, my time is spent learning about how to connect with your audience to deliver them an organization’s message. At Sexual Trauma Services of the Midlands, I learned that they focus on community relations to communicate a message. They do this by breaking down the community into sections, that way no community members are left out. The focus on leader of the community to spread messages, because they understand that many people still rely on opinion leaders to get their information. I learned a lot about diversity and how if you do not have a multicultural message, your message will not be received. This inspired me to focus on how diversity and community relations are intertwined in successful communications. I plan to use this experience when I graduate this May and work in public relations with an emphasis in community relations.

Horne, Virginia  
Mentor(s): Dr. Lara Lomicka  

I studied abroad my junior year in an effort to seek out enriching experiences that could help me understand the larger scope of the world around me. As an International Studies major I knew I wanted to study abroad during my time at the University of South Carolina. Copenhagen, Denmark was a great place for this experience because it provided me access to a different culture, economy and society with the comfort of the English language. I enrolled in a European Politics program for the curriculum and the enrichment experiences around Copenhagen and Europe while living in a homestay just outside of Copenhagen to increase my interaction with Danish culture. I did this to understand how the EU functioned and to witness the major actors of European politics with our class facilitated trips while making sure to engage with the Danish society around me. I learned about Danish culture and the importance of International Relations in a tangible way during my time abroad as I witnessed the Syrian Refugee Crisis from the perspective of a European. The importance of the world around us is critical to understand during this time of interconnectedness and globalization. We as American citizens and citizens of the world need to engage and work harder to be more actively involved in the cultures of the world around us. Through my time abroad I learned that I’m interested in living abroad again, specifically working in International Relations, International Law, or non-profit work in some way. I don’t want to stop experiencing or stop learning new things because that, for me, would be equivalent to no longer living.
Horovitz, David  
Mentor(s): Dr. Shannon Davis  
**Linkage of the Peromyscus maniculatus dominant spot mutation is to a 3Mbp interval on Chromosome 20.**

Peromyscus is a genus of North American rodents that includes deer mice, *P. maniculatus*, and old field mice *P. polionotus*. Laboratory Peromyscus are outbred and exhibit great genetic variation, especially when compared to laboratory mice, *Mus musculus*. The genetic variation of *Peromyscus* can enhance linkage analysis studies used to identify genetic loci associated with specific phenotypes. The dominant spot mutation results in a white spot on the forehead of affected deer mice, but the causative mutation has not been identified. Previous studies used linkage analysis and a candidate gene approach to link *Sox10* to the dominant spot phenotype; however, no mutations were found in the exons and conserved enhancer sequences of *Sox10* in dominant spot homozygous embryos. Therefore, we sought to define the boundaries of the linkage domain on chromosome 20 that contains *Sox10*. We tested several genes in a 5 Mbp radius from *Sox10* for linkage with dominant spot and found that the linkage domain contains a 3 Mbp region between *Sox10* and *St13*. The genes in this interval were screened for possible roles in neural crest development. *Atf4*, a gene located in the middle of the linkage region is known to affect the migration of neural crest cells in chick embryos. We sequenced *Atf4* from homozygous dominant spot embryos, but did not identify a causative mutation. These results suggest that the dominant spot mutation may disrupt an unknown enhancer sequence of *Sox10* or *Atf4* or reside in a gene with an unknown function in neural crest development.

Houck, Christopher  
Mentor(s): Dr. Teresa Moore  
**Energy Expenditure in White Water Kayakers**

Studying the energy expenditure of kayakers in white water.

Hubacher, Margaret  
Mentor(s): Ms. Maegan Gudridge  
**Effects of Art Therapy on Disenfranchised Groups in Thailand**

In retrospect, I can split my college career cleanly into two activities: volunteering for and working on social justice projects in my community, and drawing/painting/printmaking until the late hours of the night, racing to finish portfolios on time. I have spent my four years at Carolina exploring my passions for social justice and for art, and the indescribably powerful combination of the two.

I took this passion across the globe to Chiang Mai, Thailand to work with an organization called Art Relief International, whose mission is to connect international artists and art therapists with local non-profit organizations that serve disenfranchised groups. I worked with women in homeless shelters, young men working in the red light district, adults and children with disabilities, the children of Burmese refugees, and schoolchildren whose arts funding had been cut. I planned and executed lesson plans specifically tailored to each group’s needs. At the women’s shelter, Bahn Mi, we explored practical arts such as sewing and crocheting. At Hope Home, a day center for adults with disabilities, we used music and dance to compliment their exuberant and joyful personalities. At Urban Light, we worked with young people involved in sex work, focusing on projects that encouraged self-reflection and discovery of identity. I was profoundly moved by the positive reactions to these projects, and the emotional connections I made in Chiang Mai. My passion for social justice and art had collided in an incredible way. I do realize that these activities were not life altering experiences for those that participated in them. They were not relieved of their oppressive circumstances by the work we did together. But I know that art allows all people an avenue for self-discovery, it allows them to feel validated, and it allows individuals to become empowered and self-actualized. Social change occurs when individuals are personally empowered, self-actualized, and have an unwavering conviction that they deserve better than their present circumstances.
Huggins, Laine
Mentor(s): Mrs. Ashley Byrd-White
Learning to love and Loving to serve

My time spent at Carolina has not only been filled with in the classroom learning but also has been consumed with beyond the classroom experiences. In particular, during my four years, I have been a volunteer swim coach for a Special Olympics swim team. The Silver Seals swim team is not affiliated with USC but I have been able to connect a lot of what I have learned in class with how I coach and interact with my swimmers. Being a swim coach for special Olympic athletes is a challenging but extremely rewarding role and I am thankful that what I have learned in class has been able to shape me to be a better coach and friend for the swimmers. In my counseling classes and a few of my psychology classes I have learned the importance of communication and building relationships. I have been able to use that information as guidance for relating to the swimmers on a level that is appropriate for them. Through lessons of how to be vulnerable and how one should treat people as ends in themselves not merely means to an end, I have learned how crucial it is to not just be their coach but also their friend. Learning about relationships and how to walk with people through life has not only been extremely relevant towards my role as a swim coach but also has led me to choosing my future career as a counselor.

Humphrey, Mariah
Mentor(s): Dr. Mythreye Karthikeyan
The Role of Sox 2 in Ovarian Cancer

Sox 2, a transcription factor involved in the renewal of undifferentiated embryonic stem cells and the maintenance of pluripotency in stem cells, has been confirmed to possess roles in cell proliferation, invasion, and migration in various cancer cells. More recently, studies have found increased Sox 2 expression in ovarian carcinoma cells. This study focused on two experiments expected to affect Sox 2 expression: drug treatment and glucose starvation. The drug treatment involved treating a particular ovarian cancer cell line, PA-1, with all trans-retinoic acid (ATRA). Produced from vitamin A, ATRA's initial known role consisted of aiding embryonic growth; however, further research reveals that this compound is responsible for inducing apoptosis and for inhibiting cell proliferation in many cancers such as breast cancer. The compound is also currently being used as a drug regimen to treat human promyelocytic leukemia. PA-1 cells were exposed to conditions with increasing concentration treatments of ATRA for a 24 hour time period. The glucose starvation experiment aimed to determine what effect elimination of glucose in vitro has on the cell proliferation of ovarian cancer cell line Skov3 luciferase control versus Sox 2 overexpressed (OE) cells. Both the control and Sox 2 OE cells were held in three conditioned media: serum-free, glucose-free, and L-glutamine-free media. These conditions were implemented for a 24 and 48 hour lysate experiment and a 5 and 10 day crystal violet staining experiment. In vivo, cancer is known to usurp a substantial amount of glucose from the body, so the hypothesized outcome in this experiment was to see that glucose starvation will halt cell proliferation and possibly lead to apoptosis.

Hutchinson, Angelica
Mentor(s): Dr. Dirk Den Ouden
Separation of Vowels in Aphasic and Apraxic Speakers

Strokes can result in a deterioration or even complete loss of normal functions such as motor movements, eye sight, and language capabilities, just to name a few. Apraxia of speech is one of those deficits that can occur, as is Aphasia. Both are language deficits that can greatly effect a person's ability to comprehend and communicate with words; apraxia is an articulatory movement issue, while aphasia is a problem concerning the connections in the brain for language processing and production. These two deficits can express themselves in a similar manner. However, they are two different issues that require different therapies. In this study, we looked to see if the analysis of the vowel formants would allow us to better differentiate between those with aphasia and those with apraxia. We hypothesized that those with apraxia would have altered vowel formants due to their inability to properly manipulate their articulatory muscles. This study utilized speech samples, taken from 20 patients telling the story of Cinderella at three different stages during therapy. The formants of the primary vowels of context words were then analyzed. Preliminary results show that the vowel formants for those with apraxia are different than the formants of those with normal speech or aphasia.
Iftikhar, Iraj

Mentor(s): Dr. Daniel Fogerty

The perceptual processing of degraded sentences: Interrupted speech and text

Spoken sentences can be difficult to understand for listeners with hearing loss, particularly in environments where speech information is degraded due to noise. The ability of listeners to use the preserved portions of speech is determined, in part, by the size, distribution, and integration of perceptual units across the sentence that are necessary to support robust speech perception. The current study systematically investigates how the degradation of information in both the auditory and visual modality at specific intervals affects the intelligibility of sentences. In addition, comparison to degraded text conditions provided a means to determine if the identified perceptual unit is a result of modality-specific processing of auditory or visual cues, or represents higher level linguistic processes. Participants were tested at interruption rates that varied from 0.5 Hz to 64 Hz. Increasing the interruption rate increased perceptual sampling across the sentence but reduced the duration of the individual segments that were presented. Auditory presentations were interrupted by segments of silence. Visual presentations were interrupted by occluding the text with a white bar pattern. Preliminary results indicate non-monotonic functions across interruption rates for both modalities that may indicate an interaction between different levels of processing. This research can provide insight for developing clinical applications, such as providing textual cues to partially supplement speech in degraded listening environments.

Ingraham, Sarah

Mentor(s): Prof. Leah McClimans

Intern to Organizer: Building Public Engagement with Volunteer Programs

Over the past year I have been interning with Planned Parenthood South Atlantic. Planned Parenthood provides affordable, quality healthcare to millions of women every year. My main focus at Planned Parenthood has been managing the volunteer programs. From onboarding and training new volunteers, to hosting volunteer engagement activities, every part of the volunteer process has been overseen by me. My role has allowed me to have substantial freedom in managing volunteers and placing them in a role that is best fit for them. The volunteer programs that Planned Parenthood provides allow people to make a difference in other people's lives, and their own. They create a space for healing in times of stress, and a place to come together and create change. As a Women's and Gender Studies major at the University of South Carolina I have developed a nuanced understanding of feminism and female oppression globally. My internship at Planned Parenthood allowed me to implement theoretical frameworks that I learned in class, and apply them to workplace situations. My experience, both in the classroom and at Planned Parenthood South Atlantic, has transformed me into an effective organizer of people and has allowed me to build power within my community.

Jacobs, Madeline

Mentor(s): Mr. Alex Blauvelt

Thinking Abroadly

Knowing college is a challenge by itself, I recognized I wanted to use my time at the University of South Carolina to push myself out of my comfort zone in diverse ways. Studying in Barcelona, Spain for a semester way one of the most impactful means to do so. While abroad, I led a team that created a product that proved to us “the whole is greater than the sum of its parts” and it uncovered my great ability and passion to lead. I lived with my host family and became enlightened in knowing the world is much bigger than my little piece of it. I began thinking on a vaster scale realizing there is more than my singular perspective. This proved to be helpful during internships after my experience abroad by allowing me to more fully understand the environment around me. Now, I want others to understand that you can always discover something new about who you are by pushing yourself to new limits. There is untapped potential waiting to be recognized in all of us, and it is our responsibility to discover it. Studying in Barcelona helped me realize this, and I have been able to apply it to the rest of my college experience. I am now prepared to go into the world more aware of my strengths and abilities and help others discover theirs. I can move forward with a stronger idea of who I am today, and who I can become in the future.
Jacques, Samuel  
Mentor(s): Dr. Joel Stevenson  
Brand Name Marketing on Campus

Recent technology has made entrepreneurship attainable for many Millennials. The University of South Carolina encourages entrepreneurship among students, yet a cloud of uncertainty still surrounds opportunities that are available for student business ventures on campus. In Spring of 2017, I set out to determine exactly what opportunities students have to market a new idea at school. I used my small startup clothing company, The Pinkish Flamingo, as a sample. Urged by my mentor to first check that it was legal to host a company’s operations on campus, I quickly found that there are many legal restrictions to commercial activity. Conducting work in a public facility, such as university buildings, comes with limits due to equity rights between students, the university, and taxpayers. I am still researching the full extent of legal restrictions and permissions for student businesses on campus. Within these permissions, I will continue to identify unique opportunities for students to market business ideas. This ranges from PR tables on Greene street, to fliers throughout campus, to participation in campus networking events. The goal is to prove that students have a competitive advantage simply by being a student at USC. An explicit layout of ways that students can get ahead may inspire others to step out as entrepreneurs while still in school.

Jain, Harshita  
Mentor(s): Dr. Deborah Billings  
Researching and Addressing the Contexts Shaping Women’s Care-Seeking Decisions During Labor and Delivery in Rural India

Background:  
Located in northeast India, Orissa is the second poorest state with the highest infant and maternal mortality rates in the country. Since June 2013, USC students, through GlobeMed, and the non-governmental organization (NGO), Alternative Rural Movement (ARM), have been collaborating to determine the causes of these high mortality rates.

Methods:  
Using a community-based participatory research model, ARM has trained women in the community to survey their peers to better understand the decisions women make in relation to prenatal care and where to deliver their babies. The survey was developed using the Three Delays Model (Thaddeus and Maine, 1994) and the Theory of Planned Behavior. From November 2015 to December 2015, 501 women of various castes and religions were identified through pre-existing self-help groups and were interviewed on their decisions to seek care, their identification of a medical facility, how they reached the facility, and whether they received adequate and appropriate treatment.

Results:  
Of the 501 women interviewed about their most recent delivery, 330 women (66%) ages 16-34 (mean 24.7 years) gave birth at the local government hospital; while 125 women (25%) ages 18-43 (mean 25.4 years) gave birth at home. 15 women (3%) ages 20-32 (mean 26.1 years) gave birth at the private hospital, with an average age of 26.1 at the time of delivery. 26 women (5%) ages 19-35 gave birth at the sub-center with an average age of 24.8 years at the time of delivery. Finally, 5 women (1%) ages 19-23 gave birth at other places with an average age of 20.6 tears at the time of delivery. There was no significant difference in age between women birthing at the government hospital and those birthing at home, while, as hypothesized, very few women gave birth at a private hospital, most likely due to the cost of care. Further analyses are underway to determine what factors were related to women seeking care at government hospitals versus birthing in their homes.
Janos, Bethany  
Mentor(s): Dr. Homayoun Valafar  
Monitoring Smoking Behavior through Smartwatch Applications

Efforts to alert the population of the dangers of smoking have increased in the recent decades, yet smoking remains a prevalent danger to a large portion of society. Additionally, the use of smartphones is becoming increasingly ubiquitous. There have been efforts to utilize smartphone applications to aid in the cessation of smoking, however, these are often intrusive and rely on inefficient measures, such as self-reporting. In the past few years, smartwatches have become more common to the average smartphone user. These watches are often equipped with powerful sensors, including an accelerometer which measures acceleration in different axes. Utilizing this technology, we were able to develop an Android/Android Wear application to record accelerometer data as a user is smoking. This data was used for training an artificial neural network (ANN) to recognize smoking gestures. Integrating the ANN into an Android application created a non-intrusive, convenient, and accurate means of determining whether a user is smoking in real time. This application has multiple potential uses. In a research setting, it can be used to ask targeted questions to smokers in a more natural environment versus in a clinical setting. It could also be provided to the public to aid in smoking cessation efforts of an average user.

Janvrin, Kittridge  
Mentor(s): Prof. Lara Lomicka  
Communications Ethics in Exploring Ireland’s Past

Studying abroad during the spring semester of my sophomore year at Griffith College in Dublin, Ireland allowed me to expand my view of international journalistic practices. I focused on media and research ethics as well as Irish history. Over the course of the semester, I traveled to seven different countries, which provided me experience navigating and communicating with the unfamiliar. It also led me to plan a return trip to Ireland a year later, during which I interviewed lead oral historians. My time abroad changed my perceptions of international conflict and the people involved in civil struggles; I learned the importance of recording stories not only from the popularized or media-heavy side. Through flexible perceptions, I was able to form connections with people both on my study abroad program and who were from a different generation and had been involved in important areas of Irish history. In the future, I plan to use the skills I have developed in terms of planning trips to help in organizing events and focusing on details in the field of public relations.
Jefferson, Jaleel  
Mentor(s): Dr. Heather Brandt  
Evaluating recruitment, training, and technical assistance approaches to support implementation of a diet and physical activity intervention

Background/Purpose: To address health disparities in the African-American community, an evidence-based diet and physical activity intervention was implemented by lay church education team (CET) members, with support from experienced mentors. Our goal was to better understand the experiences of CETs and mentors to improve recruitment, training, and technical assistance (TA) of the intervention.

Methods: Mentors (n=9) and CETs (n=12) were invited to participate in a telephone interview. A semi-structured interview guide was used to gather information about recruitment, training, TA, and overall experience delivering the intervention. Interviews were audio-recorded and transcribed. Transcripts were reviewed to identify emergent themes and prepare a data summary.

Results: Interviews were conducted with 3 mentors and 10 CETs. Results indicated a great amount of support from the research team for training and TA. Participants felt the training prepared them well enough to lead the intervention. However, many participants indicated a need for more structured TA, as well as separate TA for mentors. Several participants felt bringing people with previous experience would help increase and improve recruitment. Additionally, CETs reported there was a need for enhanced communication methods through an online portal or website.

Conclusion: Mentors and CETs enjoyed leading the intervention and were glad to be part of it. The majority of participants appreciated and valued the training for their roles. In order to address the communication needs of the program, a website containing health information and health materials specific to the HEALS intervention is in the process of being developed.

Jenkins, Davonte’  
Mentor(s): Dr. William Harpine  
The Effects of Speaker Credibility in Race Relations: A Study of Two Speeches

This presentation examines and describes speaker credibility in two speeches that discussed race relations. Breaking down the different areas of speaker credibility, which are competence, good will, and dynamism, this presentation shows how Senator Tim Scott and former South Carolina Governor Nikki Haley established credibility in their speeches on race relations. This topic is important because of the influx in racial discussions and controversies in recent years. A speaker’s perceived credibility affects the acceptance of the message.

Jerideau, Elliott  
Mentor(s): Dr. Sarah Miller  
Student Pioneer

Evolution of Nursing (NURS 212) is a course where rising sophomore nursing students learn about the scientific base of nursing, and the evolution of nursing as a profession, science, art, practice and discipline. In this course we had the opportunity to learn about Jessie Sleet and Lillian Ward, pioneers in the nursing profession who brought nursing care to under-served areas populated by African Americans and immigrants in the 1800s. Before serving in Student Government my main focus was to get away and set down in another area but now I realize I have the drive and ability to help those in my community and neighboring communities. Through my service as Student Government Secretary I have had the opportunity to go out into my community and volunteer. Nearing Christmas of 2016, Student Government set up a potluck soup kitchen at Edgewood Baptist Church in Walterboro, SC. We had dozens of choices for people to pick from and also had the chance to donate canned goods and make a monetary donation to the church food bank. This service sparked my interest in helping people, and showed me that the community I am a member of is the community I need to help. I found I was able to effect change as Jessie Sleet and Lillian Ward did, by going out into my community and helping those in need.
Jeter, Madison  
Mentor(s): Dr. Cheryl Armstead, Ms. Deeoona Farr, Dr. Daniela Friedman, Dr. Swann Adams, Dr. Heather Brandt  
Black women reactions to breast density information

It is important for women to complete annual mammograms to reduce the rate of breast cancer death. Mammograms are less accurate for women with dense breasts. Studies indicate African American women are more likely to have dense breast compared to other women. The purpose of this study was to explore what African American women were told about breast density and how they reacted to the information. The data was collected from a larger study of breast cancer screening in Black women age forty and older. Between July 2016-January 2017, 126 survey responses were collected and of those 21% of women reported they had dense breasts. Sixty percent of women with dense breast had less than a high school education and 52% of the women were in the 50-64 years old age range. Two open-ended questions about breast density were reviewed, “Have you ever been told that you have dense breast? “ and “How did you react when you were informed that you have dense breasts? The authors reviewed the patient’s comments and organized them into themes. Majority of the women indicated their reaction to having dense breasts were either calm or worried, but many women failed to indicate the information they were told regarding breast density. This appears to indicate the lack of understanding of breast density. More information should be provided regarding breast density and how it impacts mammography accuracy.

Johnson, Hope  
Supervisor(s): Daniel Delgado, Devon Bremer, Allie Lightcap  
Mentor(s): Dr. Linwan Wu, Prof. Jeffrey Williams  
Ad Team - Integrated Marketing and Retail Campaign

Every year, the Advertising Team competes in the National Student Advertising Competition. This year the team is creating a campaign for Tai Pei frozen Asian food. For the past 8 months, we have conducted both primary and secondary research to gain winning insight. We have created a fully integrated marketing and retail campaign based on our extensive research. The creative ads we’ve designed target millennials and the platforms we’ve chosen are untapped and showcase Tai Pei in a new way. With a somewhat limited budget, we have meticulously crafted a media plan that brings our campaign to our audience.

Johnson, Madison  
Mentor(s): Dr. Swati Debroy  
An Educational Intervention to Promote Healthy-lifestyle choices among Middle Schoolers in Jasper County, SC

A salad bar option has been introduced for the first time to the existing lunch program at Hardeeville-Ridgeland Middle School in Jasper County, SC. Data are being collected on the frequency with which students opt for the salad bar option over traditional menu items. Additionally, students’ BMI, race, gender and socioeconomic status are recorded to enable the examination of associations of these personal attributes with salad bar usage. An integral part of this research effort is the design and implementation of an educational intervention program focused on eating healthy and being active. This program was implemented in the middle of the academic year, allowing an analysis of salad bar usage pre- and post-educational campaign.

The educational campaign was delivered passively with informational posters in the cafeteria, and actively, through a 30-minute presentation in every classroom by undergraduate and medical school students. Key concepts of the educational program delivered via a video and slide presentation included: 1) the nationally recognized 5-2-1-0 childhood obesity prevention program 2) the importance of eating breakfast; 3) MyPlate with 3-dimensional food models to demonstrate appropriate portion sizes. To reinforce these concepts, a Bingo game on nutrition with prizes to incentivize participation was also played. This research will allow the determination of the effectiveness of the content and delivery of the educational campaign and also its usefulness beyond the one Middle school that was treated.
Johnson, Hunter  
**Mentor(s): Dr. Bob Heere, Dr. Ed Munn Sanchez**  
**The Role of Soccer in the Post-Colonial Relationship Between Brazil and Portugal**

This is a brief synopsis of my Honors College senior thesis. I researched how the movement of soccer players from Brazil to Portugal reflected the previous colonial relationship between the two countries. Brazil is a former Portuguese colony, and Portugal still takes away valuable natural resources (soccer players).

Jones, Katlyn  
**Mentor(s): Dr. David Hatch**  
**The 100th Anniversary of the Easter Rising**

On a recent trip to Ireland, Dr. David Hatch examined student journals published during the weeks surrounding the Easter Rising of April 1916, when a group of armed home-rule activists declared Irish independence. This rebellion was successful on many levels and, for several days, resisted the British soldiers sent to suppress it. After some bloody fighting, the British authorities reclaimed the city center, restored their government, and executed several of the rebel leaders. He collected these documents and images to examine how the students responded to these events, but has not explored them or written about his findings.

When we first examined these documents, we anticipated that the students at Trinity College, which is the traditionally Protestant university in Dublin, might side with the British, but we were surprised by the fervor with which they took up the unity cause. In contrast, a glance through these journals suggests that the students at University College, the traditionally Catholic institution, supported the rebels both ideologically and financially, raising money for the legal defense of the accused rebels, many of whom were their professors. In each case, the tone of the student journal changes radically when the political climate becomes polarized.

Now, 100 years after the Rising, we open up a new aspect of the story. We have read articles on the involvement of different citizen’s stand on the issue. Current scholarship seems to focus on personal accounts and stories from the locations surrounding the two colleges: post offices and businesses (such as Lauren Arrington’s article about Jacob’s Biscuit Factory and the involvement of the factory in the rising).

From the research that has been gathered, the story of students involved shares a piece of untold history. The unique aspect of this project is that this does not come from the stories of the soldiers, government involved, or businessmen, but this research tells the stories of the college students on two campuses located only a few thousand yards apart, and how they became opposed to one another in this Easter Rising.
Jones, Bethany
Mentor(s): Prof. Anna Oswald-Hensley
Bethany Jones: GLD Professional and Civic Engagement

Club President
During my sophomore year at USC Sumter I have had the opportunity of being the president of Christian Collegiate Ministry here on campus. Christian Collegiate Ministry is a club open to anyone who wants to fellowship with other Christians and learn more about Christ. I have advertised for the club, prepared fun games for the beginning of each meeting, and even shared during our message time. I took the position of president because my biology teacher informed me that the president from the previous year was transferring, and if no one stepped up to fill her place, the club could no longer continue. During my time as president, I have learned a lot about what it takes to organize meetings and events and the effort that it takes to inspire people to participate in something that they believe in. Being a part of CCM has helped me see that there are other students that share the same passions and beliefs that I do, as well as professors who are willing to share what they believe and pour into their students. I would encourage others to get involved in an organization that they believe in. I plan to use some of the leadership skills I have gained from CCM at my current job at Chick-fil-A as a team leader, and one day in my classroom. I will be able to comfortably address groups of people that I do not know, lead them in activities, and even instruct them from my experiences.

Camp Counselor
Over the past seven summers I have had the opportunity to serve on staff at Ambassador Camp in Lake Waccamaw, North Carolina. Five of those summers I was serving as a counselor, and the summer of 2016 I was the head counselor of my cabin. Ambassador Camp is a small Christian camp located by the lake, with the goal to provide a fun summer camp experience at the same time as teaching children about Jesus. As a counselor at Ambassador Camp I had to keep up with the girls in my cabin, lead devotionals, assist with arts and crafts, supervise swim time, teach canoeing, and so much more. Ambassador Camp has had a great impact on who I am as a person. I have learned how to be assertive, enforce rules, share responsibilities with other leaders, love children who are more difficult to love, talk to children about important things in their lives, and step out of my comfort zone to get a job done. Being a camp counselor has helped me learn how to reach out and connect with all types of kids, and could help anyone step out of their comfort zone and learn how to relate to others. When I become a teacher I will be able to use the relational skills that I learned at camp to connect with my students and have personal connections with each one of them.

Jones, Katlyn
Mentor(s): Dr. Sarah Miller
Engaging in the Civics of Civic Engagement

Since I began my involvement with working with the Colleton County Sheriff’s office, my interest in politics grew immensely. When the 2016 election season approached, I found myself neck deep with working with getting our Sheriff, Andy Strickland re-elected. The complications that were to be faced, met me the day we began. Sheriff Strickland announced that he had chosen to run as a Republican in a Democratic county, the future did not discourage me, but I knew that my efforts would be needed in this election. The perseverance through the opposition of opponents, responsibility of helping organizing meetings and events, and the developed creativity learned from the campaign has inspired me. I have been inspired to walk in the footsteps of Sheriff Strickland and politicians like him, who continue to make Colleton County and South Carolina a better place. I never would have guessed that I would have the opportunity to speak to individuals on the process of voting and help our community become more actively involved. The “behind the scenes” of politics, caused me to become passionate about educating others on the importance of involvement. Spending my afternoons helping individuals learn how to register to vote encouraged me to know that each one of them is now educated in civic engagement themselves. After the months of campaigning, I look back and think of the impact and am proud to know that over a hundred people are registered to vote and are educated in the process of voting and politics. It was an educating moment for me to realize the lack of knowledge of the political system that people faced. I spent 2 nights on endless phone calls of people calling in with questions and opinions. Working with a political candidate opened my eyes to the responsibility that is to be held when doing something great for those that surround us. The office of a politician is a great duty, but also an inspiring goal.
Jones, Alec  
**Mentor(s): Dr. April DeLaurier, Dr. Nathan Hancock**  
**mPing as a tool for transposon mutagenesis in zebrafish**

The goal of this project is to demonstrate the successful in vivo transposition of the mobile element mPing, from Oryza sativa (rice), in zebrafish. mPing is a 430-bp, class II miniature inverted-repeat transposable element (MITE), which is mobilized by two enzymes: ORF1, which contains a DNA recognition domain, and TPase, which contains a catalytic DDE domain. mPing, like many invertebrate transposons, has yet to be tested for activity in a vertebrate organism, yet may serve as an effective tool for transposon mutagenesis in vertebrates, such as zebrafish. A single i Tol2 expression vector, containing the CMV immediate early promoter driving expression of mmPing20x-interrupted mCherry, will be co-injected with both Tol2 transposase mRNA and mRNA of ORF1-T2A-TPase. The expression vector also contains a cmlc2:eGFP transgenesis marker labelling cardiac cells, to check for plasmid integration. Successful rates of transposition will be determined in injected F0 fish by the ratio of mCherry expressing fish to the number of fish with cardiac eGFP expression. This will also permit us to determine the rate of transmission among F1 fish, and to potentially establish a line of fish containing mmPing20x, and remobilize this element in subsequent generations via injection of ORF1-T2A-TPase mRNA. The results of this study will form the basis to future research to use mmPing20x containing a Xenopus-derived EF2α enhancer as an activation tag in zebrafish as a tool for novel gene discovery.

Joseph, Chantaezia  
**Mentor(s): Ms. Lisa Camp**  
**Embracing Others Through Diversity**

Throughout my time here at Carolina, I have been fortunate enough to engage in many different paths, which include being an Orientation Leader, a Resident Mentor, and Studying Abroad. Becoming more aware of other cultures allows an individual to succeed in any part of life, whether it be interacting with colleagues in your profession, or intermingling with Spaniards overseas. Orientation gave me this opportunity due to how much I learned through welcome incoming students, parents, and their families to our great University. This experience not only taught me about the diversity of individuals, but it taught me about myself and what I valued in my life. By embracing others through celebrating diversity, I have left my mark on Carolina through leaving an impact on student’s lives.

Jowers, Cash  
**Mentor(s): Dr. Dmitry Peryshkov, Mr. Bennett Eleazer**  
**Phosphine directing ligands in BC-carboryne synthesis**

From o-carborane, we have achieved synthesis of a mono-substituted phosphine pincer complex. This was achieved by creation of a single hydroxy group added to the carborane cage through a lithiation reaction. Then, a substitution reaction is allowed to take place using di(tbutyl) phosphine chloride (P(tBu)2Cl), attaching a single phosphine arm to the oxygen of the hydroxy group. The goal of the project is for the phosphine arm to act as a directing group, allowing metals to bond to the other carbon and a nearby boron. The result has potential be a stable boron-carbon carboryne, which has potential to act as a catalyst and may have interesting material properties.
Kalina, Sara  
Mentor(s): Ms. Tricia Kennedy  
The Learning Techniques that Facilitate Independent Thinking

The Supplemental Instruction program provides academic support for students in core classes with at least a 25% D/F/Withdrawal rate. This program is unique because at its foundation is the idea of peer-to-peer collaborative learning. As a freshman, I saw many of my peers struggling in classes that came naturally to me and with a desire to become more involved on campus I applied to be a Supplemental Instruction (SI) Leader. As an SI leader, I create and facilitate three 50-minute sessions a week utilizing collaborative learning techniques to help the students develop a deeper understanding of the material covered in lecture. Throughout my seven semesters as an SI Leader, I have redefined my definition of what it means to learn and what it means to teach. Each semester, I have been able to more effectively integrate the “Big Three Elements” (Redirecting Questions, Wait Time, and Check For Understanding) into my SI sessions, as well as, my own studying methods. Serving as an SI Leader for BIOL 102, MATH 141, and MATH 142 I have helped hundreds of students understand concepts from the Limit Comparison Test to Genetic Variation. From my leadership positions within the Supplemental Instruction program, I have fostered the ability to facilitate an environment that is conducive towards learning, as well as, effective group work. My presentation will discuss how these skills have helped me become an effective leader and how I plan to integrate them into my career in order to develop new leaders within the community.

Kapoor, Vanu  
Mentor(s): Dr. Andrea Benigni, Mr. Jordan Burrows, Mr. Michael Mitchell, Mr. Dean Philip  
Inverter Exporting Power From A Solar-Powered Battery Charging Station

Electricity generation from renewable sources has an important contribution towards the decrement in environment pollution. Solar energy is an excellent source of power. The sun rays can be utilize to generate the solar power. Solar or Photovoltaic panels can be used to generate electricity from the sunlight. This generated electricity can be further stored in a battery for future purposes. The use of hybrid vehicles has been increasing in recent years. A Photovoltaic (PV) based charging station can be built to charge the batteries of hybrid vehicles. Photovoltaic (PV) systems can range from a small to large scale. Photovoltaic (PV) inverter is the main subsystem of a grid connected PV system. A bidirectional PV inverter is being designed for the grid connected PV system import/export power from the grid as necessary to compensate for any deficiency or surplus of PV power produced in a PV-powered Li-ion battery charging station. The designed inverter needs to verify IEEE-1547 standards and requirements. The designed system will be tested in Hardware in Loop environment to verify that the system meets the IEEE-1547 standards.

Karan, Jessica  
Mentor(s): Dr. Blaine Griffen, Mr. Ben Belgrad  
Individual personality associated with interactions between physiological condition and the environment

An emerging focus of behavioral ecology is to determine the driving forces behind animal personalities. While numerous theories have been proposed to explain these behavioral variations, empirical studies on this subject remain lacking. Here, we test ecological theory by studying the combined effects of physiological condition and habitat quality on the behavior of individual mud crabs, Panopeus herbstii, across the spawning season (early spawning season and 2 months after) in coastal South Carolina. We assessed the boldness, energy stores and reproductive effort of crabs collected across 10 oyster reefs of low and high quality using laboratory observations and subsequent dissections. Crab boldness was significantly dependent on the interaction between habitat quality and season. While crab behavior remained relatively constant on healthy reefs, crabs on degraded reefs exhibited a nearly two-fold increase in boldness during the late spawning season, approximating the boldness of crabs on healthy reefs. This behavioral change corresponds to a seasonal shift in crab energy store content and is likely to represent a switch in the primary driving force of crab behavior. During the early season, crab boldness was positively correlated with short-term stores, whereas later in the season, crab boldness was negatively correlated with long-term stores. Our results suggest that behavior is driven by predation pressure and refuge availability during the early spawning season, but afterwards depends on replenishing energy stores used for reproduction. These findings support ecological theory and also provide new insight into the stability of behavioral drivers.
Kasher, Tal  
**Mentor(s): Dr. Guoan Wang**  
**Tunable Radio Frequency Wireless Power Harvester**

Applications of many low power electronics without access to power sources are limited by battery life. A wireless power harvester (WPH) is proposed in this work which receives and rectifies ambient broadcasted Alternating Current (AC) signals (e.g., TV, Cell phone) into Direct Current (DC) electricity to supply electronic circuits and systems. WPH comprises two subsystems, antenna, which receives the signals, and rectifying circuit, which converts AC signals into DC power. Although a broadband antenna can receive signals from different frequency bands, the efficiency and insertion loss of a WPH is highly dependent on the impedance matching between the antenna and the harvesting circuit which varies with frequency. Optimized matching of a conventional impedance matching network is achieved only at a fixed frequency band. In this research, the proposed WPH system has an integrated tunable impedance matching network, which provides optimized impedance matching at the frequency of available RF signal with the highest power level, which maximizes power harvesting efficiency in the proposed WPH system at different frequency bands. The proposed new tunable impedance matching network will be designed, optimized, validated and integrated with WPH.

Kautsch, Brady  
**Mentor(s): Mr. Drew Newton**  
**Perception’s Impact on Students’ Success**

In the fall of 2015, I enrolled in a course regarding the history and philosophy of science, which greatly impacted my role as a Supplemental Instruction (SI) leader at the University of South Carolina. Throughout the course, I encountered various theories and debates that are surrounding scientific fields today. When it came to these discourses, I was mostly interested in the Realism/Anti-Realism debate. Usually in science, experimentation is done through observation and the gathering of empirical data from repeated results, commonly referred to as the realist approach. Yet, the basis for realism seems to span into lifestyle as a whole because of its reliance on the human senses and their observation skills. However, the anti-realist approach emphasizes the fallibility of the human senses, and points to the issues that surround science because of natural human bias. While investigating this topic, it became clear to me just how much individuals’ perception dictates their ways of thinking, interpreting, and living. From this experience, I was able to apply the role of perception to benefit other students by means of using a holistic approach, which accounts for the various ways students actively learn. Understanding the needs of those who learn most effectively through visual, aural, physical, and verbal methods became essential to my planning and execution of SI sessions, as these efforts made it possible to help students in ways I never would have been able to if I only considered what I thought was the best way of reinforcing course material.

Keeney, Madeline  
**Mentor(s): Dr. Nina Moreno**  
**Leadership Distinction in Global Learning**

Leadership Distinction in Global Learning
Kelley, Sharron  
Mentor(s): Dr. Randy Lowell  
Impact of Implicit Bias on Perceptions, Dreams, and Memory

The purpose of this study is to gain a better understanding of how participants’ perceptions, dreams, and memories interact. There is evidence in the literature of negative perceptions of women wearing full/partial headscarves, compared to no headwear, on dimensions such as attractiveness and intelligence (e.g., Everett et al., 2015; Mahmud & Swami, 2010). It is less clear how the presence/absence of such headwear influences memory for those individuals. In the current study, we will manipulate the photos attached to fake dating profiles (i.e. 1) headwear [no headwear, Western headwear, or non-Western headwear]; 2) skin tone [light skin, or dark skin]; and 3) gender [male, or female]), have participants evaluate those profiles and attempt to recall the information from those profiles a week later. Implicit bias regarding the variables of interest will be assessed, via the Implicit Association Test at the end of their participation, and examined in relation to their evaluation data and memory performance. In addition to the experimental tasks during participants’ visits to the lab, they will also keep a dream journal at home to track the appearance of our stimuli in their dream content. This at-home task will reinforce the impressions that participants formed of the featured men/women on their initial encounter with the profiles, and allow us to examine the relationship between wakeful encoding of these profiles with potential encoding/consolidation of related information in their dream content, which have been shown to have common mechanisms (e.g., DeGennaro et al., 2012). Data collection is in progress.

Kemp, Katherine  
Mentor(s): Mr. David DeWeil  
Learning through Experiencing

My most meaningful contribution to the University of South Carolina was when I was on Kappa Delta Sorority’s Executive Board in the position of Secretary, working with the other Executive Board members to run the organization of over four hundred members. I chose to run for Secretary because I knew this leadership position would put me in situations that would make me uncomfortable and would force me to persevere and become a more active leader.  
Summer of 2016 I moved to New York City to intern for celebrity stylist Micaela Erlanger as their Fashion Closet Intern. Although completing an internship is a requirement for my major, I chose to pursue Celebrity Styling because I had no direct knowledge of that part of the industry from previous schooling. During the internship I was exposed to a variety of jobs, immersing myself fully in the creative fashion industry.  
The fashion industry, like leadership positions, is truly not something you can learn in a classroom, one must learn through experiences—my experiences interning for a Celebrity Stylist and as Secretary of Kappa Delta Sorority have shown me that no two clients or problems are the same. Being a leader of an organization like Kappa Delta and my internship has pushed me to realize that skills are not something one is just born with but, rather, something one gains through different experiences throughout life. Through my time at the University of South Carolina and my Professional and Civic Engagement experiences while here I have learned to be intentional, communicate confidently, and collaborate creatively.

Kennedy, Kelley  
Mentor(s): Mr. Alex Blauvelt  
Putting It Together

During my time as an intern for the Vanguard Group, I learned a great deal about what it means to translate a passion for service into leadership in professional settings. Through my community service work with other Vanguard members, I discovered the importance of corporate responsibility and realized some of the ways in which businesses can be leaders in efforts for social justice and the elimination of poverty, and I had three opportunity to utilize the organizing and communication skills I had learned through leadership in other roles at USC to a professional setting.
Transposable elements (TEs) are mobile segments of DNA found throughout the genomes of essentially all organisms. While many TEs exist in low numbers and/or are relatively inactive, some regularly relocate to new sites in the genome. In order for these “jumping genes” to be mobilized, proteins must interact with the ends of the element and catalyze DNA cleavage. Although it is known which proteins are necessary for mobilization, understanding the quantity and ratio needed provides clues about the makeup of the transposition complex. For this project, we studied mPing, a DNA transposon that is highly active in rice and is mobilized by two proteins, ORF1 and Transposase. Previous results indicate that there are multiple DNA sequences involved in mPing transposition. We hypothesized that more ORF1 is necessary for transposition because it contains the DNA binding domain. We assessed the ratio of ORF1 to Transposase in the mPing transposition complex by altering the levels of expression of both of these proteins. Three different experimental treatments were tested: equal expression of each protein (control), high ORF1 with low Transposase, and low ORF1 with high Transposase. Yeast transposition assays were then conducted on the treatments to determine the amounts of mPing transposition.

Kisby, Caleb
Mentor(s): Prof. George McNulty
Exploring Non-finitely Based Finite Algebras

Determining whether a finite algebra has a finite set of axioms (i.e. a finite basis) has proven to be a very subtle problem. Ralph McKenzie showed that this question is in fact not decidable by a computer program. Since this result, a partial characterization of finitely based algebras has been sought. Much progress has been made on conditions for a finite algebra to be finitely based, but non-finitely based finite algebras remain relatively unexplored. The purpose of this project is to construct new non-finitely based finite algebras, in order to better understand these peculiar algebras.

The student has found new proofs that four already known finite algebras are not finitely based. These four proofs use a similar argument, and so we intend to apply this argument to certain non-finitely based finite algebras arising from other combinatorial structures (e.g. finite automata). The long-term plan is to generalize this argument into a new technique for constructing non-finitely based finite algebras.

We will present our work with the finite graph algebras, as well as our progress with finite algebras arising from other combinatorial structures.

Klett, Jennifer
Mentor(s): Dr. Michy Kelly
Transient Amnesia: Identifying the Role of PDE11A4 in Systems Consolidation of Social Memories

Social memories are first encoded in the hippocampus but then are transferred completely to the prefrontal cortex—a process referred to as systems consolidation. This study focuses on PDE11A4, the only PDE with mRNA expression restricted to the ventral hippocampal formation. In behavioral assays, PDE11A knockout (KO) mice showed intact social memories at 1 hour post training, but no memory 24 hours post training (recent long-term memory, LTM). However, these PDE11A KO mice regain their memory 7 days post training (remote LTM). We hypothesize this transient amnesia is caused by an expedited systems consolidation, where the memory is more quickly moved to the prefrontal cortex and erased from the hippocampus. To test this hypothesis we mapped neuronal activity of PDE11A WT and KO mice during the retrieval of a remote social memory. We also tested for changes in NMDA and CaMKIIalpha signaling, both of which have been implicated in systems consolidation. We found that during a remote memory retrieval test, PDE11A KO mice show enhanced neuronal activation of a portion of the prefrontal cortex known as anterior cingulate cortex, as indicated by elevated levels of an activity-regulated gene called Arc. PDE11A KO mice also demonstrated heightened activation of specific regions of the entorhinal and perirhinal cortices relative to WT mice. PDE11A KO mice also showed differences in NMDA receptor function and CamKIIalpha signaling in prefrontal cortex. Relative to PDE11A WT mice, KO mice showed less efficient phosphorylation of CamKII alpha and the NMDA receptor subunits NR2A and NR1. Together, these results suggest that PDE11A4 plays a major role in regulating the molecular mechanisms underlying systems consolidation of social memories.
Knott, Chandler  
**Co-Presenter(s):** Kayla Smith  
**Mentor(s):** Dr. Jane Roberts, Ms. Debra Reisinger  
**Intensity of Escape Behaviors as Antecedents of Anxiety in High-Risk Infant Populations**

Anxiety is among the most common and impairing mental health disorders in young children. Research has shown that children diagnosed with Autism Spectrum Disorder (ASD), fragile X syndrome (FXS), and Down Syndrome (DS) are at a particularly high-risk for experiencing clinical levels of anxiety. There is limited research, however, comparing how anxiety presents in infancy across these high-risk populations. This study examines the emergence of behavioral antecedents of anxiety across four etiologically distinct populations, three of which are at high-risk for anxiety. These four distinct populations are: typically developing children (TD), children with FXS, children with DS and in children with an older sibling with ASD (ASIBs). The present study aims to compare the intensity of escape behaviors, as a proxy for measuring anxiety, specifically social fear and object fear, between TD children, FXS children, DS children and ASIB children at 12 months of age. The Laboratory Temperament Assessment battery (Lab-TAB) is a standardized assessment used to observe differences in temperament in various contrived situations that mimic everyday situations. The Lab-TAB was used to code videos offline of the participants interacting with a stranger (social fear) and a toy spider (object fear) for intensity of escape behaviors when exposed to social and inanimate stimuli. The intensity of escape behaviors will be compared across groups (TD, FXS, DS and ASIBs). Based on previous research, it is hypothesized that infants with, FXS, DS and infant ASIBs will exhibit increased and prolonged periods of escape behavior, for both the stranger and spider tasks, in comparison to TD infants.

Knox, Jerica  
**Mentor(s):** Mrs. Stuart Hunter  
**Coloring Books and Crayons: Shading in My Pathway through Service with Children**

My collegiate years have been a time for development. I have had the opportunity to learn both within the classroom and beyond the classroom. Though I did not come to the University of South Carolina knowing exactly what I wanted to do, I used community service to discover myself. A combination of community service experiences have allowed me to work with children in multiple capacities. My experiences range from at-risk youth in summer camps to children dealing with mental illnesses for a crisis hotline. These activities have allowed me to realize that my passion lies within School Psychology. Along the way, I have learned about empathy, responsibility, and power in regards to people in general. The aim of my Discovery Day presentation is to reflect upon my collegiate journey through service, explain how my experiences have impacted my view of the world, and define my role within society after my collegiate years have ended.

Knox, Jerica  
**Mentor(s):** Dr. Nikki Wooten  
**Army Women’s Experiences of Military Sexual Trauma during Combat Deployments**

Throughout military service, a person can experience military sexual trauma (MST)—a psychological trauma resulting from sexual assault or sexual harrassment. MST negatively impacts the socioemotional wellbeing of military service members and is associated with posttraumatic stress disorder, depression, substance abuse, and other physical and mental health problems. Given the male-dominated military culture, women are disproportionately affected by MST during military service and deployments. Although a wealth of evidence exists on MST, little is known about deployed women’s lived experiences of MST. This study explored MST during combat deployments among deployed Army women. Army women (n=110) answered two open-ended questions about positive and negative military and deployment experiences during an anonymous, self-administered survey via SurveyMonkey. A phenomenological approach was used to analyze narrative responses using MAXQDA. Concept mapping was used to organize major themes by the MST incident, MST reporting and investigation, post-MST responses, and MST stigma. Army women’s lived experiences of MST during combat deployments increases our understanding of the social and cultural context of MST and the role gender plays in military leaders’ response to MST. Future research should examine the family dynamics of MST post-deployment and post-military.
Kraft, Elizabeth  
Mentor(s): Ms. Theresa Harrison  
Finding My Way Through Philanthropy

In today's society, people have a variety of views on what a Greek organization represents. However, once a person is a part of an organization they have a new concept of what it means to them. To me, my time in Delta Zeta has been centered around philanthropy. From the spring semester of my freshman year to the fall semester of my junior year, I was the philanthropy chair of my sorority. Our philanthropy is centered around speech and hearing disabilities. I chose to become the philanthropy chair as I wanted to challenge what people conceive sororities to be and I wanted my experience to be meaningful. I wanted to continue to do philanthropic work like I did in high school, but I also wanted the opportunity to motivate others to serve to the best of their abilities. Through this experience, I learned a lot about the importance of working together to create change and being open to other's ideas and personality types as well. I am excited to share this experience with others because when working in a group, we can make a much bigger impact. For example, in the 2015 calendar year, our sorority raised over $80,000 in donations for the Starkey Hearing Foundation. As a result of my experiences, I will continue to look for opportunities to participate in non-profit work throughout my life in order to give as much as I can and never forget to be thankful for my many blessings.

Krausman, Shanna  
Mentor(s): Ms. Tricia Kennedy  
Client Individuality

During my time at USC, I was able to work as a case manager at Insights Educational and Treatment Services, an outpatient substance abuse treatment facility. As a case manager, I was able to follow the treatment progress of over 400 clients who had come to Insights for a variety of reasons and with a variety of issues relating to substance abuse. I took this job in order to expand my knowledge in the psychological field and complement some of my classes, while gaining a more in depth and first hand look at the effects of substance abuse. Beyond some of the textbook things I learned, such as which substances effect which parts of the body, and more about the laws surrounding drug use, I learned that you can not treat any two clients the same. I’ve learned that each person that walks into the door has a different story, a different reason for coming, and is at a different stage of their life. This observation taught me that if my career path leads me into the psychological field, I will have a wide variety of clients who each need their own attention and their own treatment plans. I will also apply this learning to my every day life when I interact with my friends and family, none of whom can be treated the same in every situation.

Kule, Ann  
Mentor(s): Dr. Troy Wilson  
Growing Local: An Anthropological Case Study of Civic Agriculture in the Central Savannah River Basin

This research project analyzes organic and local farming in the Central Savannah River basin from the perspective of both the farmer and the consumer. Interviews of eight local and organic farmer/vendors were conducted as well as a cohesive survey of Aiken Organics, an online farmer’s market. Data was collected and analyzed and then presented in a way that includes both the farmers and consumers perspectives on organic, local, and sustainable agriculture. The field work for this anthropological study lasted for over a year and a half from June 2015 to April 2017. It consisted of working closely with the eight farmer/vendors as well as the consumers of their produce through Aiken Organics.
Kunselman, Lauren  
Mentor(s): Dr. Tammi Richardson, Mr. Eric Lachenmyer  
**Temperature-shift tolerance of cold- and warm-water cryptophytes**

Cryptophytes are photosynthetic microalgae that live in a variety of aquatic ecosystems, like ponds, estuaries, and oceans. Here, we examined how the growth rates of four species of cryptophytes, two from “warm” water and two from “cold” water, responded to shifts in their environmental temperature. The cold-water (4°C) cryptophyte, Geminigera cryophila grew faster at 4°C than at 6°C, 8°C, 10°C and 13.5°C, while Unid. sp. 2293 grew faster at 6°C than at all other experimental temperatures. The warm-water cryptophytes, Rhodomonas salina and Hemiselmis pacifica, grew fastest at their growth temperatures (20°C and 15°C, respectively) but did not show substantial differences in growth rates when shifted to experimental temperatures of 10°C, 15°C, 18°C, or 24°C. The cold-water species were therefore more sensitive to changes in their environment than were the warm-water species. These results are directly relevant to our understanding of how organisms will respond to increases in temperature due to global climate change. The Arctic Ocean, for example, has shown an accelerated rate of warming since the year 2000. Negative growth effects on lower trophic levels, like the cryptophytes, will impact productivity of higher trophic level organisms.

Kynoch, Cole  
Mentor(s): Mr. Drew Newton  
**Division of Responsibility Leads to Efficient Group Work**

The first time I was exposed to a group project in college was in Management 250, in which I was assigned to a group research project on discrimination in the workplace. After struggling to work through people's schedules and work styles, we found that the best way to work on a project like this was to divide the work among the group members. This provided for a more efficient work environment, and ensured that we had a more complete and fluid final product. I was then able to take the skills that I had learned in Management 250 and apply them to my work as a Supplemental Instruction Leader. Collaborative Learning is a pillar of the Supplemental Instruction model, and what I learned in my group project in Management 250 helped me more effectively apply collaborative learning to my sessions. I had the students work on different pieces of a problem, or work different problems and help each other, rather than all working on the same problem and then discussing it. This led to more involved collaborative learning and proved to be a more effective way for the students to review the material. My experience with effective group work both in Management 250 and with my role as a Supplemental Instruction Leader has helped me develop insights for the Professional and Civic Engagement pathway and has prepared me for the group work I will take on in the corporate world.
La Valley, Elizabeth
Mentor(s): Dr. Andrew Kaczynski
Exploring the relationship between physical activity opportunities in church environments and church members’ physical activity levels

Indoor and outdoor physical activity opportunities in church environments may significantly impact church member physical activity (PA) behaviors. However, little research exists comparing church environment PA opportunities to levels of PA among church members. The purpose of this study was to investigate if higher church PA environment scores were associated with greater self-reported minutes of moderate-to-vigorous physical activity (MVPA) among church members.

As part of the Faith, Activity, and Nutrition (FAN) project, early and delayed intervention churches (n=54) in a rural South Carolina county were audited independently by two trained data collectors to assess the availability and condition of indoor and outdoor PA opportunities. Using validated measurement tools, church members reported minutes of weekly MVPA as part of a survey assessing health perceptions and behaviors.

Analyses are ongoing using logistic regression to test if higher church PA environment scores are associated with increased odds of meeting PA recommendations (>150 min/week MVPA), controlling for covariates such as church intervention status and church member age, gender, and education.

This study will provide important information about how structural characteristics of faith-based settings may influence a key health behavior. Future research should explore other environmental supports for PA in church settings, such as church leadership directives and influence and church media encouraging PA.

Lambdin, Mary
Mentor(s): Mr. Andrew Schramm
Exploring a possible link between one’s sexual identity and their level of happiness

The acceptance of sexual minorities in today’s society is becoming more and more prevalent, making being a sexual minority appear to be more common. Along with this, the rate of depression in the United States has risen dramatically in the last 50 years. This study was created in order to assess whether those who identify as heteroromantic heterosexual (straight) or those that identify as a sexual minority (homosexual, bisexual, pansexual, asexual, demisexual, other) have a higher overall rate of life happiness. More specifically, this test was created to determine if homoromantic homosexuals are happier than those of different sexual minorities. This was tested through a 22-question personal interview, which was completed by 85 college aged people with differing sexualities and levels of happiness. 33 participants were heteroromantic heterosexual and 52 were sexual minorities, with 28 being homoromantic homosexuals and 24 identifying as other sexual minorities. Results concluded that people who self-reported as heteroromantic heterosexual were significantly happier than those that identified as homoromantic homosexual, and that those who identified as homoromantic homosexuals scored higher than other sexual minorities, such as asexuals and demisexuals.
Landis, Devon  
**Mentor(s): Dr. Magdalena Grudzinski-Hall**  
**Lessons in Living and Learning Abroad**

During the spring of 2016, I studied abroad for four months during which I took classes and lived in Sevilla, Spain for the entirety of a semester. While I was there I was able to immerse myself both in the language and the culture of the country by attending classes taught in Spanish at the University of Sevilla, living with a host mother and cultivating friendships with Sevillian students. I have been taking Spanish classes since I was in 2nd grade and have always had the goal of living in a Spanish speaking country to improve my skills and learn more about the culture, so this was the fulfillment of a lifelong dream of mine to both further my Spanish language skills and travel the world. I also was able to explore Spain by visiting both large cities and smaller towns throughout the nation, which gave me a deeper understanding of the country, the culture and the people. My time abroad was a period of immense personal growth with the biggest takeaway being that I learned how much I am capable of. I was able to communicate in a different language and enjoy my time abroad by embracing the challenges that I faced: homesickness, a language barrier, and cultural differences. After living abroad and pushing myself outside of my comfort zone, I will be facing the next chapter of life after graduation with a new confidence and conviction that I am capable. I am eager to expand my horizons once again and learn more about different cultures and different people in a professional capacity.

Laws, A'Ja  
**Mentor(s): Mr. Drew Newton**  
**A'Ja’s Journey to the CPA**

As early as high school I knew I wanted a career in the accounting field. I came to this realization when I took an accounting course in high school and excelled. My teacher noticed how easy the subject came to me and asked me to tutor my peers in the subject. I enjoyed this opportunity and was even given the chance to shadow my accounting teacher at the firm where she was also employed. This was a great experience so I knew when applying to colleges accounting would be the major that I choose. I chose finance to supplement accounting because after speaking to professionals I learned that accounting and finance are two degrees that work well together. When I began college, I set a personal goal to myself to gain an accounting or finance internship each summer, I achieved this goal. One of my most significant internship experiences was with a regional accounting firm called Dixon Hughes Goodman. From this internship, I was able to integrate my learning from the Darla Moore School of Business to help me succeed. I learned the most within-the-classroom concepts in a Leadership in Organizations course as well a Introduction to Psychology course that I completed. Through the Professional and Civic Engagement pathway I will be able to show how this opportunity has helped me grow professionally and personally to reach my all-time goal of becoming a Certified Public Accountant.

Lawson, SummerBrook  
**Mentor(s): Dr. Magdalena Grudzinski-Hall**  
**GLD in Global Learning: Exceeding Your Comfort Zone**

Throughout my collegiate career, I have been fortunate enough to study and volunteer abroad in Taiwan, China, and Thailand. I have studied Mandarin every semester and I am very passionate about improving my language skills on a daily basis. My experiences abroad have deepened my appreciation for cultures and languages outside of the west. This past summer, I interned for a human resource company in Shanghai, China. After living in one of the largest cities in the world for a week, I realized how divergent the living environment was from the United States and my study abroad term in Taiwan. The food, culture, and daily customs were far from anything that I had ever encountered in my life. Living in Asia expanded my definition of normal and allowed me to view daily life from a new perceptive. As a result of internship, I was able to expand on my Mandarin proficiency and learn about working in an international setting. Additionally, being abroad on multiple occasions taught myself a whole new level of independence and maturity. In my office, there were employees from South Korea, China, Germany, and India, so I was able to observe first-hand working in a non-English speaking environment. Returning to the United States, I have discovered a need to bridge the unfamiliar gap between the east and the west. My project seeks to encourage others on pursuing travel and language study outside of one’s comfort zone. Specifically, I will explain cultural norms and business etiquette of China.
Le, Thy  
**Mentor(s):** Dr. Karen Patten  
**Experiencing the other side of the world**

As an international student from Vietnam, I have had many chances to view the world through my studies abroad. My global learning journey has become a unique aspect of my life, and it has shaped me into who I am today. Coming from a developing country, I have been able to experience a brand-new atmosphere here in America. Through all the differing politics, life styles, and points of views I have learned to keep an open mind, because every story has 2 or more sides. I have been able to meet many people from all different walks of life, and through my encounters I have grown as a person. I learned that in order to treat everyone with the respect they deserve, you must not jump to conclusions without understanding all sides of the issue. Besides learning about the importance of open mindedness, I have also learned to enjoy the unexpected. Through my studies in American colleges, I have been able to take a wide variety of classes. Some of these classes were exactly what I thought they would be, while others caught me off guard. Subjects that I thought would waste my time, ended up becoming new found interests. Lastly, studying here in the United States has taught me to pursue my passions. I learned that no matter what your dream is, if you pursue it and work hard at it, you can achieve anything.

League, Alexis  
**Supervisor(s):** Rachel Hinchey, Danielle Dietrich  
**Mentor(s):** Dr. Amit Almor  
**The Role of Spatial Representation in Language Comprehension**

Previous studies indicate that language is mediated by visual attention in many ways. One line of research argues that words with spatial meanings (e.g. Heaven, ground) may cue our attention towards a particular location (e.g. up, down). Support for this theory comes from attentional cueing studies in which such words are presented immediately before a target detection task in which participants respond to visual target that appear at either the top or bottom of the display. A limitation of previous studies is that they left the cue visible during the target detection task, thus making it unclear whether the effect reflects attentional cuing or a post-attentional cue-response matching. The present study thus employs the same paradigm but removes the cue before the target presentation. We hypothesized that if the effects previously reported in the literature are based in attentional processes, then this methodological change should yield similar effects. However, if the effect is being driven by the word remaining visible during target detection, then the effect should be reduced as a result of this change.
LeBrun, Jenna  
Mentor(s): Dr. Sabra Custer  
Interventions for Parental Transitions of Care to a General Pediatric Floor

Background/ Purpose  
Hospitalization of a child is a recognized major stress for parents. Transfer between units, especially from a critical care unit to a general pediatric floor, is likely to increase parental stress and uncertainty. Although transfer to a general pediatric floor signifies improved stability of the child, parents also experience a change in the level of involvement of the child’s nurses. The increase in patient-to-nurse ratios on a general pediatric floor means that the parents are more responsible for their child’s care and updating the nurse on changes of their status. In addition, parents receive less frequent physician updates, as rounding only occurs twice a day on general pediatric floors. Appropriate interventions could be helpful to reduce parental stress and smooth the transition of care to a general pediatric floor.

Methods  
Current literature was explored to determine best practices for educating parents about the environment of a general pediatric floor. A literature search was conducted using CINAHL Complete, PubMed, and The Journal of Pediatric Nursing, with search terms of PICU, transition, intensive care, and stress. Results were limited to within the past five years.

Results  
When compared to the standard of care, studies found that providing parents with written educational materials of unit protocols and patient care significantly reduces parental stress. Videos and verbal explanations may enhance knowledge and help lessen uncertainty, however a tangible reference to consult after the transfer has been shown most beneficial.

Conclusions/Implementations  
Through both verbal and written education of what to expect of their nurses and floor policies, along with what is expected of the parent, their uncertainty has been proven to be eased, which has led to overall increased family satisfaction. This evidence could be implemented to increase parent satisfaction at the current unit in question, in a specialty children’s hospital, in a mid-sized city, within the southeastern region of the United States.

Lech, Melissa  
Mentor(s): Dr. Benjamin Montgomery  
Warming Temperatures Result in Earlier Flowering of Herbaceous Plants in North and South Carolina

This study uses herbarium records and climate data to examine the effects of climate change on flowering phenology of 12 herbaceous species from North and South Carolina with variation in self-compatibility status. A cross-species analysis found significantly earlier peak flowering with warmer temperatures, and significantly earlier peak flowering across years. Considered individually, three individual species showed a significant linear relationship between warmer temperatures and earlier flowering, and two showed a significant pattern of earlier flowering across years. There was a significantly stronger relationship between higher temperatures and earlier flowering times for self-compatible compared to self-incompatible species.
Lee, Daniel
Mentor(s): Dr. Marlene Wilson

Activation of Hypothalamic Orexin Neurons during Extinction of Fear Memories

Post-traumatic stress disorder (PTSD) is a prevalent anxiety disorder that can occur after a serious traumatic event such as serving in the armed forces or a natural disaster. However, not all people who experience a traumatic event develop PTSD which indicates that some neurobiological mechanisms may make some individuals more or less susceptible to the disorder. Long Evans rats have been shown to exhibit individual differences in cue-induced freezing during extinction of fear memories suggesting this outbred strain could serve as a useful model for PTSD. The neuropeptide orexin (hypocretin) has been shown to preserve fear responses during extinction of fear memories. Although orexinergic neurons are located in the hypothalamus, they project to areas of the brain associated with fear extinction (e.g., amygdala and prefrontal cortex). This study tested the hypothesis that individual differences in fear extinction will lead to differential activation of orexin neurons. Three cohorts of rats were exposed to three tone-shock pairings, followed by extinction training two days later in a novel environment with twenty cue (tone) presentations. Brains were collected either after the extinction learning trial or after an extinction recall trial two days later. Rats were divided into good and poor extinction groups based on their freezing during the last ten minutes of the extinction learning trial. The percentage of activated orexinergic neurons in the lateral and medial hypothalamus were examined through dual label immunohistochemistry for orexin-A and cFos. Rats showing resistance to extinction learning (high freezers) had a significantly greater percentage of orexinA neurons with cFos in the medial hypothalamus than low freezers following the extinction recall trial. Interestingly, no individual differences in the activation of orexin neurons were observed in the lateral hypothalamus, or in the medial hypothalamus following extinction learning. These data suggest that orexinergic neurons in the medial hypothalamus may contribute to differential extinction learning.

Lee, James
Mentor(s): Dr. Xuewen Wang, Mr. Joshua Sparks, Mrs. Kimberly Bowyer

Addition of Chronic Moderate Sleep Restriction to Calorie Restriction Weight Loss Induces Different Changes in Overnight Sleep Architecture

INTRODUCTION: Currently, 68% of American adults are considered overweight or obese. Being overweight or obese leads to the risk of development of multiple diseases or diseased states such as hyperglycemia and impaired insulin sensitivity. Sleep plays a role in both neuroendocrine function and metabolism which can affect weight loss. However, it is unknown whether or not chronic moderate sleep restriction affects sleep architecture following a weight loss intervention. PURPOSE: The purpose of this study was to determine how chronic moderate sleep restriction may affect sleep architecture in individuals undergoing dietary weight loss. METHODS: Twenty-six sedentary, overweight or obese individuals were randomized into either an 8-week calorie restriction (CR) group (n=12; age=45.01±6.43 years) or a calorie and sleep restriction (CR+SR) group (n=14; age=45.88±6.35 years). The CR was restricting daily caloric intake to 95% of each individual’s resting metabolic rate measured via indirect calorimetry. SR for the CR+SR group was up to 90 minutes reduction from their regular sleep duration for 5 days each week, and ad libitum sleep on the other 2 days. A portable sleep apnea diagnostic device, WatchPAT, was worn overnight to determine sleep architecture pre- and post-intervention. RESULTS: A significant decrease in weight loss in both CR (~3.43%, p<0.01) and CR+SR (~2.72%, p<0.01) showing similar degrees of weight loss between the groups (p for group x time interaction >0.05) was noticed. No significant change in total sleep duration or rapid eye movement stage of sleep was observed in either group. The CR+SR also did not show significant changes in light or deep sleep time or percent of total sleep. In the CR, however, light sleep duration time decreased (4.03 ± 1.09 hours to 3.08 ± 1.05 hours, p<0.05) even though there was no significant changes in percent of time spent in light sleep (61.48±12.1% to 55.98±11.65%, p>0.05). In addition, there was no change in deep sleep time duration (1.14 ± 0.59 hours to 1.19 ± 0.52 hours, p>0.05), but a significant increase in the percent of time in deep sleep (18.05±8.32% to 22.66±9.62%, p<0.01) was observed. CONCLUSION: The addition of SR to CR suppressed the shift in light sleep time duration and percent time spent in deep sleep that occurred with CR alone despite similar degrees of weight loss. In conclusion, chronic moderate sleep restriction may modulate changes in sleep architecture in sedentary, overweight or obese adults following dietary weight loss. Future research is needed to validate and expand upon these findings.
Secrecy is key to any nation at war, and the rise of cryptography, enciphering messages in order to keep them secret, has provided an important advantage for military powers since the Roman Empire. Standard ciphers involve transposing or substituting individual letters of a message, but for logographic languages, languages that do not utilize an alphabet, ciphers had to be made differently. One such language is Mandarin Chinese. During the twentieth century, the invention of phonetic standards such as the Romanized pinyin alphabet and the Chinese zhuyin fuhao phonetic system facilitated Chinese cryptography by providing an alphabet which can utilize Western cryptographic methods. However, little is known about the historic encipherment of the logographic Chinese language. Through investigation of historical records of Chinese military intelligence, analysis of standard cryptographic methods, and evaluation of the properties of the Chinese language, our research intends to evaluate the extent to which Chinese logographic characters were historically enciphered and in what ways China’s cryptographic methods differed from those of the Western sphere.

The vast majority of my university experience was greatly influenced by my work as Human Resources for USC Sumter’s Game Club. Through extensive collaboration with the campus’s Student Life Director and my endless interactions with my peers, I was selected as a University Ambassador near the end of my sophomore year and am still serving as an ambassador. As a University Ambassador, my primary role is to lead USC Sumter’s SOAR orientations for incoming freshmen. However, I have also participated in numerous service projects. One of the more impactful service projects was when I volunteered for Operation Fire Rescue during my Spring 2016 Semester. While making good use of the communication skills that I developed with the Game Club, I handled registration for the homeowners that received free fire alarms and assisted with installation. Through my work as a University Ambassador, I was able to further develop my effectiveness as a speaker and gained a variety of skills. I plan to effectively use my communication skills to continue my passion for video game journalism. I feel that I will be able to simplify my thoughts and better inform consumers about the products they wish to purchase.

Transitioning from high school to college life can be a daunting process for many students. However, I felt that my work as a Peer Leader University 101 is a huge step towards making that transition much easier. Shortly after becoming a University Ambassador, I was offered the opportunity to become a Peer Leader for a University 101 class. During my freshman year, I had little to no problems transitioning from high school to college, as I made friends quickly and became involved with the community from the onset. From the beginning, I had access to a stable network that grew throughout my time here on campus. During the Fall 2016 semester, my work as a Peer Leader involved covering tough subjects that the teachers may not be comfortable discussing alone and alleviating any concerns the students may have. We covered subjects from test-taking strategies to how they can get involved with the community. My time in this position has allowed me to help the students learn skills that they will need to succeed in college and to also further my own network with my fellow Peer Leaders. After college when I pursue my Bachelor’s of Computer Science in Video Game Design and Development, I plan to develop my own network of game testers to help me deliver the best quality possible in my projects.
Lentz, Connor
Mentor(s): Dr. Nina Moreno
GLD in Professional and Civic Engagement

I am graduating from the University of South Carolina with leadership distinction in Professional and Civic Engagement. The majority of this distinction comes from my internship at Greenville Health System and USC School of Medicine-Greenville. This 10 week internship allowed me to develop professionalism and network with other students going into the medical field. We also did research on healthcare disparities in minority groups. I was also able to learn from the healthcare professionals working for Greenville Health System. This internship was an invaluable learning and developmental experience.

Leppert, Margaret
Mentor(s): Prof. Kate Chappell, Dr. Robin Estrada, Dr. Abbas Tavakoli
Exploring Parent Perspectives on Healthcare Communication in a Child’s Deaf/Hard of Hearing Diagnostic Process

Treatment decisions following a deaf or hard of hearing (HOH) diagnosis may have long-term effects on children's language and learning outcomes. The time of diagnosis is the first opportunity most parents have to learn about the child's condition and available resources, including support groups, American Sign Language (ASL) classes, and specialty schools. Gaps in healthcare communication may affect the family's approach to care and ultimately affect the child's language development. Exploring healthcare communication at the time of diagnosis may contribute to the development of strategies to better support the language development and long-term success of deaf/HOH children. Parents of deaf/HOH young adults will be recruited for semi-structured interviews and surveys assessing their experiences with healthcare workers during the diagnostic process. Interview data will be analyzed for themes to better understand caregiver experiences and inform survey development. Survey data will be analyzed for correlational and associative relationships between healthcare communication factors, caregiver actions following the diagnosis, and language outcomes. The findings of this study will help identify gaps and caregiver-driven concerns with healthcare communication during the diagnostic process for deaf/HOH children. Identifying relationships between healthcare communication at the earliest point in a diagnosis and long-term outcomes on language and education will enhance healthcare workers’ understanding of their role in the wellbeing of deaf/HOH children and young adults. The results may identify methods to improve diagnostic stage communication by healthcare workers to enhance language development and long-term outcomes of deaf/HOH children.

Leschinsky, Nicholas
Mentor(s): Dr. Thomas Makris
Assembly of a Pathway for Biofuel Synthesis in Escherichia coli

The production of biofuels from novel, renewable sources provides an attractive alternative towards mitigating a dependence on the dwindling supply of natural fossil fuels. Hydrocarbon-forming enzymes, including recently identified cytochrome P450s, offer a promising means to develop a biosynthetic pathway in which fatty acid substrates can be converted to terminal alkene fuels. The current enzyme of interest, P450Staph, has been shown through multiple turnover experiments to have increased product conversions when compared to previous P450s that our lab has characterized, namely OleT. Multiple turnover experiments for alternate substrates such as oleic acid and methyladipic acid have also shown that P450Staph also has the potential to generate products such as natural rubber. In order to assemble and optimize a pathway for fuel production in vivo, the fatty acid transporter FadL has been cloned and co-expressed with both OleT and P450staph. FadL co-expression was confirmed through the use of free fatty acids as a sole source of carbon for E. coli, as well as the incorporation of the fluorescent fatty acid analog DAUDA into cells. The in vivo experiments serve as a basis for assembling a more sophisticated pathway to optimize the production of short chain length fatty acids that can be converted into fuels.
Lesemann, Katharine  
Co-Presenter(s): Madelyn Davis, Juliet Wilson, Laura Prudhomme,  
Mentor(s): Dr. David Cardenas, Ms. Rui Qui  
The Impacts of Instagram and Facebook on the Study Abroad Decision Making Process

The purpose of this study is to show the influence of social media on the study abroad decision process. The study will use University of South Carolina students to show the correlation between the two. In the study it will be an online survey to reach the most students that we can across the USC campus. The sampling method that will be used is the convenience sampling method. This is the method chosen because it will be sent to classmates and other students that we know around the University. The survey will include questions about social media and studying abroad. Once students are surveyed the information provided will be turned into measurable data which will then be used to determine the actual impact social media, and more specifically, Facebook and Instagram, had on the students expectations and perceptions of going abroad. The research findings will be able to help students better understand their decision making process and the impact social media has on it, as well as helping universities and outside study abroad providers better understand how they should market their programs to the current generation of college students.

Lever, William  
Mentor(s): Ms. Lisa Camp  
Graduation with Leadership Distinction: Professional and Civic Engagement - William Lever

I am a Senior in the South Carolina Honors College pursuing dual degrees in Political Science and Biology, as well as Graduation with Leadership Distinction (GLD) in Professional and Civic Engagement. I have always had a diverse array of interests, but as I’ve gone through college, I found myself more and more interested in politics and government affairs. I pursued this passion in the form of my academic study at first, then began interning at the Office of U.S. Senator Lindsey Graham. After that semester, I spent a year working in the Office of Governor Nikki Haley, and currently am working in the Office of Governor Henry McMaster. Through these experiences, I’ve learned so much about being a professional and working in government, and at the same time, my love for Biology never wavered. It’s very interesting to have two such different courses of study, and it is definitely a conversation starter. GLD is the perfect way for me to synthesize my diverse experiences inside and beyond the classroom when looking back on my college experience. In my presentation I will describe the work I’ve done at UofSC, explain the key insights I’ve gleaned from my studies and professional experiences, and discuss the way I’m planning to take what I’ve learned and apply it to my Leadership in the future.

Levy, Gillian  
Mentor(s): Mrs. Stuart Hunter,  
Leading Through Service

My first medical service trip in the spring of 2015 was an eye-opening, life-changing experience to Jamaica. We hosted a free medical clinic for a village that did not have proper access to healthcare. I was amazed by the warmth and kindness of the Jamaican people. The rewarding feeling from the Jamaican people further instilled in me a passion for service and medicine. Participating again the following year on the medical service trip in Panama, I was reminded of their effect on not only the people in the community, but the personal development within myself. By engaging with the people in an underserved community, one must expect to feel and see things differently. I felt so passionate about these trips that I became the leader of the medical service trip to Nicaragua in the spring of 2017. By engaging in this leadership position, I was able to connect the principles and theories I have learned in the classroom to my experience. I learned the importance of self-understanding in order to better work with myself and other people. I further understood the significance of obtaining the trust of both the group and the patients. The lessons I have learned from my classes and my experiences through these service trips are vital skills that I will use throughout my next steps toward medical school and as a doctor.
Student organizations are an essential part of the collegiate experience as they promote campus and community involvement, cultivate personal growth, foster learning, and give meaning to college beyond the walls of the classroom. During my time at the University of South Carolina, I have become heavily involved in two student organizations – USC Dance Marathon and Amigos del Buen Samaritano. Becoming a leader in both of these organizations has greatly enhanced my collegiate experience by teaching me how to advocate ethically, utilize critical thinking, and acknowledge and promote diversity. The combination of what I have learned inside of the classroom and outside of the classroom as a leader in student organizations has enabled me to discover myself and affirm my future career aspirations of becoming a physician. Beyond my personal achievements, my leadership roles in USCDM and Amigos have allowed me to give back to a community and a university that have given me the best four years.

Lewis, Alyson
Mentor(s): Dr. Dev Karan
Analysis of LL-37 in association with prostate cancer

Leucine-leucine (LL-37) is an antimicrobial peptide that belongs to the cathelicidin family and has been linked to carcinogenesis. This study aimed to examine the hypothesis that an increased expression of LL-37 is associated with the development and progression of human prostate cancer. Expression levels of LL-37 were analyzed in a panel of human prostate cancer cell lines using semi-quantitative PCR (RT-PCR), quantitative-PCR (q-PCR), and western blotting methods. The RT-PCR and q-PCR analysis showed variability in expression of LL-37 across various cell lines. However, the protein expression was significantly higher in aggressive prostate cancer cell lines (PC3 and DU145) as compared to early stage LNCaP cells. The action of LL-37 is also linked to immunomodulation and inflammatory reactions, therefore, we further tested the effect of inflammatory cytokines (IL-1β, IL-6, TNF-α and GM-CSF) on the regulation of LL-37 using early stage LNCaP cells. We observed that IL-1β, IL-6 and GM-CSF significantly increased the transcription level of LL-37 in LNCaP cells while the effect of TNF-α was minimal. Since the prostate is home to infection and injury leading to inflammation, it is likely that activation of LL-37 may play an important role in the growth and development of prostate cancer. However, more studies are warranted to understand the mechanistic regulation of LL-37 and to substantiate its role with the progression of prostate cancer.

Lewis, Kaila
Mentor(s): Ms. Moryah Jackson
Fashion in Florence

My passion for culture started at a young age. I grew up with a grandfather from Zimbabwe and family that have spread all over the world. Travel has always held a special place in my heart, and I came to the University of South Carolina knowing that studying abroad would be a meaningful experience to aid my education. In spring of 2016, I studied abroad in Florence, Italy. This experience reinforced the reasons why I became a public relations major and fashion merchandising minor. I got so much hands on experience in a city loaded with fashion, as well as developed stronger communication skills with people from all different backgrounds. I was able to learn more about myself and really grow as not only a student, but a person in general. From my experiences abroad, I was able to return to Florence for Pitti Imagine Uomo, its world renown fashion week for men. I was able to see upcoming trends for all sorts of brands and attend new collection release events. I even got to meet Tommy Hilfiger, a fashion icon that is looked up to by me. This extra chance to return to Italy for fashion week opened my eyes to what the fashion world has to offer and proved to me that doing public relations for a fashion company, particularly an Italian one, is my ultimate career goal.
Lewis, Addison
Mentor(s): Prof. Elise Lewis
Addison's Experience- GLD

The University Of South Carolina has taught me many lessons these past four years. I’ve had the opportunity to learn from brilliant professors, serve the community as an executive board member of Helping Hands, intern at a physical therapy clinic, dance on the field at William's Brice Stadium, teach dance, and make life long friends. Being as active as possible in college has been a great way to make the four years count and make an impact on the greater Columbia area.

Dance has always been a passion of mine; being active, graceful and performing has helped build my confidence, and the amount of time The Carolina Girl's Dance Team has required, forced me to be better at organization and time management. Teaching dance at Palmetto Performing Arts has molded me into a better learner and made me more aware of what techniques work best to portray a point of view to others.

Along with dance I have always had a deep appreciation for the human body. The body is protective, somewhat self sufficient, and is with us from birth until death constantly processing food, energy and waste. My love for the skeletal and musculoskeletal systems peaked my interest in physical therapy to help dancers and other athletes recover. My internship at Carolina Physical Therapy solidified my dream to become a physical therapist. Helping others overcome injuries and get back to dance or activities of daily living is what I’m excited to do in the upcoming years of life.

Liddle, Julia
Mentor(s): Mrs. Stuart Hunter
Orientation to Life

During the summer of 2016, I was a team leader (TL) for the Office of New Student Orientation and learned so much about how to be a significant leader. The Office of New Student Orientation is an office on campus that focuses on acclimating new students as well as their parents and guests to the University of South Carolina. As a team leader, I was responsible for a group of the fifty orientation leaders, as well as making the program work logistically. I made sure that everyone had what they needed, and were in the correct places at the correct times. Becoming a team leader was an easy decision for me because I had enjoyed my experience as an orientation leader during the previous summer. Through this experience I had the opportunity to make connections with current and incoming students, as well as professionals on campus. I also gave a presentation at the Southern Regional Orientation Workshop on conflict management. Through my involvement with the Office of New Student Orientation, I have become very confident in my leadership and teamwork skills. As an accounting major with an interest in audit, working on teams is imperative, and the skills I gained as a team leader are extremely transferrable. I hope to use these techniques in my accounting internship next summer.

Liese, Jana
Mentor(s): Dr. Bert Ely
Identification and Characterization of a Riverwalk Bacteriophage

Recent studies have found that bacteriophage genomes vary widely even between closely related phages. Currently, little is known about bacteriophage genomics; therefore, basic characterization is necessary before further research can be done. A phage infecting Caulobacter crescentus was isolated from a water sample obtained on the River Walk side of the Congaree River in Columbia, South Carolina and characterized. The phage was grown on C. crescentus and produced both clear and cloudy plaques. Recent experiments demonstrated that the phage genome consists of double-stranded DNA and additional experiments are underway to determine the size of the genome and the morphology of the phage particle. Subsequent experiments will determine and characterize the nucleotide sequence of the genome and compare it to the genomes of known bacteriophages.
Likins, Ben  
Mentor(s): Dr. Rosemarie Booze  
The potential effects of abnormal ß-Amyloid aggregation on HIV-related cognitive disorder in aged rats

The HIV-related cognitive impairment has shown prevalent in aged patients. However, the cause of the worsening cognitive disorder is still unknown. To investigate the neurodegenerative process associated with HIV, we used HIV-1 transgenic rats (Fisher 344) as a model to study the cognitive deficits and abnormal protein aggregates (ß-Amyloid) in the brain. First, we used immunohistochemistry staining (IHC) to detect the intraneuronal ß-Amyloid expression in the hippocampus and the cortex in both HIV-1 transgenic and control rats. Second, we observed the expression of amyloid precursor protein (APP) in the hippocampus and the cortex both in HIV-1 transgenic rats and F344 control rats. To further investigate, we also performed Western Blot to detect the expression of ß-Amyloid and amyloid precursor protein in the brain. The IHC results indicated that an abnormal intraneuronal ß-Amyloid accumulation was found in hippocampal CA3 region (1.34 fold increase) and cortex (4.06 fold increase) in HIV-1 transgenic rats compared with the F344 control rats. Interestingly, a higher amount of amyloid precursor protein was detected in CA3 region of hippocampus in F344 control rats (3.81 fold increase) relative to the HIV-1 transgenic rats. However, there was no significant difference of amyloid precursor protein expression in cortex between the F344 control and HIV-1 transgenic rats. The Western Blot data additionally proved the abnormal increase of ß-Amyloid in HIV-1 transgenic rats. Further experiments will elucidate the potential effects of intraneuronal ß-Amyloid accumulation on the HIV-induced neuronal dysfunction. Collectively, in HIV patients, an accumulation of ß-Amyloid suggests that long-term survival with HIV might interfere with the elimination of harmful proteins like ß-Amyloid that might worsen the neurodegenerative process and cognitive impairment.

Lin, Ying-Chen  
Mentor(s): Dr. Michael Grant  
Using Mobile Computing Devices for formal and informal learning contexts

With the development of technology, people have much more access to information than those in the past. In the education field, technology has been widely developed and used to facilitate students’ learning. The purpose of this qualitative study will be to describe how learning with mobile computing devices occurs across formal and informal learning contexts for undergraduate students at USC. By understanding how mobile computing devices help learning from students’ perspectives, as teachers/professors/educators, this research can inform how we design instruction and learning opportunities that align with how students use devices, meet students individual needs, and make better use of the tools available for learning.
Linder, Jocelyn  
Mentor(s): Mr. Jamie Levitt, Dr. Sandy Strick  
A Comparison of Restaurant Customer Perceptions between Sustainable and non-Sustainable Restaurants

Introduction  
Restaurant consumers are becoming aware of environmental consequences in the industry. It’s important for restaurants to research consumer perceptions of sustainability as it allows them to tailor their actions to match consumer demand. Currently, restaurant sustainability research hasn’t focused on consumer perceptions, but instead on how to create sustainable practices. For example, Freeman’s (2011) study focuses on barriers to creating sustainable restaurants. Thus, this study presents the following question:

• Does implementing sustainable practices impact restaurant customers’ perceptions?

Methodology  
Data was collected from Yelp reviews of a fast-casual Mexican chain, “Mad-Mex”, located throughout Pennsylvania and Ohio. Mad-Mex contains 14 restaurants, but only the Pittsburgh branches have been identified as sustainable.

Results  
There were 964 Pittsburgh reviews and 1,362 reviews from outside of Pittsburgh. The mean rating for Pittsburgh reviews was 3.53 (out of five), while the rating outside of Pittsburgh was 3.19.

A one-way-ANOVA was performed on average Pittsburgh scores in comparison with average “outside Pittsburgh” scores. There was a significant difference between these ratings at the p<.05 level [F(1, 2324)=43.36, p<.0001].

Conclusion/ Limitations  
Overall, it was determined that ratings for the sustainable restaurants were, on average, higher than the “non-sustainable” restaurants. This implies that customers have better perceptions of sustainable restaurants. Therefore, restaurants should seek sustainability certifications. There were limitations to this study. Notably, it only assessed restaurants in limited parts of the USA and didn’t look at potential confounding variables.

References  

Lindsey, Alison  
Supervisor(s): Amanda Leszczyszyn, AnnMarie McManus, K-Leigh Taca, Brittany Buckner  
Mentor(s): Prof. Rui Qi  
The Effect of Generational Differences on Consumer’s Willingness to Pay in Local Food Restaurant Settings

The aim of this research is to identify the key differences between Baby Boomers, Generation X, and Generation Y that influence that generation’s willingness to pay premium prices in local food settings. The simple random sample for this study would be the current students, faculty, and staff (all of which represent the generations previously mentioned) at the University of South Carolina. To obtain the data, a short survey will be released to all who possess a University e-mail address. Responses are voluntary and once participants have completed the survey, all information will be sent back electronically to the researchers. In addition to the survey, interviews with individuals from the generation deemed most likely to pay premium prices may also be conducted. All of the collected data will assist restaurants and other food providers in understanding the growing local food movement, to better define their target markets, and to price menu items effectively.
Fall 2015, I was granted the opportunity of a lifetime. Being accepted into The University of South Carolina’s College of Education’s Professional Program I now could further my professional goals. The College of Education serves up to 3,000 students ranging from freshman to education professionals. The college is dedicated to creating and fostering ongoing dialogue about theories and practices, democracy, equity, advancement and opportunities for everyone. Being denied from the program during the Fall semester of 2014, initially left me devastated because I believed my career goals were no longer in sight. However, this particular incident gave me the motivation to continue to fight for something I was passionate about, and that would ultimately help me with achieving my professional goals. My participation in the program has allowed me to learn many new things and gain many enriching experiences. During the first year of the program, I met many different teachers that shared the understanding of the importance of educating our youth. With these interactions, these teachers have become more than educators but mentors, that will be able to advise beyond my years at Carolina. Additionally, as one of the requirements of the program, I was able to be a student teacher in third and fifth grade classrooms. By lending a helping hand in these classes, I came to a realization that in classrooms all students are different and as a teachers, our job is to accommodate those differences in ways to ensure success for all students. Lastly, I’ve fostered many friendships with colleagues. Building these friendships and engaging in conversations allowed me to see how much passion that my colleagues and I share when it comes to education. Looking forward to the future, I plan to continue to use the many strategies and theories learned in the program to continue to build and mold myself into the best teacher I can be. Additionally, I plan to continue to use these relationships that have gained over my time in the program to seek professional advice from others who share my passion, as well as allowing myself to see different perspectives whether it be the classroom or in my own life.

Lockhart, Jason
Supervisor(s): Chelsea Campbell
Mentor(s): Dr. Brandon Bookstaver

Differences in Priority Placed on Scholarship for Pharmacy Practice Faculty Seeking Promotion

Chelsea Campbell, MSPH, PharmD Candidate; Jason Lockhart, PharmD Candidate; P Brandon Bookstaver, PharmD, FCCP, FIDSA, BCPS, AAHIVP

South Carolina College of Pharmacy, University of South Carolina, Columbia, SC

Background: Differences in priority placed on scholarship in promotion criteria for practice faculty are often discussed but have not been formally evaluated among Colleges of Pharmacy (COPs).

Methods: This was an observational study and was exempted by the IRB. The primary endpoints were to determine the overall priority of scholarship in promotion criteria from Assistant to Associate level and whether differences exist among COPs (public vs. private; legacy (>10 years since inception) vs. non-legacy). ACPE-accredited COPs as of July 2016 were eligible for inclusion. Promotion criteria were searched and retrieved electronically or through direct inquiry. The magnitude of scholarship priority was evaluated using a 7-item rating tool developed by study investigators categorizing as follow: low (score of 0-2), moderate (3-5), and high (6-7).

Results: Of 127 programs, data for 93 (73%) were available including 54 public (58%) and 39 private (42%) institutions. Seventy-nine (85%) were considered legacy programs. Low, medium and high scholarship priority was observed among 26%, 46% and 28% of COPs, respectively. The median scholarship priority score was 4 and was not different between public and private institutions. Slightly more private institutions scored in the low priority range (28% vs. 22%, p=NS). The highest scholarship priority (score=7) was observed in 11% of public institutions compared to 2.5% of private institutions (p<0.05).

Conclusion: Approximately one-quarter of COPs placed high priority on scholarship for promotion from Assistant to Associate professor based on our rating tool. A disproportionate amount of private institutions and newly launched institutions were excluded which may limit interpretation.
Lombardo, Mary  
Mentor(s): Prof. Courtney Worsham  
Throwing Yourself Overboard and Learning to Swim

For the past two years I have served on the Sorority Council, the governing body of Sorority Life at USC. During the time of my leadership as Vice President of Service and then President, major events took place that have taught me valuable lessons about what it takes to be an effective leader that actually enacts change. Being a leader during this time, I was asked to form plans and craft solutions on issues that I had no experience in. Some of the main things that I learned during this time was that constantly planning and analyzing things was not going to help. At the end of the day it became important to act and to keep moving forward even if I did not know the answer. Once I gained momentum it became easier to make decisions and figure out solutions to constant challenges. I learned that as a leader, responsibility is put on your shoulders and you have to accept whatever consequences follow actions or mistakes from your community even if you had no involvement. The connections I made with fellow leaders, mentors, and members of my community proved invaluable to my success as a leader and the success of the community. This experience has helped me become emboldened to challenge myself in my career path.

Long, Bryanne  
Mentor(s): Mrs. Anna Oswald-Hensley  
Bryanne Long’s GLD Enrichments at USC Sumter

University Ambassador
Currently at the University of South Carolina Sumter, I have the opportunity to be a University Student Ambassador that overall has allowed me to guide fellow students to become familiar with our campus and provide clarity to others that were interested about events and information about the university. Furthermore, while being responsible for giving campus tours and helping in major events that were going on and off campus, we also do community service projects to nearby organizations in the community. This leadership role has led me to gain intrapersonal skills and new opportunities that let me network with important individuals in the USC system. I learned to enjoy the time that I have here at the Sumter campus and lead students to similar experiences that I was grateful to be apart of. I would not have met the respected people or attended the events that I was invited to if I was not an Ambassador so this accomplishment meant that I am capable to fulfill an important position in my USC family. I would like to take this amazing experience and hopefully become an Ambassador at the Columbia campus next Fall of 2017 to gain insight on many more achievements in the future.

University 101 Peer Leader
As a Peer Leader at University of South Carolina, I was able to stand along side one of the University 101 professor to aid in lectures, discussions, and group activities to the new freshmen class of the 2016-2017 school year. The purpose for this involvement was to share my thoughts and experiences on topics that I found meaningful to others that can relate on the same level, such as the transitioning from high school to college. This has influenced my desire to teach in which could ultimately support my career path as a Physical Therapist. Being a Peer Leader allowed me to be a student, teacher assistant, a mentor, and a friend to the new students in University 101. I would like to use this leadership experience to continue to motivate people through learning and guidance to succeed.
Long, Mallory  
**Mentor(s): Dr. David Mott**  
**Neuronal Circuitry Involved in Fear Processing**

Post-traumatic stress disorder is a fear-related disorder that afflicts nearly 24 million adults. The amygdala is a brain structure that plays a vital role in fear processing involved in disorders like PTSD. A detailed understanding of the anatomy and connectivity of the amygdala provides critical information for advancements in therapeutic research. The prelimbic cortex and the thalamus are brain regions important in the fear processing that have projections to the amygdala. In this study, we used anterograde tract tracing with an adeno-associated virus (AAV) that encodes yellow fluorescent protein (YFP), to define the termination fields of these neuronal projections in the amygdala. Preliminary studies defined stereotaxic injection sites and compared expression and transport of different serotypes of the virus (AAV2 vs. AAV5). These studies also determined the time frame needed for optimal YFP expression. Data demonstrated that AAV5-CAG-YFP was better contained to the injection site than AAV2-CAG-YFP and that the optimal expression of YFP in the amygdala was at approximately 5 weeks. Two groups of adult, male B6129SF2/J mice were then injected in either the prelimbic cortex or the thalamus with AAV5-CAG-YFP. The injected YFP traveled down axons that terminated in anatomically defined amygdalar nuclei. After 6 weeks, the extent of the axonal projections was quantified in each nucleus. Results demonstrate that projections from different brain regions terminate in distinct subregions of specific amygdalar nuclei. These results support a differential role for amygdalar subregions in fear and emotional processing. Supported by NIH R01 MH104638 and the Magellan Scholars Program.

Lonneman, Molly  
**Mentor(s): Dr. Stacy Fritz**  
**The development of an online stroke resource for stroke survivors, TIPPS: Tools & Inventions for/from People Post-Stroke**

Recent medical advancements have increased the rate of stroke survival in the past several years, however, that means more Americans are living with the devastating effects of the disease. Of the nearly 7 million stroke survivors in America, about half continue to struggle with some hemiparesis that complicates everyday tasks. Many of these recovering and resourceful individuals have used their creativity to adapt everyday objects (e.g. strings, clothespins) to make their own assistive medial devices; in other words they have learned to “hack” their own lives. Increasingly, the population of stroke survivors is becoming more and more technologically advanced and turning to the internet for ideas on how to help navigate their lives post-stroke. TIPPS, Tools & Inventions for/from People Post-Stroke serves as a working, online database of inventive tools and tricks that can be used to complete daily tasks by stroke survivors, for stroke survivors. The website found at tipps-sc.com is the bridge between what can be taught in occupational therapy and the simple everyday tasks that one often does not realize are difficult until they lose or have limited function in one side of their body. Organized into general categories, TIPPS demonstrates adaptive ways to tie shoelaces, chop vegetables, zip up a vest and even fish using only one hand. The website has been disseminated throughout the physical therapy, occupational therapy and medical communities in South Carolina. The blog format allows for the addition of new tips so it is not a stagnant database. As a community resource, TIPPS is a beneficial tool for stroke survivors in this area and around the country.
Loper, Caroline  
**Mentor(s): Mr. Alex Blauvelt**  
**Sustainable Development Goals: Aligning Initiatives with the Interests of Stakeholders**

In 2015, the United Nations adopted 17 Sustainable Development Goals (SDGs) which created the basis for the 2030 Agenda; a comprehensive plan of action to address various global issues such as poverty, health, education, equality, energy, sustainability, and pollution. This past December, I was invited to attend a conference hosted by the European Commission on achieving the goals of the 2030 Agenda where various interest parties gathered for a day to discuss the necessity, impact, and proposed implementation of the SDGs. As an International Business student at the Darla Moore School of Business, in pursuit of Graduation of Leadership Distinction in Global Learning, I was honored for the experience and am compelled to share my critical analysis of the conference agenda. It was apparent that communication is crucial for the success of this aggressive platform, as failure arises when there is a lapse between the conveyance of good ideas and their successful implementation. Not only is it important for myself and my peers to be aware of such global cooperative initiatives, but it is also imperative that these SDGs are effectively communicated for sake of their survival. My research illustrates the importance of managing the interests of stakeholders, understanding existing lessons and foreseeable problems from previous U.N. sustainability projects, while sharing my observations and likely success of the current 2030 Agenda.

Loszko, Abigail  
**Mentor(s): Dr. Andrew Greytak**  
**Multidentate Polymer Ligands for Biocompatible Quantum Dots: Does Sequence Matter?**

Fluorescent semiconductor nanocrystals are colloidal structures whose qualities make them appealing for biological applications such as imaging, sensing, and therapy. For QDs to be biocompatible, they should exhibit water solubility, small size, low toxicity, low non-specific binding, long-term stability, and potential for functionalization. The most popular form of QDs are CdSe dots enclosed by a shell of ZnS. Exchanging the native ligands on these dots with polymeric ligands provides them with many of the aforementioned characteristics. Loss of the protective ligand monolayer on QDs can lead to loss of fluorescence, aggregation, and toxicity. Biogenic thiols, such as glutathione (GSH), can displace thiolate-bound ligands from the QD surface. This ligand-to-QD stability issue is partly addressed by using multidentate ligands in which multiple binding groups are available per molecule. It is hypothesized that localizing the monomers with binding groups in one block and those with hydrophilic groups for solubility in another block would lead to stronger biocompatible coatings. This project is the first to compare the binding strengths between random and block copolymer capped QDs and between different molecular weights of these polymers. This is done by comparing the response of these polymer-capped QDs to GSH titration via fluorescence spectroscopy. The results of this research will be used to discern the differences between the long term stability of the block and random copolymers of different molecular weights in conditions present in biological media. Ultimately, these results have the potential to suggest a new QD/polymer combination best suited for biological sensing and imaging.
Love, Meredith
Mentor(s): Dr. David Barbeau
Detrital Zircon Tests of Competing Hypotheses for the Eastern Blue Ridge & Inner Piedmont Provinces, Southern Appalachian Mountains, USA

The tectonic and terrane history along the eastern border of North America is complex, poorly constrained, and controversial. The present conventional wisdom is that within the Eastern Blue Ridge and Inner Piedmont geologic provinces are North American rock that were rifted off at the break up of the supercontinent Rodinia in the Neoproterozoic Era and then reattached during the amalgamation of Pangea in the Paleozoic Era. However, preliminary detrital zircon U-Pb crystallization ages suggests otherwise. I analyzed the U-Pb detrital-zircon geochronology of samples from the Inner Piedmont and Eastern Blue Ridge, which suggest a more complicated tectonic history for these two terranes. I am using these data to test three partially competing hypotheses. The first is that the Eastern Blue Ridge and Inner Piedmont provinces are both truly North American terranes that were rifted off and accreted back on. The second is that the metamorphic rocks in one or both of these provinces are a part of a back-arc basin system that accreted onto North America during the formation of Pangea. Finally, the third is that the Ashe Metamorphic Suite of the Eastern Blue Ridge is an intramontane basin, formed perhaps following back-arc basin formation (i.e. if the second hypothesis is also correct). Detrital zircon ages from the Tallulah Falls Formation, a part of the Inner Piedmont province, have a dominant middle Paleozoic (ca. 440 Ma) age population, which is too young to have formed during the rifting of Rodinia. This age correlates better with an alternative hypothesis of an extensional back-arc ocean basin, comparable to the modern Sea of Japan. This has been proposed for similar units along-strike in Alabama and western Georgia. Detrital zircon ages from the Ashe Metamorphic Suite, part of the Eastern Blue Ridge province, have a dominant late Paleozoic (ca. 320 Ma) age population. This age is not compatible with a divergent back-arc basin, because of the well-documented continental convergence from the creation of Pangea during the Alleghanian phase of the Appalachian orogeny. However, it does potentially fit with an intramontane basin model due to its position within the Appalachian mountain belt, and similar to basins in the Altiplano and the Tibetan Plateau, in the subduction-driven Andes and collisional Himalayan Cenozoic mountain belts, respectively.

Love-Baker, Cole
Mentor(s): Dr. Andrew Greytak
Spincoating Quantum Dots onto Epitaxial Graphene Chips For Tunable, High-Gain Infrared Detection

The aim of this project is to develop a process for the deposition of quantum dot films and to measure their light-detecting capabilities. The films will be tested for their potential application in light-detecting devices. The quantum dot films will be placed onto epitaxial graphene, silicon-carbide chips using a spincoating process. This project combines two major aspects; the use of silicon-carbide, epitaxial graphene chips and the creation of lead sulfide quantum dot films. Although lead sulfide quantum dot films have been studied in the past, they have not been combined with silicon-carbide, epitaxial graphene chips.

Loyo-Rosado, Frances
Mentor(s): Dr. April DeLaurier
Understanding the function of kdm1a using CRISPR/Cas-9 in zebrafish

The purpose of this research is to understand the function of the lysine demethylase 1a (kdm1a) gene of the PHF21A complex in human Potocki-Shaffer Syndrome (PSS) using the clustered regularly-interspersed short palindromic repeat (CRISPR) and associated Caspase 9 (Cas9) system in zebrafish. PSS is a genetic disorder that follows an autosomal dominant inheritance pattern in which symptoms include craniofacial abnormalities and intellectual disabilities. These anomalies are caused by a mutation on chromosome 11, resulting in the deletion of the p11.2 p11.12 band. One goal of this research is to create a stable line of zebrafish carrying a mutant form kdm1a in order to study the phenotype-genotype correlation of loss of kdm1a. Targeted mutagenesis in this gene was completed by co-injecting a guide RNA (gRNA) targeting kdm1a and nuclear-localized nCas9n mRNA into the one cell stage of zebrafish embryos. These embryos were scored using a T7E1 assay for mutations. Founder fish were identified, raised, and outcrossed in order to test germline transmission to the F1 generation via T7E1 assay. Positive F1 fish were sequenced in order to establish the nature of mutations. To date, we have two lines showing frameshift mutations in the kdm1a gene. These fish will be in-crossed and F2 offspring will be screened for phenotypes. Ultimately, we want to establish the effect a kdm1a knockout can have on craniofacial development and development on other organs such as the brain and spinal cord, with a goal of understanding the role of kdm1a in PSS.
Luckey, Briana  
Co-Presenter(s): Jerrod Wigmore  
Mentor(s): Dr. Andrea Benigni, Ms. Yan Chen  
Distributed Monitoring and Control of Photovoltaic Generation

In recent decades the world has come to realize our dependence on fossil fuels cannot be permanent due to their eventual decline in availability and their adverse effects on the environment. In order to end our dependence on these fuels we have sought new ways to produce power in the form of hydroelectric, wind, and photovoltaic (PV) sources. Especially with the introduction of tax breaks and other incentives, the installation of photovoltaics in commercial and residential areas has dramatically increased in the past decade. Although there are numerous benefits associated with this growth, there are still issues arising due to our current centralized grid infrastructure. On a clear day, distributed PV generation can cause node voltages to exceed the normal range leading to issues such as equipment overloading, shortened lifespan of voltage controlling devices, and a reduction in efficiency of the grid. In order to prevent such fluctuations new methods must be used to track the voltage profile of distribution systems, and then make corrections based on these measurements. We are developing and testing a fully distributed peer to peer approach for monitoring and control of photovoltaic generation in distribution grids and we will implement the developed algorithm on embedded control units and we will test it using a hardware-in-the-loop approach.

Lunsford, Rachel  
Mentor(s): Dr. Nina Moreno  
The Immersion Process: Cross-Cultural Language Learning

This study seeks to analyze the effects of motivation, awareness, and the immersion process through study abroad on foreign language production. Three participants were analyzed, two of which studied abroad and one who did not (my control case). Two of the three participants lacked the variable of awareness, measured as perception and reflection on language learning development, while only one participant (Participant M) who studied abroad in both Costa Rica and Spain, was made aware of her own learning process via a language learner's journal and monthly recorded conversations. By studying abroad in two Spanish-speaking countries, Participant M self-reported the effects of cross-cultural language learning. The results of the study showed a greater increase in Spanish fluency as measured by improvements in grammar and speed of response by the two participants who studied abroad compared to the participant who did not go abroad. Although all three participants scored high in a motivation scale, and therefore, it would be predicted that all three would score high in the willingness to communicate (WTC) index, only the two participants who studied abroad exhibited more confidence in their Spanish-speaking abilities and were more likely to engage in conversation than the participant in the classroom setting. The results seem to indicated that students who study abroad are more likely to maintain and improve their Spanish than students who are taught solely in a classroom setting.
Lutz, Taylor  
Mentor(s): Prof. Elise Lewis  
Humbled, Engaged, and Able

For three years now I worked the Masters Golf Tournament in Augusta, Georgia, greeting for Calamity Jane’s Burger Bar within Berckmans Place. When the opportunity arose, I applied for the position motivated by the chance to attend a considerably exclusive sporting event and to enhance my resume. Little did I know, working the tournament would turn out to be one of the greatest experiences of my life. While employed, I learned how to operate in arguably the most elite Golf Club in America. I learned how to provide the not guests, but patrons, with utmost customer service, how to hold myself confidently, and how to fully absorb an experience, on top of strengthening my basic restaurant skills. The experience was so impactful because I worked somewhere that I did not necessarily fit in, that was intimidatingly prestigious, but I had the honor of attending and serving those lucky enough to be let in. I was appreciated and needed during this tournament and I fully committed myself to being engaged and an active novice. I plan on using the information and skills I gained at Augusta National in all of my future, hospitality endeavors. I want every client or guest that I come across to feel as important, taken care of, and welcome as the patrons of the Masters, while still gaining respect and remaining confident in myself and my abilities. This realization that I gained during my employment furthered my professional and civic engagement pathway, presenting even more of a purpose to work towards Graduation with Leadership Distinction and bettered my outlook on a future career.

Lytle, Natalie  
Mentor(s): Prof. Courtney Worsham  
Global Sustainability: Fostering Productive Environmentalism through International Business

“You can never have an impact on society if you have not changed yourself.” - Nelson Mandela. This quote resonates throughout my college experience as I’ve explored different corners of the earth, gaining invaluable cultural knowledge that has changed my perspective. From South America to Spain, I’ve had extraordinary experiences that have fostered a passion for global sustainability. During a Maymester abroad in Santiago, Chile and Buenos Aires, Argentina, I recognized firsthand the cultural differences in both professional and personal life and methods with which governments allocate natural resources. My transnational exposure continued through International Business classes that provoked critical thinking through case studies and debates regarding political and business interactions. Many of the cases involved the use of natural resources and how countries treat them as another commodity in the global market. Finally, my semester abroad at Universidad de Carlos III in Madrid, Spain introduced a way of living I had not seen previously. This was a more personal learning experience about sustainability, rather than professional or academic. I had to adjust to a much more minimalistic lifestyle, which contributed my previous larger scale studies of global environmental sustainability. Overall, I see a future in innovating conventional systems to achieve a more balanced, efficient, and economical world through global sustainability. International business and international relations are crucial to achieving this, and sooner rather than later it will become a priority, not just an option.

Mabe, Lindsay  
Mentor(s): Dr. George Roy  
Helping Students Experience Success in the Classroom

Poor academic performance is a tremendous barrier that prevents middle school students from moving forward in school with confidence. Throughout my coursework and student teaching experiences, I have learned about educational theories and been able to put them into practice. One problem that I have witnessed is that some students are not experiencing success in the classroom. This negatively affects their behavior, grades, and involvement in classroom activities. There are three things that can be done to improve the rate of student success in the classroom. First, teachers can conference with their students to inquire about the student’s personal definition of success. Next, teachers can depart from having their students take notes and move towards incorporating relevant, engaging activities that involve content literacy and allow students to make choices. Finally, teachers can help their students practice accountability by incorporating a democratic discipline plan that initially allows students to brainstorm their own expectations for themselves and the class. Through having conversations about success with students, implementing engaging and challenging activities into lessons, and allowing students to have a say in their own discipline, I can help every one of my future students experience success in my classroom.
Madisetti, Dylan  
Mentor(s): Dr. Sourav Banerjee  
Modeling of Crack Propagation under Dynamic Loading

Using peridynamic models in isotropic media, it is possible to determine crack propagation in plates under dynamic loading.

Madormo, Victor  
Mentor(s): Dr. Guiren Wang  
Dielectrophoretic Separation of Premalignant Cancer Cells Using a Microfluidics Chip

The work is to achieve separation of cancerous HKc/DR-61 cells from benign and premalignant HKc/HPV16 cells through use of a microfluidics chip primarily using dielectrophoretic separation to develop a method to selectively move target cells away from nontarget cells.

Madrid, Jennifer  
Mentor(s): Dr. Ben Roth  
Knowledge Beyond the Classroom

My time at the University of South Carolina has molded me into a leader. Although I still have a lot to learn, I have gained vast experience both in the classroom and through extracurricular activities. Several classes have allowed me to develop leadership skills by requiring volunteer projects to be done throughout the semester. Community Psychology 487 was one of the classes that I took that allowed me to grow both at a professional and personal level when completing my volunteer project with The Family Shelter. Throughout my four years of college I have also been involved in different organizations that incorporated volunteering like Best Buddies and Kappa Delta Chi Sorority, Inc. Kappa Delta Chi is a volunteer based sorority that five other women and I charted onto campus. The organization has been a big part of my growth process throughout my four years at the University of South Carolina. Our volunteer projects tend to focus on homelessness and immigration. My passion for helping immigrants and homelessness further grew during my time in the sorority, which inspired me to complete my practicum with PASOs. PASOs is a nonprofit organization that helps low income Latino families. Throughout my semester at PASOS I’ve learned how a non-profit has to be run and the tremendous impact they have on the community, influencing my decision to get my masters in Public health. I am hoping to someday open a non profit organization where I am able to advocate for the many that do not have a voice. I wouldn’t have gained the knowledge, leadership, and passion I have now if I hadn't spent my last four years at the University of South Carolina.

Major, Nicholas  
Mentor(s): Dr. Joe Jones  
Graduation with Leadership Distinction in Community Service: Understanding the Importance of Community Health

I will be graduating from the University of South Carolina in May 2017 with a Bachelor of Science degree in Public Health and two minors in Psychology and Medical Humanities. Throughout my experiences at USC as an undergraduate, I have obtained many experiences, both inside and outside of the classroom, to help bolster my education and ultimately prepare me for applying to and attending medical school at the Medical University of South Carolina. Through these unique experiences, I have chosen to pursue a pathway of graduating with leadership distinction in community service to help reaffirm and solidify my leadership, dedication, love, and support of my fellow community members. One of my key insights for graduating with leadership distinction is that of the understanding of the importance of community health. Mt time at USC as well as within certain required courses for my major have provided me with the opportunities to engage with local underserved community members at their level to help provide them with the tools they need to live better lives. One of my most impactful volunteer experiences occurred while I was volunteering for Healthy Columbia. My time at Healthy Columbia has taught me invaluable life lessons that will guide me as a physician as well as give me firsthand access to vulnerable populations in Columbia to help bring them knowledge about their current health statuses as well as the tools and resources to find a medical home and to manage their different health conditions. My time working within underprivileged communities has given me great insight into the importance of community health and the work that must go into it to provide our fellow man with equal opportunities and access to a better tomorrow.
Connecting what you have learned in classroom to real-life application is vital to a person's understanding of the theories that are being talked about. Matter of fact, the actual learning takes place beyond the classroom when a person experiences the situation at the hand and reflects upon it. One theory that I have particular experienced in a real-life setting is the social learning theory. The theory states that a person learns from another through observation, imitation, and modeling. In a process like this, we make observations when we find something beneficial and decide whether it will contribute to our overall personal growth. This theory was very well evident in my experience of doing community service. I observed the images that my peers showed of the different sites that they have volunteered through USC. I imitated by signing up for different volunteering opportunities through Service Saturday program, and finally modeled by participating in community service. In my case, I saw doing community service as an opportunity to increase my teamwork, leadership and communication skills. Also, I found that volunteering would be very beneficial for the community as a whole because it would get many of the tasks done, and as a result the community can progress further. The experience of serving community reinforced my understanding of the theories in a sense that now I know how are real-life settings reflective of the content that we learn in class. For future, I will strive to use similar approach by observing, imitating, and modeling an experienced physician in order to grow as a physician myself and provide best care for the patients.

Marinelli, Nick
Mentor(s): Dr. Sofia Lizarraga, Ms. Seon Hye Cheon
The Role of ASH1L in Neuronal Development

Autism Spectrum Disorders (ASD) affect 1 in 68 children, often resulting in impaired language development, social interactions, and increased repetitive behaviors. ASD is challenging to study because it is a highly heterogeneous and heritable disorder, yet the known genetic etiology constitutes only 25% of ASD cases. Preterm birth is often associated with defects in neuronal connectivity, and an increased prevalence of autism. Moreover, the risk of autism in preterm infants is worsened by maternal prenatal stress. These suggest an association between environmental risk factors and ASD pathology. However, the molecular underpinnings associated with prenatal risk factors in the etiology of autism remain largely unknown. Whole exome analysis showed high risk variants of genes encoding chromatin and transcriptional regulatory proteins associated with ASD, suggesting a potential role for epigenetic regulators as mediators of environment risk factors for ASD. Therefore, it is hypothesized that environmental insults during pregnancy alter chromatin regulation and disrupt pathways essential for the development of neural circuitry. The primary objective of this study is to unravel the neuronal function of ASH1L, a histone methyltransferase that has been previously associated with ASD, though its neuronal function is largely unknown. We have generated human stem cell derived two-dimensional (2D) neural models to investigate the interactions between the epigenetic mechanisms and the developing brain. Specifically, we are interested in how ASH1L regulates neuronal gene expression, and how deficits in ASH1L could affect neuronal arborization and synaptogenesis. We found that treatment of human neurons with valproic acid (VPA) a known environmental risk factor for autism leads to a reduction in ASH1L expression in human neurons. We conducted analysis of ASH1L localization in human neurons by fluorescence microscopy. We determined that ASH1L localizes in the nucleus and in growing neurites, suggesting a role for ASH1L in establishing neuronal connectivity. Using CRISPR/Cas9 genome-editing techniques, we are developing mutant lines to alter expression of ASH1L in human stem cell derived neurons in order to analyze the neuronal function of ASH1L.
Marker, Kassidy
Mentor(s): Dr. James Carson
Skeletal Muscle Protein Synthesis in Response to Feeding: A Time-Course Study

The maintenance of skeletal muscle mass plays a key role in life quality and survival in numerous chronic diseases. Skeletal muscle mass is sensitive to altered protein turnover, which is the balance between protein synthesis and protein degradation. Akt activation stimulates protein synthesis through mTORC1 signaling. Feeding can stimulate protein synthesis through Akt/mTORC1 signaling, however, the time-course of nutrient regulation of protein turnover in skeletal muscle remains unknown. Therefore, the purpose of this study was to investigate the effects of an orally gavaged meal on protein turnover regulation in skeletal muscle. It was hypothesized that feeding stimulates the subsequent activation of muscle Akt/mTORC1 signaling. To test this hypothesis, 12 week C57BL/6 mice were gavaged a liquid meal and were sacrificed 30 minutes and 1 hour post gavage. Blood glucose was significantly increased 15 and 30 minutes post-gavage. Akt activation was increased 30 minutes post-gavage, but returned to baseline by 1 hour. Similarly, muscle protein synthesis was also activated 30 minutes post-gavage. These results demonstrated that a meal acutely activated Akt signaling and protein synthesis in mice. Further work is needed to determine the potentially disrupted feeding response in diseased skeletal muscle.

Marler, Ashley
Mentor(s): Dr. Shannon Davis
Characterization of the Role of PACT in the Mouse Cerebellum

Dystonia is a neurological disorder resulting in repetitive muscle contraction and characterized by abnormal postures. Dystonias are thought to result from defects in the basal ganglia, but recent research has also implicated defects in the cerebellum. Dystonia 16 (DYT 16) is a subtype of dystonia caused by the mutation of the PACT gene in humans. PACT is a double-stranded RNA (dsRNA) binding protein that plays a role in stress-response and cellular antiviral defense by binding to and activating the protein kinase PKR. Four spontaneous mutations in PACT in mice result in a little ear (lear) phenotype, characterized by a small body size, small ears, and craniofacial malformations. A fifth spontaneous mutation in PACT (lear5J) was recently identified that not only results in the little ear phenotype, but also causes dystonia, similar to DYT16 in humans. This mutation is a result of a G to GT frameshift mutation that causes a premature stop in translation, potentially producing a truncated protein with dsRNA binding domains, but no PKR activation domain. In order to determine if PACTlear5J/lear5J mice have cerebellar defects that may contribute to dystonia, we have conducted a histological and molecular analysis of PACTlear5J/lear5J brains, and found that PACTlear5J/lear5J mice have a reduced number of folia in the cerebellum and a reduction in the number of Purkinje cells, a cell type critical for cerebellar function and movement coordination. These defects may contribute to the dystonia phenotype seen in PACTlear5J/lear5J mice and suggest that similar defects may occur in DYT16 in humans.
Ovarian cancer is the most deadly gynecological cancer in the United States and mutations in essential DNA repair genes, such as RAD51D, increase a woman’s risk of developing the disease. Studies in the Pittman laboratory demonstrated that the RAD51D protein directly interacts with the E3 ubiquitin ligase RNF138, and in the absence of either protein, cells have increased sensitivity to DNA damaging agents, in particular interstrand crosslink (ICL) damage. Additionally, we demonstrated that RNF138 promotes ubiquitin modification of RAD51D, and these data led to the hypothesis that this modification is essential for DNA damage repair in response to ICLs. Ubiquitin molecules are attached to lysine residues on a target protein, therefore, to identify lysine residues essential for RAD51D function during ICL repair, complementation assays were performed using the ICL-inducing agent mitomycin C (MMC). Introducing individual lysine to arginine substitutions at residues 235 and 298 along RAD51D increased cellular sensitivity to MMC. Interestingly, ex vivo ubiquitination assays demonstrated that this substitution at either residue did not affect ubiquitin modification of RAD51D. An alternative post-translational modification that occurs at lysine residues is acetylation. I demonstrated that deacetylase inhibition increased RAD51D stability and these data suggest that this regulation occurs upstream of RAD51D. Current studies are investigating the effect of deacetylase inhibition on gene expression of RNF138 as a potential mechanism for RAD51D stabilization. Elucidating the function of post-translational modifications and their role in DNA repair has the potential to lead to new diagnostic and treatment strategies for ovarian cancers.

To Learn Is To Do

When you sit in the classroom and learn all day about strategies and students, it’s natural to sit and wonder if all of it will actually work when you get to the real thing. For three years, I learned as much as I could about theories, babies to third graders, every subject, and helpful tips to teach a classroom, or so I thought. My most intensive learning took place during the four months of my Student Teaching Internship and my independent two weeks in A.C. Moore Elementary School’s second grade classroom. Not only was my coaching teacher and many others around me supportive, but also the students themselves kept me going through all of my new experiences. I was able to build on my classroom management skills and learn how to effectively teach more difficult subjects. Through my entire experience, I came to the conclusion that you can sit in a classroom all day long but you will never learn more than when you learn by doing. Being able to physically get in a classroom and work through real life problems and scenarios made me become more comfortable with teaching such amazing children and reassured me that this profession was exactly meant for me. By pursuing this profession and teaching many other kids, I will continue to learn by doing and hopefully change lives throughout the years.
Marshall, Wyatt  
Co-Presenter(s): Nicole Vonada  
Mentor(s): Dr. Jane Roberts, Ms. Kelly Caravella  
**Relationship of Fragile-X Syndrome and Generalized Anxiety Disorder on Sleep Initiation**

Fragile X Syndrome (FXS) is a genetic disorder that’s categorized by intellectual disability and behavioral challenges. Anxiety has been recognized as a prominent feature of FXS, previous research shows that up to 82.5% of individuals with FXS meet criteria for at least one anxiety disorder, with 23.7% meeting criteria for Generalized Anxiety Disorder (GAD). Issues related to sleep are closely related to anxiety disorders; past research has shown that 98% of children with GAD exhibit at least one sleep related problem and 77% of children with FXS show some issue with sleep.

The Preschool Age Psychiatric Assessment (PAPA) is a parent-report interview that diagnoses psychopathology in young children based on DSM-IV criteria. In this study, the PAPA was used to examine the presence of GAD and the time taken to initiate sleep in 54 children (2-7 years olds) who fit in one of three genetic risk groups; FXS (n=21), children whose sibling has autism (n=10), and typically developing children (n=23).

A 2x3 ANOVA was conducted to evaluate the relationship of risk group and GAD on the time to initiate sleep. We found no significant interaction between GAD and risk group, $F(2, 48)= 2.09, p=.14$, and no significant main effect for diagnostic category, $F(1, 48)= .042, p=.84$, or risk group $F(2, 48)= 2.03, p=.14$. These results suggest that neither the presence of GAD or a child's genetic risk group have a significant impact on time to fall asleep.

Martin, Hannah  
Mentor(s): Dr. Brian Parr  
**The Effects of Simulated Versus Actual Resistance Training on Maximal Muscular Strength**

Resistance training results in increases in force production and strength. Two factors that account for these changes are neural adaptations and muscle hypertrophy. Neural adaptations are the movement patterns of the muscles as well as the synchronous firing of the motor units. While hypertrophy results from muscle synthesis that increases muscle size, it is thought that initial strength gains are the results of neural adaptations with hypertrophy occurring later. Most training studies that show neural adaptations utilize resistance training, the actual lifting of weights. It is not known whether neural adaptations would occur without added resistance. The purpose of this study is to determine the effects of simulated and actual resistance training on maximal muscular strength (1-RM). It is hypothesized that simulated resistance training will increase strength, but not as substantially as actual resistance training. Twenty male and female volunteers that do not currently engage in resistance training will be recruited as subjects for this study. All subjects will have their 1-RM determined for bench press and squat. Then subjects will complete a total of twelve training sessions of bench press and squat exercises using either the weighted barbell (actual training) or plastic pipe of minimal resistance (simulated). They will complete 3 sets of 8-10 repetitions each session. Then following training the 1-RM for bench press and squat will be measured again. The significance of differences in the initial and final 1-RM will be determined using ANOVA, with the level of significance will be $p<0.05$.

Mathis, Tabitha  
Mentor(s): Dr. Adam Pazda  
**Investigating how personality traits influence gaze attention toward high-chroma colors**

Personality traits influence a wide array of human thoughts, feelings, and behaviors. One domain in which personality traits have been paid little attention is aesthetic preferences, specifically relating to color. The present research aims to address this gap in the literature by examining how personality traits relate to preferences for color intensity. Participants viewed a photo slideshow containing several side-by-side images of various scenes (e.g., abstract shapes, landscapes). Some of the photographs had increased color intensity (high-chroma), and others had decreased color intensity (low-chroma). An eye-tracker recorded their gaze attention to each picture for the duration of the slideshow. The relationship between personality (specifically extraversion) and time spent gazing at the high vs. low-chroma images will be analyzed using regression analyses. This project is ongoing.
The Lone Woman of San Nicolas Island, a Nicoleña who inhabited one of California’s Channel Islands, lived alone on San Nicolas Island from 1835 to 1853. After eighteen years of complete isolation, a group of otter hunters led by George Nidever took her to the mainland, where she lived for several months before she died. No one who spoke the language of the Nicoleño/Tongva could be located, so she had to speak through signs. As a result, details about the Lone Woman remain uncertain, and narratives about her life often include inaccuracies and are told exclusively from a European-American perspective.

The story of the Lone Woman has been intriguing audiences since rumors of her existence surfaced in the 1830s. This narrative has been recapitulated in various newspapers, magazines, scientific articles and papers, and children’s books, including Scott O’Dell’s Island of the Blue Dolphins (1960). Under the direction of Dr. Sara Schwebel, the Lone Woman and Last Indians Digital Archive has compiled these documents and analyzed them for literary tropes common throughout textual representations of her life, tracking the evolution of the story across time. Ideally, the archival website, which is published in conjunction with the National Parks Service, will be utilized by teachers and scholars wishing to supplement their understanding of the Lone Woman and Island of the Blue Dolphins with historical sources.

To enhance the reader’s experience of the archive, we conducted research and produced supplementary materials in an attempt to provide context and clarity. One of our group members wrote source notes, which are write-ups about the periodicals in which the Lone Woman’s story was published and give information about the time period and possible readership of each article. Additionally, for each significant person, place, organization, or ship within an article, we wrote a brief description that provides historical context related to the Lone Woman’s story. Hopefully, these resources will assist teachers and scholars as they approach the story of the Lone Woman in a culturally conscious, historically balanced manner.

Examining Differences in Fear Regulation in Infant Populations

Fear is defined as a natural response to a real or imagined threat to an individual’s safety (Turner & Romanczyk, 2012). Therefore, it is normal for children to show signs of fear in response to distress, threats, or pain. However, in a study by Clifford et al. (2012), that compared differences in negative affect between infant siblings of children with autism spectrum disorder (ASIBs), who later received a diagnosis of ASD and typically developing (TD) infants, those who received the diagnosis of ASD were found to have higher levels of negative affect. Children with fragile X syndrome (FXS) display similar abnormalities as ASIBs in their fear response. Children with FXS and ASIBs also experience high rates of anxiety diagnoses as children, which can be attributed to their dysregulated fear responses as infants (Buss et al., 2013). Appropriate emotional regulation, including the regulation of fear, is important for the socio-emotional development of children (Hirschler-Guttenberg et al., 2015). In TD infants, the fear of strangers emerges at six months and increases before twelve months (Pappa et al., 2014). The present study aims to look at the emergence of fear in response to a “stranger” stimulus in three groups of nine-month-old infants (FXS, ASIBs and TD). The Laboratory Temperament Assessment Battery (LabTAB) stranger episode was used to capture infant fear response to a novel stranger. The episode was recorded and then behaviorally coded with Observer software. It is hypothesized that infants with FXS and ASIBs have reduced ability to regulate their fear. Therefore, it is predicted that, compared to TD infants, the FXS and ASIB groups will exhibit increased fear of the stranger, as evidenced by more time spent looking away or at their parent. By looking at stranger fear in infancy, we hope to add to existing literature on the early identification and emergence of anxiety and ASD in these high risk groups.
Mutations in Transactive DNA Binding Protein 43 (TDP43) protein are causal for the adult motor neuron disease amyotrophic lateral sclerosis (ALS) and frontotemporal dementia (FTD-TDP). However, the exact role for TDP43 in the pathophysiology of these diseases is not clear. TDP43 is a predominantly nuclear protein regulating transcriptional repression, pre-mRNA splicing and translational regulation. In ALS and FTD, this protein accumulates in the cytoplasm of neurons forming ubiquitinated aggregates. Previous studies suggest that mutations in TDP43 lead to cytoplasmic translocation of the protein causing toxic gain-of-function that triggers neurodegeneration. Nonetheless, little is known about specific roles that TDP43 plays in the neuron’s axons and dendrites that are needed for neural function. Towards this end, we developed an expression system to overexpress wildtype and mutant forms of TDP43, in a spatially and temporally regulated fashion. The temporal control was achieved by fusing TDP43 open reading frame to a mutant form of the E. coli dihydrofolate reductase (ecDHFR), a destabilizing domain that confers instability to the fused protein of interest. A small-molecule ligand, trimethoprim (TMP), stabilizes the domain thus blocking the DHFR-mediated degradation. To locally introduce the protein in axons, we introduced the axonally localizing element of Amphoterin/HMGB1 mRNA’s 3’ untranslated region to the construct, thus spatially restricting expression of the fusion protein. Using these expression systems, we have started to explore the effect of axonally localized wildtype and mutant TDP43 proteins in neuronal development and function.

Karlyn McCaleb Abstract
The University of South Carolina has given me four years to explore its traditions, its resources, my major and most of all myself. The journey I embarked on my freshman year is significantly different from the pathway I am on now. My experience at the University of South Carolina has defined my purpose and my perspective while my trials and triumphs have provided diverse insights that have infinitely affected my present and future. These insights perfectly describe my evolution of education and leadership at the University of South Carolina.

For my first call to action, I took a step in a surprising direction and ultimately found my voice and how to express it both in my studies and in my career. Then, I began to recognize the value in myself as a student and as a role model. I felt the motivation to invest in myself and others, and from this, I noticed great reward. After many changes in my life and the world around me, I felt comfort in the change and reassured by my progress. Initially, my college career was disarrayed and I was overwhelmed with uncertainty in various situations, but like an artist working with mosaics, the broken pieces and confusion each encompass a unique experience that can be fit together to form a solution and a connection infinitely larger and stronger than before.

Kyle McCoil Abstract
During my time here at Carolina, I have grown as a student and as a Leader, but more importantly, I have grown as a person. All of my experiences since coming to USC have shown me who I am and where my values lie. If I have learned anything, it is that success looks different for everyone and that the first steps toward success begin with you. I look back on who I was freshman year and I am proud of how far I have come and the things I have been able to accomplish. It is from my time as an Orientation Leader, a University 101 Peer Leader, and my various other leadership roles that I have gained a passion for mentoring students to achieve their definitions of success. I am confident in my decision to pursue my master’s degree in Higher Education and Student Affairs after graduation. I know that none of these things would have been possible if not for this amazing opportunities and experiences I have had here at The University of South Carolina. I will forever be proud to call myself a Gamecock, forever to thee!
McCormick, Nitaya  
Mentor(s): Dr. Hilary Lichterman  
Investing in Our Future  
Nitaya McCormick, Chemistry, Criminal Justice –Senior  
Mentors: Dr. Hilary Lichterman  
Dr. Tia Andersen  
While I have always been passionate about helping others, my learning experiences here at Carolina allowed me to make meaning of my service to my community. As a double major in both an art and science field of study, I was able to combine the two collectively into my service at the Boys & Girls Club of the Midlands, where I took on a leadership position as a Program Leader for members of the Spirit Club. Through both observation and interaction with the members, I gained collectively an insight and understanding of some shortcomings and strengths in our youth education resources and mentoring relations. A mentoring and tutoring role I had prior to this experience led me to this opportunity with the Boys & Girls Club. From being a part of this organization, I was allowed to impact a lot more communities to include Columbia, West Columbia, Red Bank, Lexington, and Irmo, S.C. areas. It broadened my perspective and provided me insight on matters which could improve the quality of youth life and experience through our education system and mentoring programs. These experiences became more personal as I became inspired to create an my own mentoring program; one that serves to promote creativity and leadership, provide fundamental resources and moral support, and encourage healthier relationships between youth and our community. This project has and will allow me to exercise my creative abilities and make decisions that I intend to positively affect a multitude of people. This leaves me to continuously challenge myself in being an impactful leader while investing in our youth to invest in our future.

McGaha, Ryan  
Mentor(s): Dr. Brett Barwick  
Boij-Soederberg Decompositions of Grade Three Gorenstein Ideals Minimally Generated by Five Homogeneous Forms  
We give a brief introduction to the newly budding field of Boij-Soederberg theory as well as a complete description of the Boij-Soederberg coefficients of homogeneous grade three Gorenstein ideals which are minimally generated by five homogeneous forms.

McGee, Gabriel  
Mentor(s): Mr. Jay Pou  
How A Sousaphone Changed My Life  
My presentation was created as part of my pursuit of Graduation with Leadership Distinction in the Professional and Civil Engagement pathway. I will discuss what I have learned over my collegiate career and how marching band and internship opportunities have led to key insights and professional goals that I hope to accomplish. I will go into detail about my experiences as a section for the past two seasons with The Mighty Sound of the Southeast-Carolina Band, and my volunteer time at a local middle school and describe how these experiences, along with my coursework have changed my life. I hope to exemplify how meaningful these experience have been in my life and relate them to specific instances of how classes along with these experiences have shaped my future as teacher.

McGee, Gabriel  
Mentor(s): Mr. Tyler McNamara  
Forgotten For the Greater Good  
This presentation is part of the History department’s Bachelor with Distinction program. For my senior seminar history class we focused on the history of a specific space or place. My specific paper focuses on the history of the Lake Murray Dam in the Columbia Metropolitan area and how its building impacted the thousands of individuals who lived in its basin. It is a study of people and how and why their voice is forgotten in the general historical narrative.
McGovern, Leah  
Mentor(s): Dr. John Weidner  
The Effect of System Contaminants on Fuel Cell Performance  

A polymer electrolyte membrane fuel cell (PEMFC) is an electrochemical device that produces electricity and water from the reactions of hydrogen (H2) and oxygen (O2). Balance of plant materials (BOP) used in fuel cell systems can produce contaminants that have the potential to reduce the durability and performance of a PEMFC. Via an accelerated aging procedure, the contaminants from the BOP structural material polyamide (PA) were leached out and studied. Of the organics, inorganics, and ions found in the PA leachate solution, caprolactam and sulfate (SO42-) were chosen for further study. Several in situ diagnostic tests, such as polarization curves (VIR), cyclic voltammetry (CV), and electrochemical impedance spectroscopy (EIS), were performed to determine if caprolactam or SO42- compounds had a negative and irreversible effect on fuel cell performance. The results indicate that caprolactam causes a non-recoverable decrease in fuel cell performance, SO42- seems to have no effect, and the mixture of the two contaminants causes a smaller decrease in fuel cell performance than caprolactam alone. There is also an indication that the negative effects of caprolactam on cell performance overwhelm the effects of SO42- when the two contaminants are infused as a mixture. Due to the significant impact caprolactam has on PEMFC performance, it may be necessary to replace the PA material with a different structural plastic to mitigate the caprolactam contaminants effect on fuel cell performance.

McGoyle, Amanda  
Mentor(s): Dr. Lara Ducate  
Transforming Health Care Through Community Service  

During my time at Carolina experience through organizations such as the Therapy Place has played a significant role in shaping both my learning experience and who I have become as an individual in the last four years. The Therapy Place is an outpatient pediatric clinic in Columbia that provides physical, occupational, and speech therapy to children with disabilities. It was during this opportunity that I was able to serve as a volunteer who observed and aided therapists in client sessions. My initial desire to take part in this opportunity stemmed from my desire to gain more experience in my future career as an occupational therapist. Through Graduation with Leadership Distinction I have been able to better understand just how influential the Therapy Place has been on my life and how I plan to carry myself as a leader in my future endeavors. It has provided me with extensive experience working with children of all functional levels and has shown me the impact that therapy can have on transforming the lives of individuals with disabilities. In my future career as an occupational therapist, I plan to utilize the knowledge gained from this experience to create individualized, client-centered sessions as well as develop my own non-profit therapy organization. I will utilize this organization to educate families, caretakers, and other health and wellness personnel on the importance of early intervention in therapy while providing financial assistance to families who are unable to afford therapeutic care.

McGuire, Ian  
Mentor(s): Dr. Francisco Blanco-Silva  
Computational models for Human memory, applications to problem-solving in low-memory situations  

This project's focus is to explore problem-solving algorithms within restricted memory environments in hope to gain insight into the mechanism of human memory. The inquiry of focus is “How are complex tasks completed by organisms with strict limits on working memory?”. This project attempts to model working-memory by limiting variable storage space in certain problem-solving algorithms. One way in which this can be shown is by a “maze-solving robot”. This robot will navigate a maze with optimal efficiency while functioning within set memory limits. Conclusions drawn from this project may aid in the understanding of human memory on the neural level.
McIntosh, Sarah
Mentor(s): Mr. David DeWeil
Criminals and the Community

Doing service gave me the opportunity to have a first hand look into more pressing issues specific to the community. Hannah House is a transitional shelter for women and children that rely on volunteers in order to help; I was responsible for drafting documents for the executive director that dealt with women having visitors on the weekend, and helping to plan a baby shower and Christmas party, and doing chores around the house. Women and children are a special population, and once you spend time with them, they were average people. Most of them had jobs, the kids would go to school, they just did not have the money to afford a place to live. Many of the women did not anticipate becoming homeless, but this goes to show that there will be times that unexpected things happen, and there is comfort in knowing that places are out there to help. I learned throughout my service experience that crime can have an impact on communities. Some of the women ended up in the homeless shelter because they had a record and was not able to get a job or housing. Others are able to make a difference in their community. We need to be more willing to promote preventative programs and/or rehabilitative programs for those who get out of incarceration. In the future, I would like to continue with my service experiences. There are ways that you can service the community in a legal capacity and with a legal education.

McKenzie, Patrick
Mentor(s): Dr. Matthew Greenwold, Dr. Jeff Dudycha
Evolution of the Cryptophyte Phycobilin Beta Subunit

Cryptophytes are members of an under-studied phylum of algae that have undergone secondary endosymbiosis with red algae. Because of this, they have a unique evolutionary history involving light-harvesting proteins called phycobilins. Phycobilins are made up of both alpha and beta subunits that attach to a chromophore and vary widely in their maximum absorbance between species and clades. To gain insight into the evolution of differences in these phycobilins, we have extracted, amplified, and sequenced the beta subunits of 16 species of cryptophytes. Now, we are working on sequencing beta subunits for more species, constructing a gene tree for the beta subunit among cryptophytes, and identifying differences in structurally significant amino acids.

McKinney, Amy
Mentor(s): Prof. Moryah Jackson
Integrated Learning with a Global Outlook

During my time in the Honors College at the University of South Carolina, I lived on the Horseshoe, studied abroad in Paris, France, participated in the Washington Semester Program, and advocated to members of Congress on behalf of museums. My course of study was concentrated in history and anthropology; however, I also received a broader education in the humanities. My experiences outside of the classroom reinforced and expanded upon the material I learned in my courses and enhanced my understanding of the subject matter. I have come to better understand bias through connections between libertarian paternalism and public history via museum texts. I also experienced first-hand the differences between insider and outsider perspectives while abroad, much like anthropologists who strive to achieve emic, rather than etic, understandings of cultures through participant observation. My leadership is demonstrated through the work of my senior thesis, which involves working with Historic Columbia to develop a furnishing and reinterpretation plan for two rooms in the upstairs of the Hampton-Preston Mansion to include more about the African American experience in Columbia and the South in general. These experiences pushed me to gain a more holistic undergraduate experience and benefit from activities across a broad spectrum of academic studies and hands-on learning opportunities, which have allowed me to achieve Graduation with Leadership Distinction in Global Learning.
McKinney, Bradshaw
Mentor(s): Dr. Eric Montie
Establishing a Relationship between Seasonal Patterns of Fish Sound Production and Seasonal Patterns of Juvenile Fish Abundance in the May River and Chechessee Creek South Carolina

Bradshaw McKinney*1; Claire Mueller1; Somers Smott1; Agnieszka Monczak1; Thomas Morgenstern1; Jamileh Soueidan1; Tony Mills2; Chris Marsh2; Eric Montie1

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2The Lowcountry Institute, Okatie, SC

Atlantic croaker (Micropogonias undulatus), black drum (Pogonias cromis), red drum (Sciaenops ocellatus), silver perch (Bairdiella chrysoura), southern kingfish (Menticirrhus americanus), spotted seatrout (Scianesax xanthurus), spotted sea trout (Cynoscion nebulosus), and weakfish (Cynoscion regalis) are all fish that belong to the family Sciaenidae and inhabit the waters of North Carolina and South Carolina. Fish within this family produce sounds that are associated with courtship behavior and spawning. Thus, by listening to estuarine soundscapes, we can identify spawning aggregations. The goal of this study was to establish a connection between reproductive activity (as measured by sound production) and young-of-the-year (YOY) abundance. The data collected from DSG-Ocean acoustic recorders provide the exact dates of when spawning seasons begin and end, the duration of these seasons, and a general location of the spawning aggregation. From these data, intertidal creeks near each recording station were chosen and sampled bi-weekly using a haul seine during low tide. Juvenile fish abundance, total length, and biomass were collected throughout the sampling period. Atlantic croaker, black drum, red drum, silver perch, southern kingfish, spot croaker, and spotted seatrout were all collected near the DSG stations. Silver perch YOY were most abundant May through July, spotted seatrout YOY from August through October, and red drum YOY from October to December. The appearance of YOY in the estuary is approximately one month later than the spawning season predicted by the detection of courtship sounds. These patterns provide further support that passive acoustics can aid in monitoring reproductive output in an estuary.

McLaughlin, Erin
Mentor(s): Dr. William Jackson
Expression of Vif-resistant ApoBEc3G from a HIV-1-dependent lentiviral vector

While current HIV treatments may reduce viral load in HIV-positive individuals, these treatments are not ultimately curative. Gene therapy has the potential to be a more effective and permanent method of controlling HIV infection. One gene therapy approach involves the delivery of anti-HIV genes to infected cells using lentiviruses. This project explores the delivery of the innate anti-retroviral protein human Apolipoprotein B mRNA editing enzyme catalytic polypeptide-like 3G (A3G), which works to induce mutations in the HIV provirus during reverse transcription. HIV encodes the protein Vif (viral infectivity factor) that blocks A3G’s antiviral effects. This project uses a Vif-resistant human A3G that has a single amino acid change, D128K that renders A3G resistant to Vif’s effects. We have previously created a lentiviral vector, pLTG(INs2)R, which expresses Renilla luciferase and eGFP in a HIV-1-dependent manner. D128K A3G was cloned in place of the Renilla luciferase gene in this vector producing pATG(INs2)R. Successful transfection of pATG(INs2)R with the helper plasmids pMD2.G and pCMVR8.74 into HEK 293T cells produced recombinant virions. Currently, A3G is being modified to express an influenza hemagglutinin tag (HA tag) on its N-terminus to allow for easy detection of A3G using antibody-based assays. Once cloned, the vector will be used in challenge tests to analyze the anti-HIV activity of this reagent.
McLees, Anna  
Mentor(s): Ms. Tricia Kennedy  
Fundamentals of Personal Interaction in the Tourism Industry  
During the spring 2016 semester, I was living in Orlando, FL and working at Walt Disney World. Disney World is one of the most well known tourist destinations in the world, attracting people of all demographics to enjoy its resorts, theme parks, restaurants, and shopping center. My position was the park operations management intern, collaborating with a team of leaders in charge of managing a group of over 70 employees. The interpersonal skills I gained while working with such a diverse group of people made me appreciate individuality and uniqueness, and the importance of collaboration. As a tourism management major at the University of South Carolina, this internship provided me with first hand experience of all the topics I had learned about while at school. I had the opportunity to work on promoting an app for employee recognition, creating weekly message boards for break rooms, and interacting with excited guests on a daily basis. Along with the internship, I participated in an 8-week leadership class with other interns in different departments, which broadened my knowledge and helped me define my leadership skills. In taking this course I formed relationships with coworkers from all over the company who worked in different lines of business. This expanded my knowledge of the company and the industry and made me realize the importance of maintaining professional relationships. Participating in this internship solidified my decision to pursue tourism management and work in a guest experience role.

McLees, Anna  
Supervisor(s): Meribeth Turpin, Abby Kunz  
Mentor(s): Dr. David Cardenas  
The Effect of Deluxe Amenities in Hospitals on Consumer Perspective  
The purpose of this study is to see if there is a relationship between hospitals that are structured more like hotels or resorts, with a focus on quality customer service, and consumer perspective and choice. A random sample of five hospitals in Columbia (midlands region), South Carolina with similar characteristics, is going to be chosen so that the amenities and services variables can be isolated and studied. The hospital must have similar characteristics in order to see the results solely based off of the amenities and services. Observations at the hospitals will be done, focusing on patients and how they seem satisfaction wise, and employee behavior. Questionnaires will also be sent out online and through the mail. Second hand revenue and attendance data will be the source of data collection, as it is readily accessible on the Internet. The study will compare data between the five hospitals in two categories, those hospitals with amenities and those without. Then, the data will be compared to find if there is an impact on consumer behavior. If there is a difference, it will be analyzed to see whether the difference is positive or negative.

McNamara, Liam  
Mentor(s): Dr. Patrick Hickey  
My GLD Pathway: How a Background in Biomedical Research Fostered Leadership and Academic Success  
As a senior in USC’s Biomedical Engineering program, I have learned that individual and professional success is an active pursuit, and if you wait passively for your academic track to bring it to you, it will never come. Furthermore, the professors and faculty that I have met and forged relationships with throughout my collegiate career have shown me that the potential for success disguises itself as opportunities outside of your comfort zone. These two lessons have shaped my academic success for the last four years, and they have served as the catalyst that transformed me from a freshman on a study abroad medical missions trip into a future graduate student with the potential to work in the pioneering field of manned spaceflight.
Background: Studies have shown that chemokines play a vital role in metastasis of certain cancers. Due to this, chemokines are gaining much attention as a possible marker for cancerous cells.

Objective: To determine the expression levels of chemokine genes in various cervical cancer cell lines with hopes of identifying specific and unique chemokines for cervical cancer screening.

Methods: Reverse Transcriptase-Polymerase Chain Reaction (RT-PCR)

Results: Using semi-quantitative analysis; the panel of cervical cancer cells showed differential expression of genes of chemokines CXCL2, CXCL11, CCL24, and CCL13. However, no expression of the CCL3 appeared in any of the cell samples.

Conclusion: The high level of expression of CXCL2, CXCL11, CCL24 and CCL13 suggests that these chemokines contribute to cervical cancer and CCL23 does not. Further studies are needed to support this conclusion.

McRae, Kimberly
Mentor(s): Ms. Lisa Camp
Medicine as a Social Science
For many, medicine is seen as a field that involves only the hard sciences. Very rarely is it seen as a field for the social sciences--one that studies human interactions and how social conditions influence health. As a student at the University of South Carolina, I have witnessed through various internships, the more humanistic aspect of medicine. This presentation will discuss my experience as an intern with Palmetto Health USC Orthopedics, The Alala Cancer Society, and my studies abroad at the Infanta Luisa Hospital. I will discuss what I learned from each experiences, how I have combined this with what I have learned within the classroom, and how I will apply this to my future.

Mears, Cordelia
Mentor(s): Dr. Carol Boggs
Pollinator Syndromes at the South Carolina National Guard McCrady Training Center
Pollinator syndromes are a theoretical evolutionary force that suggest floral trait diversity today comes from adaptations over time to appeal to the most effective pollinator of an angiosperm species. The purpose of this research was to analyze the data collected from six sites within the McCrady Training Center for the South Carolina National Guard. Floral and pollinator species at the site were recorded, as well as the frequency of pollinator visit at each flower type. The floral morphological traits observed were color, form, presence of fragrance, presence of nectar, and anthesis, while the insect taxonomic groups observed were Hymenoptera, Lepidoptera, Coleoptera, and Diptera. The types of pollinators visiting will be calculated for each flower species to determine whether pollinator syndromes are accurately representing the interactions, or if the interactions are random. Should pollinator syndromes be found present, this study will support the theory of the existence of pollinator syndromes.
The Institute of Medicine (IOM) recommends a range for healthy gestational weight gain (GWG) based on pre-pregnancy Body Mass Index (BMI). Physicians are the primary source of health information during prenatal appointments. However, mobile applications (apps) and websites used as a parallel or supplemental tool hold potential as a convenient resource for pregnant women. Understanding pregnant women’s knowledge and perceptions regarding GWG is essential for the development of meaningful resources. The purpose of this study was to look at the health information needs and interests of pregnant women and examine if BMI was associated with physician-provided GWG recommendations and women’s perceived healthy GWG recommendations. Using social media sites, 324 pregnant women living in the US were recruited to complete an online survey (mean BMI =26.1±6.5). Half of the participants (50.6%) reported that they did not receive recommendations for GWG from their physicians. Pre-pregnancy BMI classifications were not associated with receiving GWG recommendations from physicians (X^2=0.189, p=0.979). When asked about GWG recommendations, 46 participants (14.5%) cited GWG below recommendations for their BMI class, 200 (62.9%) cited within recommendations and 72 (22.6%) cited above recommendations. Normal weight participants frequently cited GWG recommendations within IOM guidelines, while overweight/obese participants cited GWG that exceeded IOM guidelines. This indicates that more targeted resources are needed to increase overweight/obese pregnant women’s knowledge of healthy GWG. Physician-provided information to address IOM guidelines may help close that gap in knowledge, but mobile apps or websites geared toward pregnancy can address GWG recommendations as well while reducing physician burden.

Increasing research is examining the long-term influence of repetitive sub-concussive impacts on athletes’ brain and behavioral health. However, no prior study directly compared contact athletes with and without a history of concussion to controls in order to delineate the independent contribution of sub-concussive and concussive blows on athletes’ neurophysiological and neuropsychological function. Accordingly, this research sought to fill the knowledge gap by comparing non-contact athletes (control group), soccer headers without a history of concussion (sub-concussion group), and soccer headers with a history of concussion (concussion group). To do so, we employed a neuropsychological battery to assess executive functions, as well as a three-stimulus oddball task during which event-related brain potentials were recorded (ERPs). We observed that athletes in the sub-concussion and concussion groups exhibited similar amplitude reductions in the ERP indices of attentional resource allocation (P3b) and attentional orienting (P3a) relative to non-contact athletes. However, only athletes in the concussion group exhibited reduced amplitude in the ERP index of perceptual attention (N1). Athletes in the sub-concussion and concussion groups also exhibited deficits in memory recall relative to non-contact athletes, but athletes in the concussion group also exhibited significantly more recall errors than athletes in the sub-concussion group. Additionally, only athletes in the concussion group exhibited response delays during the oddball task. The current findings suggest that sub-concussive impacts are associated with alterations in the neurophysiological and neuropsychological indices of essential cognitive functions, albeit to a lesser degree than the combination of sub-concussive and concussive impacts.
Melton, Molly  
**Mentor(s):** Dr. Elizabeth Easley, Dr. Sarah Sellhorst  
**Differences in visceral adipose tissue and total body fat based on BMI in female college students**

Body mass index (BMI) is a widely used method to determine obesity status using a weight-to-height ratio. There are many criticisms of the use of BMI due to misclassification of obesity status and lack of regard for visceral adipose tissue (VAT) and total body fat (%BF). Purpose: To determine if a difference exists in VAT mass, VAT volume, and BF% between healthy-weight (HW) and overweight/obese women (OO). Methods: Forty-six traditional-aged (18-25y) college students participated in this study. Height and weight were recorded and BMI was calculated for each participant. VAT mass, VAT volume, and BF% were measured using an iDXA. A multivariate analysis of variance (MANOVA) was used to determine whether the differences between groups existed in VAT mass, VAT volume, and BF%. Results: There was a statistically significant difference in VAT and BF% based on BMI, Pillai's Trace = .47, F = 12.24, df = (3, 42), p < .001. BMI effected VAT mass (F(1, 44) = 25.07; p < .001), VAT volume (F(1, 44) = 25.05; p < .001), BF% (F(1, 44) = 36.69; p < .001). Discussion: There were significant differences in VAT mass, VAT volume, and BF% based on BMI categories. The mean BF% in the HW group was at the top of the healthy category. This indicates that many of the participants classified within the healthy BMI category had BF% outside the healthy range. Therefore, the results supported criticisms that the singular use of BMI can misclassify obesity status due to the lack of regard for VAT and BF%.

Mignardi, Annissa  
**Co-Presenter(s):** Justin Gallman, Baker Getz, Elizabeth Karnavas,  
**Mentor(s):** Ms. Ivy Sibley, Ms. Hayley Efland  
**Hydroponics at USC**

Sustainable Carolina Farm and Garden is utilizing the uniqueness of hydroponics as a way to educate students on sustainable agriculture and food choices while also providing local produce to the USC Columbia Campus. Hydroponics is a growing technique of sustainable framing. Some benefits include shorter growing times, lower water use, avoidance of pesticides, and minimal use of land and space.

Mikkelson, Skyler  
**Mentor(s):** Mrs. Stuart Hunter  
**Finding a World of Knowledge in Tokyo**

Growing up, my family would visit my Japanese grandmother a few times a year and she would always tell me stories of Japanese culture. I always loved learning more about the country and it became a dream of mine to visit it for myself. As part of my International Business major, I finally had the chance to visit this wonderful country in spring of my junior year to study at Hitotsubashi University in Tokyo. I was able to take courses on Japanese business, global leadership, and the Japanese language, but the most valuable learning came from my cultural experiences. Some of these experiences included touring temples and shrines, exploring various towns and restaurants, and meeting many interesting people. I even managed a solo climb of Mt. Fuji which had a profound impact on my self-confidence and exposed me to culture in a new way. It was incredible seeing what all Japan had to offer and I tried my best to squeeze in all that I could. At Discover USC, I want to communicate just how interesting and beneficial my experiences abroad were to my learning. This trip opened my eyes to just how small a part of the world I was and how much more I had to learn before venturing into this international environment in search of a career.
My semester abroad in Rio de Janeiro, Brazil, contained a whirlwind of varied experiences that intertwined knowledge and frameworks from my education with my ever-developing understanding of my role as a global citizen. As an international business person, these experiences have been pivotal in building my foundation as I enter my career; and they have also caused significant and positive change in my personal life. My most momentous experience while abroad was my volunteer work through the nonprofit organization Teto, which took place one weekend in the community of Jardim Gramacho. This community is utterly destitute as it is located in one of the largest landfills in the world. While volunteering, I viewed how interconnected the world is as the trash making up this landfill is from every corner of the globe. This caused me to acknowledge the repercussions of every action I take, even the ones as simple as throwing a piece of trash away. Also, during this volunteer work, I used my Portuguese language minor as a tool to communicate and connect with the people of the community, gaining their insights and stories. Finally, after serving the community of Jardim Gramacho, I realized that as a global citizen I have to incorporate service in every aspect of my life. The multifaceted impact of this experience permeated every aspect of my life and education; and I know I will continue to grow and develop as a global citizen.

Great leaders build great teams. In my experience as a student and then as a leader, I learned that great teams come together in the presence of leaders who adhere to the following five key concepts:

1. Build traditions of high achievement
2. Ask the hard questions
3. Understand your limits, and others’ strengths
4. Pass the praise down the line
5. Put your feet on the ground

Using these keys, I have been successful at creating teams that change the school and community for the better. As a student at Carolina, I learned these ideas from my own mentors. As Regent of Theta Tau professional engineering fraternity and Vice President of Chi Epsilon Civil engineering Honor society, I applied these skills to build successful teams that led each organization to exceptional success. My proudest accomplishments at Carolina have been as a team builder, and my presentation will examine the rules to team building that I have developed to help anyone be successful as a student leader.
Miller, Kiana  
Mentor(s): Mrs. Anna Oswald-Hensley  
The Kiana Miller Experience

Student Ambassador  
As a student ambassador here on the University of South Carolina-Sumter, I am responsible for functioning as a tour guide for people visiting our campus, contacting prospective students, and assisting in new student orientation. As an ambassador, I embody the values of my campus and serve as a visual representation of USC Sumter to outsiders. I was motivated to take on this role because it was distinctive from any other role I had ever taken up and because of my social nature I relish meeting and communicating with new people from various walks of life. Through this role I learned the importance of being self-aware and how your first impressions can make a great impact on others as well as being able to convey information accurately. Participating in this position will fine tune my recruitment, persuasion, communication, and people skills. In the future, I plan on becoming an ambassador for USC Columbia and use the skills I learned when it comes to future interviews for jobs and even interviewing others for writing pieces within my major in Journalism.

Peer Coach  
As a peer coach for the Opportunity Scholars Program here at USC Sumter, I am responsible for assisting freshman and new students to the program with their transition into the college environment. I was motivated to take on this role because I enjoy helping others and I wanted to serve as role model to those who may still be trying to find their bearings as a college student and in life in general. Undergoing this role allowed me to familiarize myself with different personalities of students and identify certain risk factors of stress and depression among college students and how to help them cope. Participating in this position will allow interpersonal skills to develop and builds possible lasting relationships. In the future, I plan on applying these skills when it comes to networking with others within my field of study.

Miller, Jessica  
Mentor(s): Dr. Joseph Quattro  
Evaluating the Effectiveness of American Shad (Alosa sapidissima) Hatchery Programs in the Santee-Cooper River Basin Using Parentage Analysis

Due to a lack of offspring last year, shad samples are currently being collected this spring and the data is still being processed. Microsatellite DNA markers will be used to assay genetic diversity and relatedness in shad broodstock and their progeny across the experimental period. The number of parents that contribute to each week's progeny, and the potential for parents to contribute across time, will be determined.

Collected shad samples are preserved in 95% ethanol. As brood stock die throughout the production period, they are removed from the tank, a fin clip taken for genetic analyses, and the date of death recorded. This information is used as a record of potential parents alive at the time of fry sampling. At the end of fry production, fin clips are taken from all remaining broodstock individuals. Whole genomic DNA is isolated using a commercial kit (Qiagen). Three multiplex PCR reactions are performed for a total of 13 loci/individual. Amplification products are run on an ABI 3730xl and scored using Genemapper 4.0 (ABI).

Parentage analyses use the algorithms implemented in COLONY. Parentage is assigned to each of the individual fry collected each week using all broodstock alive at the time of sampling as potential parents. Basic measures of population genetic diversity (number of alleles, observed and expected heterozygosity) are calculated for all samples and the broodstock using those algorithms implemented in GenAlEx 6.5. Analysis of Molecular Variance is used to estimate within and between components of genetic variance attributable to each 1-week sample and the pooled progeny across the study versus the broodstock and wild SCR population.

I anticipate few parents contribute disproportionally to the fry production at the SCDNR shad hatchery; therefore the results have ramifications for the proper management and implementation of shad hatcheries. By assessing and monitoring the genetic variability and parentage of the brood stock, we can potentially affect positive changes in the hatchery that will improve both reproductive output and long-term survivability of the population.
Mills, Mary  
**Mentor(s):** Dr. Charles Lovell  
**Determination of environmental parameters that correlate strongly with turbidity**

Vibrio parahaemolyticus is a bacterium that thrives in marine ecosystems and is a successful human pathogen that causes food poisoning. Human infection occurs when raw or undercooked oysters that are contaminated with V. parahaemolyticus are consumed. The area studied is within the North Inlet Estuary of South Carolina. In this ecosystem it is thought that the bacterium exists in the upper two millimeters of sediment. When this sediment is resuspended (the severity being measured by turbidity) surrounding oysters will filter this suspended sediment and become infected with the organism. In this study, data taken from the NOAA and the Baruch Institute is analyzed for a connection between various environmental parameters and increased turbidity. Parameters include tidal levels, wind speed, wind direction, precipitation, and others. Currently, data from the study suggests that there is a cycle that turbidity follows along with tidal levels. Therefore it is hypothesized that tidal level correlates with turbidity. It should be noted that some days have an unusually high turbidity. It is currently hypothesized that days with precipitation are most affected by this parameter when tidal levels are low. Wind speed and direction are also being analyzed for possible connections. Once the important parameters are determined a computer model will be built so that the likelihood of oysters being infected may be determined in real-time weather conditions and so that it is known whether or not it is safe to harvest oysters for human consumption at that time.

Mills, Sarah  
**Mentor(s):** Mr. David DeWeil  
**Lessons from Study Abroad**

I am pursuing Graduation with Leadership Distinction in Global Learning and would like to share what I learned both within and beyond the classroom during my time abroad. In the fall semester of my junior year I had the opportunity to study abroad at Griffith College Dublin in Dublin, Ireland. It was the experience of a lifetime. Both my domestic and abroad experiences have been incredibly impactful, and I’ve learned valuable lessons at both the University of South Carolina and Griffith. Studying abroad was something I knew I wanted to do when I started college, mostly for the opportunity to travel overseas and meet new people. I’ve always been passionate about traveling, but didn’t fully understand how much of an impact it can have. What I didn’t realize before my time in Ireland was how much I could learn just from being immersed in another culture for a few short months. I’ve learned about diversity, community, and perspective, and I am confident that I can apply this knowledge to any experience that comes after my collegiate years. Study abroad was more than a fun semester of travel. It was an incredibly rewarding experience that changed my worldview and helped me to grow as a person with more maturity and independence.

Miskin, Arianna  
**Mentor(s):** Ms. Lisa Camp  
**Connecting Leadership and Medicine: Experiences of a Volunteer**

When you tell people that you’re a pre-medical student who wants to help people, they tend to access their schemas surrounding the “less fortunate”, which involves either low SES Americans or citizens of an underdeveloped country. Although I have been lucky enough to volunteer medically in both settings (at a Free Medical Clinic located in Columbia, SC and at a pop-up clinic in Jamaica), I realized that helping others expanded beyond the scope of just those in need. By being a Carolinian, I was able to be a U101 Peer Leader for two years, a member of the Student Government, and had many other experiences that allowed me to volunteer my time and help others at various points in their life. These experiences have not only taught me vital skills and lessons, but have also led me to the next step in my life: joining Americorps City Year. My experiences in volunteerism through the University of South Carolina have made me a better future physician, a better thinker, a better philanthropist and a better-informed citizen of the world.
Miskin, Arianna
Mentor(s): Dr. Kate Flory

The Use of A Community Sample in Research

When researchers want to examine the effects of a disease or a treatment, they employ stratified sampling of the total population and recruit people who fit their criteria. When you are using a community sample, you can use simple random sampling and get a truly representative sample of the population. Community samples are used to both determine frequencies in a certain population while also uncovering patterns that may be generalizable to the entire population. In this presentation, we will explore the uses of a community sample, the pros and cons and how it is being employed today in research!

Miskin, Arianna
Mentor(s): Dr. Narendra Singh, Dr. Udai Singh, Dr. Prakash Nagarkatti, Dr. Mitzi Nagarkatti

Activation of cannabinoid receptors alters the expression of miRNAs in Granulocytic Myeloid Derived Suppressor cells (G-MDSCs) and Splenic Resident Granulocytes (SRG) thereby identifying shared and unique pathways of differentiation

THC (Δ9-Tetrahydrocannabinol) is the main psychotropic component in marijuana and has been shown to have potent anti-inflammatory properties. Recent studies from our laboratory have shown that THC triggers massive induction of myeloid derived suppressor cells (MDSCs) through modulation of miRNA(miR). In this study, we investigated the effect of THC on the regulation of miRs in Granulocytic MDSCs (G-MDSCs) and splenic resident Granulocytes (SRG) in mice. To this end, mice (C57BL/6) were treated with vehicle or THC (20 mg/kg bw) and 24 hrs post injection, G-MDSCs from peritoneal wash and SRG from spleen were sorted (>95% purity) and microRNA arrays were performed using total RNAs including miRs. There was significant alterations in the expression of about 75 miRs in both G-MDSCs and SRG. Out of the 75 miRs, 31 miRs were upregulated and 9 miRs were downregulated in both G-MDSCs and SRG. There were 21 miRs that were downregulated in G-MDSCs but upregulated in SRG. The remaining 14 miRs were upregulated in G-MDSCs but downregulated in SRG. Upon analysis of dysregulated miRs using IPA, there were more than 20 diseases and pathways that were regulated by these miRs. We also observed that dysregulated miRs played a common role in the development of several diseases including cancer and inflammatory diseases. This study demonstrate for the first time that THC regulates miRs that are both shared and unique to G-MDSCs and SRGs, thereby suggesting that while G-MDSCs are similar in some ways to SRGs, they may be at different stages of differentiation.

The present study was supported in part by NIH grants (P20GM103641, P01AT003961, R01AT006888, R01ES019313, and R01MH094755).
Moffitt, Casey  
**Mentor(s): Dr. Susan Wood**  
**Investigating the role of the locus coeruleus-noradrenergic system during social stress on neuroinflammation and resulting changes in serotonin**

Repeated exposure to social stress is known to result in the emergence of depression. While depression is associated with dysregulation of norepinephrine (NE) and serotonin (5-HT), the mechanism by which this occurs remains unknown. We have previously determined that a history of social stress enhances neuroinflammation in stress sensitive brain regions, proving causal to a depressive-like phenotype in socially stressed rats. A growing body of evidence suggests that NE is capable of altering proinflammatory cytokine release (ie. IL-1β) in the brain. Therefore, there were three major goals of this study: 1) to determine if a history of social defeat produced a sensitized neuroinflammatory response to a subsequent stressor within the serotonergic dorsal raphe (DR); 2) because IL-1β is capable of decreasing 5-HT synthesis, we sought to determine whether changes in IL-1β in the DR were related to changes in 5-HT synthesis and 3) rats were treated with DSP-4 (400μg/rat, icv), a selective retrograde NE neurotoxin that reduces NE levels in LC target regions (ie., DR), to determine the role of NE on stress-induced IL-1β levels in the DR and relative 5-HT expression. Our initial studies identified sensitized stress-induced proinflammatory cytokine expression in the brains of socially defeated rats compared with rats with a history of control. Furthermore, DSP-4 significantly increased stress-induced proinflammatory cytokines in the central amygdala a prominent LC target and induced anhedonia in the 2-bottle choice sucrose preference test, regardless of stress history. This suggests that LC-NE has inhibitory control over neuroinflammation in its target regions, including the DR. Since inflammation is known to increase the enzymatic activity of indoleamine-2,3-dioxygenase (IDO), resulting in a shift from 5-HT synthesis to the production of kynurenine (Kyn), stress-induced inflammation in the DR is likely associated with a concomitant increase in IDO activity and a reduction of 5-HT. Together these data suggest that LC-NE activity may suppress neuroinflammatory drive under conditions of stress and that impaired LC-NE firing may serve as a mechanistic link between stress-induced neuroinflammation, dysfunction in the 5-HT system, and expression of depressive-like behaviors. These studies seek to identify mechanisms involved in stress susceptibility, in order to reveal novel targets useful in the treatment of stress-related psychosocial disorders.

Monzavi, Tina  
**Mentor(s): Ms. Jennifer Bess**  
**The Amgen Scholars Program**

For a student who asks entirely way too many questions about how everything around us works, I knew early on that research was the path for me. I also knew that every year, the Amgen Scholars Program provided hundreds of selected undergraduates with the opportunity to engage in a hands-on research experience at many of the world’s premier educational institutions. During the fall semester of my sophomore year, I applied to become an Amgen Scholar and was awarded the opportunity to be a part of the Amgen Scholars Program at Stanford University for the summer of 2016. Being an Amgen Scholar was one of the most difficult, yet rewarding experiences of my life. I was able to conduct research at one of the best universities in the United States and attend the Amgen Scholars Symposium, where Amgen Scholars from all the participating universities across America come together to share their research and hear firsthand from leading scientists working in industry and academia. The Amgen Scholars Program at Stanford was a life changing opportunity because it not only elevated my research ability but also greatly elevated my technical skills through intensive review of my personal statement, research statement, and curriculum vitae by official Stanford program advisors. Completing the Amgen Scholars Program helped me grow as a researcher, define my research interests, and experience the challenges that I will face in the future at graduate school. I have never felt more prepared for a future life in academia than I do now as an Amgen Scholar.
Monzavi, Tina
Mentor(s): Dr. Dan Jarosz
Identifying Chemical Modulators of Genetic Buffering

Within the United States, colorectal cancer is one of the most common cancers in both men and women. Patients with the genetic disorder known as Lynch syndrome (also known as HNPCC, hereditary nonpolyposis colorectal cancer), have an especially high risk of colon cancer due to mutations in DNA repair proteins. Regular screenings are beneficial for early diagnosis and treatment. However, tumor cells with mutations in mismatch repair proteins have the ability to quickly acquire new mutations leading to the development of new traits advantageous to cancer growth such as drug resistance. A key player in this ability to harness mutation load is the buffering function of the molecular chaperone Hsp90, which helps many other client proteins fold and function. Genetic buffers, like Hsp90, essentially buffer underlying genotypic variation to provide robust expression of uniform phenotypes within crucial signaling pathways. Under normal growth conditions, the reservoir for molecular chaperone activity keeps signaling pathways functioning optimally, allowing variation to accumulate without phenotypic consequence. However, when environmental stress, like cancer, compromises the chaperone reservoir, the effects of previously hidden genetic variation are released in a combinatorial fashion. This provides a means for producing genetically complex traits in a single step. Genetic buffering provides a novel perspective with which to approach this disorder and the evolution of cancer. Accordingly, we have identified drugs that inhibit buffering of mutation load by conducting a chemical screen in Saccharomyces cerevisiae. These results will allow us to accomplish our fundamental goal of identifying unknown genetic buffers through the use of their chemical inhibitors. Identifying novel buffers of mutation load has the potential to shift the current paradigm of genetic interactions and cancer treatment.

Moore, Thomas
Mentor(s): Dr. Natalia Shustova
Photophysics of Green Fluorescent Protein Mimics

Thomas M. Moore,* Ekaterina A. Dolgopolova, and Natalia B. Shustova
University of South Carolina, Department of Chemistry and Biochemistry, Main St. Columbia, 29208, USA
New efficient methods for solar energy utilization could be significantly boosted by material development. Metal-organic frameworks (MOFs) serve as a unique candidate to study and model directional energy transfer (ET) processes due to their structural tunability, versatility, and self-assembled nature. Hierarchical MOF structure allows one to organize hundreds of chromophores into a complex, light-harvesting structure that mimics a natural photosystem. Our studies establish a novel method for utilization of MOFs as a multifunctional scaffold that allowed us to tune photophysical properties of chromophores with the 4-hydroxybenzylidene imidazolinone (HBI) core. The presented approach demonstrates that non-coordinative immobilization of chromophores within a porous scaffold could result in restoration of emission profiles of non-emissive chromophores. Substituents on the chromophore core can be used to adjust the chromophore photoluminescence profile and therefore, the spectral overlap function, which is a key parameter for efficient ET. MOFs with immobilized HBI chromophore maintain the chromophore emission and, therefore, replicate photophysical properties of natural GFP-based systems. Thus, the presented study demonstrates that MOF scaffolds have the ability to be applied in further development of solid-state materials requiring high efficiency solar energy conversion.
Morales, Lizeth  
Mentor(s): Prof. Leslie Pearson  
The Power to Create Cultural Change at the University of South Carolina

The power we have as humans goes a long way when we realize what we can do with that power. This may seem like a broad statement but in these past four years of my undergraduate career, I have used that power to create a cultural change in the university. Being born in Colombia, SA and raised in New York City, NY made it especially difficult for me to adjust to the Southern way of life and to the University of South Carolina. As a freshman, I knew I wanted to get involved with student organizations and clubs but I found it difficult to find an organization that I identified with, as the Hispanic population only makes up approximately 5.3% of the total student population at the university. To my surprise, I was not the only person that felt this way, therefore a group of friends and I decided to start our own student organization in order to provide a place where incoming students can find their “home away from home”. We realized the need to create a space where minority women can unite and empower each other while collectively changing the culture at the university. Kappa Delta Chi Sorority, Inc. is currently the only active Latina founded sorority at the University of South Carolina. The purpose of starting a new organization was to create a place that was inclusive to all students and promoted diversity within the university. Even though Kappa Delta Chi Sorority, Inc. is a Latina founded organization, we have never limited ourselves to the Latino population for recruitment. We all come from different backgrounds and instead of letting our cultural differences separate us, we use it as a catalyst to bring us together. On April 11, 2015 six members were initiated to join the sisterhood and expand Kappa Delta Chi Sorority, Inc. at the University of South Carolina. Two years later, we have successfully initiated sixteen members who represent several ethnicities and cultures around the world. I would not have been able to achieve any of this if I did not believe in the power each individual has in creating the change they want to see. We used all resources available in order to make Kappa Delta Chi Sorority, Inc. a “home away from home” for incoming students who are passionate about service and creating a positive cultural change at the University of South Carolina.

Moraney, Robyn  
Mentor(s): Dr. Michael Wyatt, Dr. Misha Shtutman  
The Power to Create Cultural Change at the University of South Carolina

Mitochondrial integrity is essential to the health of mammalian species, because many degenerative diseases are associated with mitochondrial damage. The mitochondria has its own small circular genome (mtDNA) of 16,569, that codes for 37 genes. POLG is the only known mammalian DNA polymerase for mtDNA. Mutation in Pol G can lead to ataxia neuropa-thy specturm disorder, Alper- Huttenlocher syndrom and NARP (neurogenic muscle weakness, ataxia, retinitis pigmentosa). Currently there is little known information about the mitochondrial repair pathway, because of the inability to quantify the mtDNA genomes in the mitochondria and specified cells. Unlike nuclear DNA, that has a defined number of copies in each cell, mtDNA differs based on the physiology of the cell. In order to understand mtDNA repair pathways and quantification patterns of mitochondria, DU145 cells were treated with differing concentrations of Ethidium Bromide (EtBr), in order to induce mtDNA damage and loss of mitochondria. After which rolling circle amplification (RCA) and qPCR experiments were preformed to selectively amplify mtDNA, which allowed for increased sensitivity and specificity of measuring mtDNA quantity and quality. DU145 cells samples were amplified using RCA, followed by qPCR, to allow for observation of mtDNA amplification patterns. The results showed that amplification of mtDNA with RCA, followed by qPCR, showed a striking difference between the DU145 treated samples. Specifically, a much lower quantity of mtDNA in EtBR treated cells were observed and was also dose dependent.
Previous studies indicate that the higher the exposure to alcohol the greater the chance for sexual victimization and violence. Students who are members of sororities or fraternities often have a greater exposure to situations involving alcohol consumption which increases their risk for being victims of sexual assault. However, prior research fails to address how this high risk population addresses and protects themselves from sexual assault and violence. The current study assessed the frequency with which male and female members of sororities and fraternities intervened in situations involving the overconsumption of alcohol, addressing offensive language, and situations where sexual victimization or intimate partner violence had occurred. These frequencies were compared to the frequencies of non-member students. The data suggests that females in sororities engaged in more prosocial bystander behaviors than did females who were non-members. Men who were in fraternities also engaged in more bystander behaviors than men who were not in fraternities. Women reported communicating more about behaviors to reduce risks of sexual assault and dating violence than did men, and women in sororities endorsed doing this more than any other group in our analysis. Members of sororities and fraternities reported more bystander behaviors in situations concerning hazardous drinking than did those not involved in those organizations (for e.g., making sure someone got home safely, and expressing concern when someone was talking about how they got wasted). The findings of this study will supplement the development of victimization interventions due to the specification of particular bystander behaviors students frequently use in high-risk situations. In conclusion, these results suggest that a strength of fraternity and sorority members is the relatively high frequency with which they engage in prosocial bystander behavior. Implications for research will be discussed.

Morris, Mackenzie
Mentor(s): Mrs. Allison Hamm
How to be SMART

Throughout my time here at the University of South Carolina, I have set a variety of personal goals that I have worked hard to accomplish. As an Exercise Science student with a concentration of health science, learning about how to set goals within our everyday lifestyles has been the basic foundation in most of my classes. The central focus in one of my classes was to develop an efficient and runnable health business system. During the course of this project, I came to realize how important it is to narrow in and be specific when setting our goals. Through using the SMART (specific, measurable, attainable, relevant, timely) goal approach I was able develop specific goals and objectives that are deemed essential in health business systems around the nation. In my last semester at UofSC, I have had the opportunity of being able to shadow a Nurse Practitioner and Doctor of Medicine at Padgett Family Medicine in Bamberg, SC. I personally worked alongside MUSC in a class to help improve diet, exercise, and lifestyle in multiple diabetic patients around the area. We did this by having biweekly sessions with dietitians, and exercise physiologists from the Medical University of SC. While working with these individuals, I discovered how important it was for them to develop their own SMART goals to focus on through the 16-week program. Throughout these experiences I have began to realize how crucial goal setting is in the health care world. The experiences that the UofSC has offered me has allowed me to expand my focus from personal goals to a more broad focus on the application of SMART goal objectives in a future healthcare profession.
Morris, Caleb  
**Mentor(s): Ms. Tricia Kennedy**  
**My University 101 Peer Leader Experience**

In the fall semester of my senior year, I served as a Peer Leader for a Business section of University 101, USC’s nationally recognized first year seminar course. I wanted to be a Peer Leader to get the opportunity to interact with and mentor other students; I really enjoyed my experiences working with membership development in my sorority, and I wanted to take that experience and apply it in a different setting. As a Peer Leader, I worked with my co-instructor to plan lessons, facilitate activities, provide help or insight when needed, and reach out to my students to make sure that they were getting through their transition from high school to college. I had one student in particular that experienced some stumbles throughout his semester. In helping him out, I found myself utilizing some of the key insights I learned from my in the classroom and beyond the classroom experiences and by utilizing my insights, I was able to help my student through his struggle, which resulted in him finishing off the semester strongly. Through my experience as a Peer Leader, I have learned that the first step in helping someone is meeting them where they are at, a theme I previously learned about in my POLI 215 class. I will be able to use my experience as a Peer Leader in the next step of my life, pursuing a career in the field of Higher Education and Student Affairs.

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Morris, Chelsea  
**Mentor(s): Ms. Lisa Camp**  
**Graduation with Leadership Distinction - Chelsea Morris**

Throughout my time at USC, I have developed my passion for languages and cultures and further developed an in-depth understanding of the many ways that language affects and connects our world today, as well as the burgeoning importance of globalization. My studies in the classroom, compounded with my experiences beyond the classroom, have led me to develop a number of invaluable skills and key insights, which I’ve outlined here in what I find is the most logical, most effective order to discuss how these experiences have shown me the importance of globalization and cross-cultural communication in contemporary society.

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Morris, Chelsea  
**Mentor(s): Dr. Kurt Goblirsch, Dr. Amanda Dalola**  
**American Undergraduates’ Perception of the German Language**

Studies of language attitudes and linguistic perception are often employed in contemporary society to better understand the relationship between language and globalization. In this study, language attitudes of American undergraduates towards the German language were analyzed. A matched guise test was used to ascertain American undergraduate students’ attitude towards German and then statistically analyzed. The results were then evaluated from a sociolinguistic and linguistic anthropological viewpoint and inferences related to language ideologies are made to determine the root of American undergraduates’ perception of the German language.

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Morris, Chelsea  
**Mentor(s): Dr. Kurt Goblirsch**  
**American Media Portrayal of the German Language**

Media theory and language are undoubtedly interlinked, and in relation to American portrayals of foreign language in film, stereotypes are likely to play a part. In this study, American films portraying the German language were linguistically and sociolinguistically analyzed to determine both language accuracy (i.e., phonology, morphology, syntax, etc.) and degree of stereotype influence (i.e., that Germans are overly orderly). Die Hard, The Sound of Music, and Inglorious Basterds were all analyzed to determine the prevalence of cultural stereotypes, as well as language accuracy. Results were then analyzed to infer the effect of these films on the American cultural consciousness.
Moser, Carly  
Mentor(s): Dr. Jessica Klusek, Dr. Jane Roberts  
**Parenting Stress as it Relates to Vagal Tone and Social Support in the FMR1 Premutation**

Mutations on the FMR1 gene cause a range of fragile X related conditions, including the FMR1 premutation and fragile X syndrome (FXS). FXS is a neurodevelopmental disorder and is associated with increased caregiver burden. Mothers of children with FXS are often “carriers” of the condition, carry the FMR1 premutation. Higher levels of parenting stress have been documented in mothers with the premutation, which is buffered by social support. Reduced vagal tone, a measure of autonomic functioning, has also been documented in women with the FMR1 premutation (Klusek et al., under review), suggesting impaired physiological regulation of emotional responses that may affect stress responses. This study explored vagal tone and social support as factors that could contribute to parenting stress. 32 mothers with the FMR1 premutation and 30 control mothers were included. Parenting stress and social support were measured using self-report questionnaires. Vagal tone was estimated through the measurement of heart activity. A series of linear models tested the group difference of stress, social support and vagal tone, as well as vagal tone and social support and their interaction as predictors of stress. The groups differed in parenting stress (p=.004), social support (p=.025), and vagal tone (p=.028). The interaction of vagal tone and social support was not a significant predictor of stress (p=.15). Mothers with the premutation were found to have increased stress, decreased social support, and reduced vagal tone, yet these were not related to one another. Greater research is needed to understand the difference in the physiological profile of the premutation and how it is affecting them behaviorally and psychologically.

Muniz-Gonzalez, Mariela  
Mentor(s): Dr. Stacey Lance, Dr. Kristina Ramstad  
**Examination of Ranavirus sequence variation within and among wetlands and amphibian species on the Savannah River Site**

Ranavirus, a genus of virus in the family Iridoviridae, has caused mass die-offs of amphibian and reptilian populations worldwide. At the United States Department of Energy Savannah River Site (SRS), Ranavirus occurs in Carolina Bay ephemeral wetlands that are inhabited by many amphibian species. Previous studies on the SRS have shown a Ranavirus prevalence of 37% and the virus’ presence in 15 of 21 amphibian species examined and in 10 of 11 wetlands surveyed. However, to date, no mass die-offs have been observed at SRS and none of the animals that tested positive for the virus have shown signs of disease. There is little known regarding the variation of strains within Ranavirus. Our long-term goal is to determine why the strain on the SRS is not virulent enough to cause mass die-offs. As a first step, we are working to identify the strain(s) of Ranavirus present within and among wetlands and species on the SRS. To accomplish this, we will sequence ~400 DNA samples previously extracted from amphibians that tested positive for the virus at loci that code for the Major Capsid Protein, DNA polymerase, and Methyl transferase of the Ranavirus. These data will allow us to determine the strain(s) of Ranavirus infecting amphibians that inhabit SRS wetlands and compare its sequence(s) to known strains from other areas where mass die-offs have been observed. Thus, we will gain insight into the virus’s behavior and interactions with each species and wetland, which will in turn help us determine why the SRS Ranavirus strain(s) appears to be less virulent.
Murphy, Molly  
Mentor(s): Mrs. Ashley Byrd-White  
Lymphedema Therapy: Improving the Quality of Life of Breast Cancer Patients  

I spent the spring semester of my senior year as an intern with Palmetto Health Baptist Physical and Specialty Therapy. This experience exposed me to the field of lymphedema therapy and its important role in the breast cancer community. Lymphedema is a lymphatic disease that can occur from the removal or injury to the lymph nodes that results in the accumulation of lymph fluid (swelling). Many breast cancer patients are at risk for developing lymphedema after surgery. Treatments to lymphedema include manual lymph drainage, compression garments, intermittent pneumatic compression, bandaging, exercises and skin care. I witnessed how an integrative approach to lymphedema therapy produces the best results in patients. It is the role of the physical therapist to focus on the needs of the patient to create an integrative and individualized treatment plan. While lymphedema has no cure, the effects of lymphedema therapy can improve the overall quality of life of a patient and help manage their lymphedema. My internship at Palmetto Health Baptist allowed me to use my background in Exercise Science from USC and apply it outside the classroom and in a practical environment. My within classroom experiences at USC, coupled with my beyond the classroom experience at Palmetto Health Baptist, have inspired me to pursue a career in specialized physical therapy to serve those suffering from cancer diagnoses.

Murphy, Kirsten  
Mentor(s): Dr. Melissa Moss  
Endothelial Cell Based Sensor for Alzheimer’s Disease Diagnostics  

Alzheimer’s Disease (AD) is a chronic neurodegenerative disease and is the sixth leading cause of death in the United States. AD is characterized by the accumulation of amyloid beta (Aβ2) plaques on the blood brain barrier (BBB). The BBB is a highly selective permeable barrier responsible for circulating blood to and from the brain and protecting the brain from toxins. Human brain microvascular endothelial cells (HBMVECs) connected by tight junctions form the BBB. When Aβ aggre-gates, the BBB tight junctions can be compromised, causing the barrier to become leaky. It is imperative to find an accurate diagnostic tool to catch the disease in its earliest stages to prevent the progression of permanent brain damage or memory loss. My research project explores the capabilities of a cell-based biosensor to detect varying levels of cell membrane permeability by measuring the voltage change across HBMVEC monolayers. When HBMVECs are treated with Aβ2, the membrane becomes leaky and its permeability to ions increases. The concentration of ions that pass through the membrane’s opened channels produce a signal that directly correlates to the amount of Aβ2 present. Therefore, the correlation between the signal’s strength and the amount of Aβ2 aggregates should directly relate to the progression of the disease, thus providing an accurate diagnostic tool. The end goal of this project is for Dr. Moss to receive a grant in order to develop an inexpensive, simple, and reusable device that would be easy to use in a clinic to help diagnose AD. The final device would test a patient’s cerebrospi-nal fluid, which contains Aβ2, on a monolayer and measure the resulting permeability to provide a potential diagnosis of the disease.

Murray, Carrington  
Mentor(s): Prof. Drew Newton  
Discovering and Climbing my Building Blocks to a Rewarding Future  

Carrington Murray, Public Relations- Senior  

As a senior Public Relations major and Criminal Justice minor, I have had four years of wonderful experiences that has only prepared me for the rewarding future that lies ahead. I now feel amply prepared to begin my professional journey. I will share insights on my rewarding experiences as planner and coordinator of USC’s National Pan-Hellenic Council Homecoming Greek stepshow, serving as a public information intern for Sumter School District and finally my work with the “Palmetto Group”, my PR firm developed through my campaigns capstone course. As I transition into the professional world I have had the opportunity to learn new things, and discover new passions as well. Much of it being accredited to the named experiences. My future is great, because I now have the building blocks to get there thanks to my education provided by the University of South Carolina.
Myer, Madison  
*Mentor(s):* Dr. Elma Lorenzo-Blanco, Mrs. Melek Yildiz-Spinel  
**Literature Review of the Effects of After School Programs on Depression, Anxiety, Academic Success, and Stress in Latina/o Youth**

There is limited research on the influence of after school programs on the emotional (symptoms of depression, symptoms of anxiety, perceived stress) and academic well-being (e.g., GPA, school engagement, low school-dropout) of Latina/o youth under the age of 18, despite the group being one of the fastest growing minorities in the United States (Acosta, 2004). After school programs tend to promote positive emotional and academic well-being among children from low-income families and vulnerable communities; however, few culturally and linguistically relevant programs have been developed to specifically help Latina/o students (Coller, 2014). This study provides a systematic literature review of the existing research on the effects of after school programs on the emotional and academic well-being of Latina/o children and adolescents. It aims to identify the most important aspects of after school programs that, through academic help and socialization, would promote the emotional and academic well-being of Latina/o students. By analyzing the existing work, the ultimate goal of this project is to develop a curriculum and outline for a school-based program that could be implemented in schools around Columbia, SC.

Myers, Kira  
*Co-Presenter(s):* Tammie Jones, Ghia Ulrey, Whitnie Farrow  
*Mentor(s):* Dr. Sarah Rothenberg  
**The Role of Carbon Dioxide in Climate Change**

Carbon Dioxide (CO2) is the most talked about greenhouse gas, and it is what our group chose to focus on for our presentation of the topic of climate change to students at the Edventure museum on April 13, 2017. We have researched the broad categories of CO2 sources, effects to the environment, effects to humans, and mitigation and narrowed these topics down into a simplified poster format. The purpose of this is to take a complex scientific idea, and explain it in ways children can understand. We also plan to use a hands on technique involving a scavenger hunt for CO2 molecular models spread throughout the museum in order to engage with the student. Our goal is to make science fun so that the youth of today will want to learn more. This is especially important because climate change is a critical problem these children will face in the future so it is crucial that they are educated and care about the topic. We will be there to do our best at transmitting climate change knowledge specifically about carbon dioxide to a younger generation.

Nadon, Noelle  
*Mentor(s):* Mr. Alex Blauvelt  
**Noelle Nadon’s GLD Presentation: Global Learning**

This presentation is for the Graduation with Leadership Distinction Global Learning Pathway. During my time at the University of South Carolina, I was fortunate enough to study abroad to Vienna, Austria for a semester. I traveled to 13 different countries and over 30 different cities. I learned about the importance of looking past the initial picture in front of people as well as learning more about diversity and how it affects people differently, but I think most importantly I learned that different people have different priorities and sometimes those priorities are based on their culture or their external environment. The experiences both inside the classroom and outside the classroom have definitely shaped my priorities and how I view the world around me. All of this will help me later on in my career because I can understand how I think and how others around me think as well. I can adjust to new cultures and new cities and that excites me for my future because I want to keep learning about new cultures and visiting new countries.
Nadon, Noelle  
Mentor(s): Mr. Alex Blauvelt  
Noelle Nadon’s GLD Presentation: Professional and Civic Engagement

Coming to the University of South Carolina has allowed me to become more professional in all aspects of my life. I was able to serve as a Resident Mentor, serve an internship in Marketing and Operations with a small loan company as well as complete the Disney College Program. I discovered my passion in creativity and research affording me the knowledge of hearing my audiences as well as understanding them. During my college program at Walt Disney World, I learned how “Making Magic” became the personality of the brand itself. All of this has taught me how to be a leader both inside the classroom as well as outside of the classroom. These key insights and all of my experiences have been vital to my undergraduate career and serve as the platform for my venture into the business world after college. This presentation allows me to culminate all aspects of my journey for the Graduation with Leadership Distinction in Professional and Civic Engagement.

Naik, Avni  
Mentor(s): Mr. Alex Blauvelt  
Abroad in Arras

During the second semester of my junior year, I spent 5 months abroad in a small town called Arras in the Northwestern region of France. As a French minor, I felt that the best way for me to learn the language was to fully immerse myself in the culture. This is one of the reasons why I chose the smaller town setting and studied in Arras rather than a big city like Paris. Because Arras is not as big of a tourist attraction, English is not widely spoken and this forced me out of my comfort zone to speak in whatever French I knew to the locals and the students. During this experience, I learned a lot about reaching out to people first and expanding my horizons instead of waiting for others to approach me. Being abroad also sparked an interest in me to learn about other people and their life experiences socially and culturally based on where they are born and raised.

Narro, Kimberly  
Mentor(s): Mr. David DeWeil, Mr. Mike Lifavi, Mr. Ryan Patterson  
Discomfort Leads to Growth

In order for a neuron to send a signal to other tissue it needs to be sufficiently stimulated by depolarizing to a threshold value. Once threshold is reached, the axon hillock triggers an action potential which travels down the axon to the axon terminal, and triggers a chemical release into the synapse. These chemicals then communicate with the adjacent tissue. None of this occurs if threshold isn’t reached at the axon hillock through sufficient stimulation in the neuron’s soma and dendrites. On a macroscopic scale I have discovered that personal growth does not occur unless one gets stimulated through stepping outside of their comfort zone. I didn’t see myself as a leader when I entered college, but slowly through more exposure, I recognized the skills that I had and the ways that I could further develop into a leader. Through constantly pushing myself, I went from being uninvolved as a freshman to in a Service Sorority as a sophomore, and then to leading a successful donation drive and being an emcee at the Student Leadership and Diversity Conference. Through constantly pushing myself out of my comfort zone, I was not only able to personally grow, but also, I was able to ignite change within others. Personally, I am going on to become a physical therapist, where I will also challenge my patients to overcome discomfort and complacency to grow. I will have to challenge my patients to rise to a challenge, and provide them constant support and encouragement so that they are successfully able to do so.
Natividad, Ianara  
Mentor(s): Dr. Magdalena Grudzinski-Hall  
Graduation with Leadership Distinction: Cultural Understanding & Perspective in Global Learning

During my junior year, I studied abroad at the University of Warwick in Coventry, England as part of the history department’s student exchange program. The time I spent in England led to travel and intercultural experiences which have driven me in my pursuit to graduate with Leadership Distinction. My personal experiences and the time I spent studying at the University of South Carolina honed my initial impressions regarding cultural diversity and understanding domestically. However, as a History major, I felt the need to further expand my perspective through travel and immersion, leading me to participate in the exchange. During my time abroad, I took both history and sociological courses at Warwick. The campus provided a culturally and internationally diverse setting which, along with my travels around the United Kingdom, made me adjust how I perceived my surroundings and the people in them. Yet, I most fondly found company among students from the UK who shared interests that I already had prior to studying abroad, such as my interest in comedy. My work on the global learning pathway for graduation with leadership distinction helped me realize the importance of recognizing and understanding the similarities between people, in addition to considerations of cultural diversity. I believe the open-minded and adaptive perspectives that I developed from my international experience will aid me in my future endeavors, both as a student and a professional.

Natterstad, Anna  
Mentor(s): Dr. Heather Brandt  
Evaluating Community Partnerships to address Cancer Health Disparities in Faith-Based Settings

Addressing cancer disparities in African-American communities requires developing and maintaining community-academic partnerships to support initiatives. As part of a larger community-based participatory research (CBPR) project, this study examined lay health educators’ (LHEs) experiences regarding maintenance and expansion of a community-academic partnership. The Wilder Collaboration Factors Inventory was adapted and administered to 35 LHEs involved in community education efforts. Survey respondents rated the organizational capacity of the community-academic partnership positively. Items addressing the composition of partners were rated less favorably. Results illustrated several strengths of the partnership, possibly related to the CBPR approach, and the need to consider expanding partnership membership.

Needle, Rose  
Mentor(s): Prof. Karen Mallia  
Leadership in the Creative Industries

This project involves the collection of research for a manuscript entitled “Leadership in the Creative Industries” by Karen Mallia. The manuscript offers insights into what the creative industries are; the role creativity plays in the workplace; and how to succeed as a leader in such an industry. The creative industries include any industry that has its origin in individual creativity, skill, and talent, such as advertising, film, or publishing. The manuscript and the final product will utilize academic research in fields ranging from psychology, business, marketing, and sociology to offer an academic perspective on the creative process and leading creatively.
Nelson, Melanie  
Mentor(s): Ms. Elise Lewis  
Community Building in Conflict Torn Regions- Education is the Way

My presentation is for the Graduation with Leadership Distinction is in the Global Learning track of this program. My extensive Beyond the Classroom experience brought me to spend my Spring 2016 semester abroad in Copenhagen, Denmark. Before that, I also participated in a maymester trip with the Darla Moore School of Business to Eastern Europe for the Business in Europe class. I had been adamant about going abroad since even before I attended the University of South Carolina, and my two-year residency in the International House at Maxcy College my first years on campus, only enhanced this desire for me. I was prepared for my study abroad to bring a deep, lasting impact on my life, but I did not fully understand how greatly this experience would create a steady track and inspiration for my future ambitions. The ideas and incidents I was exposed to during my travels helped me hone in on my career aspirations to branch into a field of peace and conflict studies in my higher education. This has become the center focus in my GLD portfolio and the influence I hope to make with this project. My problem is regarding education in lower income areas, and surrounding the idea of building self-sustaining communities for the people of conflict torn regions, to create a safer environment for the people and to direct efforts towards a more positive outcome.

Nesbitt, Rachel  
Mentor(s): Dr. Amber Fallucca  
Sharing My Passion Through Leadership

During the last three years of my undergraduate career I have been a University Ambassador at the University of South Carolina Visitors Center. I led tours of campus to perspective students and their parents where I had the opportunity to showcase my experiences and passion about USC to assist them with their own college decisions. Deciding to come to USC from out of state was a major decision for me. I strongly believe in this university so I wanted to have the chance to share my love for it while giving high school students the opportunity to see the value in becoming a Gamecock. This organization has impacted my college experience tremendously as I have learned professional, communication and persuasive skills. I have seen myself progressively develop as an Ambassador during each semester and found the process of seeing students become excited about USC incredibly rewarding. Being an Ambassador was a great way for me to give back to USC while I was a student here. The skills I learned, particularly in regards to being adaptable and able to relate to different personality types, are going to be directly applicable in my future career in the hospitality industry. I will always appreciate having had this opportunity and am grateful to have been a part of such a passionate organization.

Nettles, Emma  
Mentor(s): Dr. Adam Pazda  
Perspective Taking and Self-Other Overlap: How Self-Compassion Mitigates the Negative Effect of Blame on Helping Behavior

Research suggests that perspective taking can lead to a greater degree of perceived self-other overlap with a stranger in need, promoting a greater willingness to provide help (Myers, Laurent, & Hodges, 2013). Additionally, studies have shown that self-compassion is often indicative of compassion for others, as individuals high in self-compassion have been shown to attribute blame to a person in need while still intending to help them (Welp & Brown, 2012). The present investigation will examine self-other overlap as the mechanism through which self-compassion prompts compassion for others and reduces the negative effects of blame on helping behavior. Participants will be randomly assigned to either an objective condition or perspective taking condition and tasked with reading a scenario of a blameworthy person in need. The scenario describes a situation in which an individual knowingly declines to purchase health insurance due to the high price, then requires expensive hospitalization because of a cycling accident. Attribution of blame and self-other overlap will be assessed following the scenario, in addition to self-compassion. Participants will be compensated $5.00 upon completion of the study but will have the option to donate any of that amount to the Community Medical Clinic of Aiken County, which provides free or low-cost healthcare to the uninsured. The donations will serve as the dependent measure of helping behavior. We hypothesize that perspective taking will lead to a greater degree of self-other overlap with the target in need, resulting in an increase in helping behavior. Additionally, due to a greater degree of self-other overlap, self-compassion is expected to moderate the association between blame and helping behavior.
Ng, Samantha  
Mentor(s): Prof. Courtney Worsham  
Language Learning to Leading  

During my sophomore year, I volunteered to become an American buddy for international students through the Buddies Beyond Borders program. The program assists international students in getting accustomed to the social and cultural life in the United States, and provides me an opportunity to closely interact with international students and to gain a better understanding of their cultural background. As a Spanish and Chinese language minor, I find the program to be a very valuable resource in not only for practicing the languages, but also for gaining knowledge about the cultures from people that have first-hand experiences. To help make them feel more at home, I listen to the challenges that my international buddies may be facing during the academic semester and come up with ways to solve them together. Buddies Beyond Boundaries not only shares my passion in language learning and helping others. It helps decrease the risk for international students from falling into depression due to homesickness, culture shock, social pressures, language barriers, and social isolation. I will use the knowledge and skills that I acquired from the program to prepare for my goal of working in an international company related to the supply chain industry, where multiple language skills and knowledge of different cultures are vital. Having been able to connect with multiple international students throughout my college career, I will also show you the value of the program and its impact on our peers.

Nichols, Teyanna  
Mentor(s): Mrs. Laura Carnes  
Application of nursing concepts within higher education administration: How caring theories may positively impact distance learning models  

During my time as an upper division nursing student at USC Lancaster, I have had the opportunity to participate in distance learning courses. After completing my Graduation with Leadership Distinction process and reflecting upon these courses, I have come to the conclusion distance learners need more support from a student services perspective. Using my key insights based upon Maslow’s descriptors of basic human needs, Watson’s explanation of 10 carative factors, and Bertalanffy’s characterization of human wholeness I am proposing a student services model designed to help distance learners at USC Lancaster. Today, I will be discussing this model via an educational application of the three nursing concepts listed above.

Nicklas, Jaclyn  
Mentor(s): Dr. Carol Boggs  
Butterfly Nectar Preference and Nectar Glucose Composition in Colorado Wildflowers  

Does the glucose composition of the nectar in flowers affect Butterfly flower preference? Research was done on insect-plant interactions at the Rocky Mountain Biological Laboratory during July, 2016. Speyeria Mormonia butterflies in Gothic, Colorado were observed while exhibiting feeding behavior. The species of flower and duration of feeding were recorded, and then each flower species was sampled for nectar composition. The nectar samples were analyzed for glucose composition at the University of South Carolina. This data could help explain why butterflies feed on certain flower species and elaborate on the ecological connection between butterflies and wildflowers. Species conservation can be dependent on aspects of the organism’s survival, specifically nutrition.
Nielsen, Gabrielle  
Mentor(s): Prof. Moryah Jackson  
Linking a Web of Experiences

During my time at the University of South Carolina I have been given many opportunities to connect my academics to my involvement in the community. I have always had a desire to help those in need and what I have learned in the psychology field has enabled me to do this in an entirely different approach. An example of this is in the work that I have done as a volunteer advocate with Sexual Trauma Services of the Midlands. In this volunteer experience I work directly with survivors of sexual assault. My background in psychology has aided me in assisting those who have been both directly and indirectly effected by trauma. My academic work as well as my experiences in my community have helped me to recognize how I can improve some of the ethical issues in the field of genetic counseling.

Nordhausen, Gretchen  
Mentor(s): Ms. Theresa Harrison  
The Journey to be a Leader

As a double Marketing and Human Resources major, with a double minor in Spanish and Japanese, I came to the University of South Carolina to gain a global understanding and develop my leadership skills. Through my studies and experiences, I learned that to become a leader is challenging, where self-appreciation, reflection, coupled with a mission to create value through innovation will ultimately prompt success. My most important contribution to the University of South Carolina was becoming the President and a founding member of the Diversity and Inclusion Student Council of the Darla Moore School of Business (D&I Council). I realized that I could become an advocate and represent students with disabilities, international students, and women in business. My role in the council has developed my leadership skills through conducting meetings, planning events, communicating with a diverse group of people, and presenting about my own experiences at the university. I want to pursue a career in the legal profession and study either Civil Rights Law or Labor Law. I believe that my experiences will further my passion to continuously advocate for diversity, inclusion, and equity.

Norkitis, Julia  
Mentor(s): Dr. Troy Herter  
Examining the Influence of Attentional Mechanisms on Visual Search during Motor Skills

Many daily motor tasks, such as driving, walking and preparing meals, use patterns of eye movements, known as visual search, to quickly and efficiently gather visual information that guides control of limb movements. Attention is an important contributor to the efficiency of visual search and is modulated by “bottom-up” mechanisms that guide eye movements towards highly salient objects and “top-down” mechanisms that guide eye movements towards objects that are relevant to task performance. The purpose of this study was to examine how visual search and limb movements are modulated by these attentional mechanisms during a motor task that captures the complexity of driving. Stroke survivors and healthy adult controls used a robotic device with eye tracking to perform an Object Hit and Avoid task in which they used virtual paddles attached to each hand to hit away Target objects and avoid hitting Distractor objects that moved towards them in the horizontal plane. We manipulated the salience (visibility) of targets and distractors across five conditions: all salient targets, all salient distractors, half salient targets, half salient distractors, and no object salience. Task performance varied across the five conditions and was tightly coupled to changes in visual search. Limb movements were similar across all conditions. This shows that efficiency of visual search contributes directly to performance of motor tasks. This indicates that rehabilitative therapies designed to reduce the deficits in visual search by manipulating bottom-up and top-down attentional mechanisms may lead to improvements in performance of daily motor tasks following stroke.
There isn't a parenting manual handed out to every set of parents as soon as they find out they're expecting. There aren't guidelines and rules that parents learn about in a class that everyone takes. Parents can easily become overwhelmed with the responsibility of raising a child. Add in challenging behavioral problems and the situation becomes a more difficult to handle. The purpose of this study is to assess the effectiveness of the online version of the Triple P: Positive Parenting Program in comparison to the in-person version. The study begins with the family coming in for the first assessment. The primary parent and the second parent (if present) fill out a questionnaire detailing their child's problem behaviors. The child and parent perform a series of play tasks that are filmed and analyzed. After the T1 assessment, the family is randomized to either the online or in-person program. After 4 months of parenting help, families come in for their Time 2 Assessment where they complete the same play tasks. Eight months from their T2, families come in for their Time 3 Assessment where again they complete the same tasks as a follow-up. Analysts review videos of the play tasks to see if the parenting program has improved the child's behavior. Questionnaires from the child's teachers and parents are completed at each assessment to further determine the effectiveness of the parenting program. Results have yet to be processed as data collection and family enrollment will continue through the end of 2017.

Community service has been integrated throughout my college career in a variety of ways. I've participated in multiple service experiences, some more time consuming than others. I've been involved in Capstone sponsored service projects, a medical mission trip to Jamaica, projects sponsored by my sorority, counseling a pre-medical camp, and serving in the Palmetto Baptist Emergency Department. Additionally, I've had some community service enhancement experiences, like the Oxfam Hunger Banquet and USC Dance Marathon. By going through the process of Graduation with Leadership Distinction via the Community Service Pathway, I have been able to explore these service projects and discover how they have impacted my character development in college. I have been serving the community for quite a while, but the experiences that I've had with service in college have truly shaped who I am. While exploring this GLD pathway, I've been able to dictate what I've learned from my experiences. My first key insight explains how I have developed the ability to learn on the spot and think quickly on my feet. My second key insight delves into my heart for service and where that may have stemmed from. My third key insight examines how a college student like me can make service count and continue throughout life. By reflecting on these community service experiences, I've been able to get a better understanding of how community service has impacted my undergraduate experience and how it will continue to impact me as a medical professional.

I have spent my undergraduate career as a student, but also as a leader within the Carolina community. While pursuing the Professional & Civic Engagement Pathway of Graduation with Leadership Distinction, I've been able to explore my growth as a leader and identify how leadership has impacted my life. My core experiences that showcase my professional engagement are my position as an Orientation Leader, my Peer Consultant position in the Student Success Center, and my role as Vice President of Programming for Executive Sorority Council. To enhance these roles, I attended the Southeastern Regional Orientation Workshop, the Southeastern Panhellenic Conference, and the Greek Leadership Conference. I've also had other leadership experiences on campus that have added to this role. In these positions, I've learned some very important lessons. In my first key insight I explore the value of being a team player and how to work effectively in a group. In my second key insight I review the importance of the first year experience and how that will carry into other areas of my life. In my third key insight I discuss women in leadership and how being a woman leader on campus has impacted me as a person. Reviewing these experiences and making connections to my courses has been beneficial to better comprehend my undergraduate experience while also helping me prepare for my future.
O'Brien, Caitlyn
Mentor(s): Dr. Magdalena Grudzinski-Hall
Traveling to Increase Business Practices

During the spring semester of my junior year I studied abroad in Tokyo, Japan. As an international business major, I have been taking Japanese language classes during my 4 years at USC. Studying abroad was not only a way for me to further my Japanese language skills, but to further my education of business and cultures around the world. As a business student who desires to eventually work on an international level, this experience was essential. I was able to take business classes that focused on the Asian, specifically Japanese, viewpoints of business. I was also able to conduct group projects within these classes with students from around the world. This unique experience with different cultures and business ideas has opened my mind about business procedures and how to work closely with those who are different from me. I was also able to immerse myself in the culture and language of Japan. I was able to interact with Japanese natives through school organizations as well as during my day-to-day life in Tokyo. Learning to adjust to a culture that is highly based on respect has really prepared me for entering the international business world and learning to adjust to differences I may face.

Oduwole, Simisiolaoluwa
Mentor(s): Dr. Ron Prinz
Methodology for Studying Parent-Child Interaction

Being able to understand and explain the developmental changes that occur in children from newborns to adults is why observational studies like the one I worked on are so crucial. The purpose of what we hope to do is gain more background knowledge and insight of how people develop throughout life. “Methodology for Studying Parent-Child Interaction” explores parent and child behavior during a series of pre-recorded play sessions. My role in the study involves collecting affect and behavioral content of parent-child interactions through observational coding. Specifically this is done by analysis of the perspicuity and frequency of the directions a parent gives to their child; followed by how quickly the child complies, the total amount of positive physical closeness between a child, and the different times, if any the child is behaving inappropriately. I learned the process of coding schemes that were needed to learn variations in behavior, separate objective and subjective interpretations of data and understand the parent and child interactions.

O’Flaherty, Andrew
Mentor(s): Dr. Gwen Geidel
Effect of Outdoor Classrooms on Student Performance in Classes at the University of South Carolina

The goal of this project is to assess students’ performance in traditional classrooms versus an alternative learning environment. We compare student performance based on the criteria of attendance, engagement, motivation, and emotional well-being in the two different classroom environments. To understand if alternative academic environments affect student performance, we simulated an outdoor classroom at Green Quad in the Sustainable Carolina Farm and Gardens. Four classes participated in the study, which is around 70 students. Classes utilized the outdoor classroom for a consecutive 3 class periods to allow the students to adapt to the environment. Surveys were given to the students once in their inside classroom and once in the outdoor classroom. By assessing the impact of an outdoor classroom on USC students’ achievement, our study will provide a foundation for understanding the implications of alternative environments on student development. If results show that alternative classrooms enhance student performance, we hope to provide evidence that there is potential in creating an outdoor classroom environment on campus.
O’Leary, Erin  
Mentor(s): Prof. Maegan Gudridge  
Learning around the World

In the spring semester of my junior year, I had the most incredible opportunity to study abroad in Barcelona, Spain. As a finance and marketing double major, I was expecting to learn more in my fields of study, but my experiences overseas taught me more than any textbook could. My travels provided me with a vision of my desired career path—something I longed for throughout my first three years of college. I was fortunate enough to spend five months in one of the world’s most diverse cities and traveled to eight other countries. Every time I explored a new place, I made an effort to “do as the Romans do” and partake in cultural customs. By doing this, I felt I learned the importance of local culture and the beauty and achievement of adapting. For example, I practiced my Spanish as much as possible and gained an appreciation from those who heard me trying. This idea of cultural adaptation is something I learned in my business classes. For a company to be successful when expanding internationally, they must adapt and learn about the local people. From my irreplaceable abroad experience I learned that to be as successful as possible, one must take the time to get to know local cultures. This concept is one that I will apply throughout my life both personally and professionally.

Olson, Lindamarie  
Mentor(s): Dr. Robert Hock  
Exploring help-seeking and stigma related to autism spectrum disorder among parents in India

Early identification and treatment of autism spectrum disorder (ASD) is a pressing global concern, and parent help-seeking is critical first step towards this goal. At the present time, little is known about ASD-related help-seeking outside of Western countries. To address this gap, the current study examines help-seeking among parents of young children in India. Within Indian culture, disability is often seen as a tragedy. Social exclusion and familial isolation are common, and there is a spiritual belief that a disabled child is a curse from God (Ravindran and Myers, 2012; Dhar, 2009). The purpose of this study is to examine the relationship between ASD-related help-seeking and dimensions of stigma among parents of young children in India.

Olyarchuk, Sarah  
Mentor(s): Dr. Amber Fallucca  
GLD: Importance of Deep Thinking in the Workplace

Through my experiences inside and outside of the classroom I have chosen to pursue the Professional and Civic Engagement pathway for graduating with Leadership Distinction. This presentation will include the processes and takeaways of two key projects in my college career. Through my beyond the classroom experience in my internship with the Small Business Development Center I’ve had great practice with the concept of deep thinking. It is a different form of thinking that results in the discontinuous “aha!” experience, which is the essence of creativity. We aim to help ask the hard questions so as our clients are given a slight lead but are forced to develop an answer themselves through thinking deeper. Within the classroom, in my Management Science 485 class I was part of a project where my team’s focus was on USC’s Study Abroad Office and how to improve their emergency response system with students traveling abroad when there is an emergency overseas such as natural disasters, terrorist attacks, etc.. This helped me further realize the importance of deep thinking to construct solutions in my future in supply chain management as well. These experiences and opportunities had a significant impact on my confidence and ability to know that in my future career I will be able to successfully implement the knowledge I have learned in supply chain and operations management. I feel it is important to recognize thinking deeper than the surface is imperative for business solutions and success.
Ondus, Lillian  
Mentor(s): Dr. Karen Smith  
Decorative Mode Glossary for Thom’s Creek Pottery  

This research concerns hand-built pottery from Spanish Mount, a 4,000 year old Native American shellfish mound located by a tidal creek on Edisto Island. The people of Spanish Mount produced what archaeologists call Thom’s Creek pottery, a sand-tempered ware famously embellished with punctated linear and curvilinear designs. Although Thom’s Creek pottery has been studied by researchers for decades, they have yet to develop a comprehensive guide to the various tool’s punctuations that they impress on their vessels. Tool types can potentially tell archaeologists something about communities of learning or practice among Thom’s Creek potters and their neighbors. To study tool diversity, I focused on an assemblage of ceramics from a single unit at the site, organizing the sherds into decoration modes and experimenting with clay in an attempt to distinguish what tools were used to make the varying designs. The next step in the research process was to name, describe, and create a glossary of these decorative modes. I am currently in the cataloging phase of the project, which involves the use of an archaeological database to input attributes of each sherd by excavation layer. This data will allow researchers to organize and create data tables that can be analyzed for changes in decorative mode uses over time. This research as well as the excavations being performed at Spanish Mount are extremely important to cultural preservation because over the years erosion has begun to destroy portions of the mound.

Padi, Akhila  
Mentor(s): Dr. Susan Wood  
The Role of Estrogen in the Cardiovascular Consequences of Witness Stress  

Repeated exposure to or the witnessing of social stressors is known to result in the emergence of psychosocial disorders, which significantly increases the risk of cardiac morbidity. Depressed women are at a greater risk for the development of comorbid diseases such as coronary heart disease and heart attacks in comparison to depressed men. Furthermore, increased risk in females begins during puberty and ends following menopause, suggesting that ovarian hormones play a role in this vulnerability, particularly estrogen (E).

We utilized a model of social defeat stress to determine stress-induced cardiovascular dysfunction between (1) female intact vs ovariectomized (OVX) witness rats, and (2) female OVX rats treated with estrogen (OVX + E) vs treated with placebo (OVX +V). For the first stage of the study, female Sprague Dawley rats were randomly assigned into control/witness and intact/OVX groups. For the second stage of the study, in order to determine the contribution of E, female OVX Sprague Dawley rats were randomly assigned into control/witness and OVX+E/OVX+V groups. Each witness was paired with an intruder, and was placed behind a plexi-glass partition in the resident cage for the duration of the intruder defeat exposure. 5 days after the 5th stress/control exposure, all stressed rats were re-exposed to the defeat environment in the absence of the resident. Cardiovascular telemetry (blood pressure and ECG) were collected for 5 mins/hr, 24 hrs/day starting 2 days before control or stress began and continued until 5 days after the final stress/control exposure.

Analysis of cardiovascular telemetry of Stage 1 of the study indicated a higher presence of increases in heart rate, blood pressure, and the occurrence of pre-ventricular contractions (PVCs) during defeat for female witness intact rats in comparison to female witness OVX rats and controls. This suggests that ovarian hormones make females more sensitive to stress-induced cardiac dysfunction. The data that was found in Stage 2 of the study demonstrates a higher presence of these same cardiac dysfunction factors during defeat in OVX + E witnesses in comparison to OVX + V witnesses. This demonstrates that estrogen plays a role in the increased vulnerability to stress-induced cardiac dysfunction. Ongoing studies are assessing the mechanism by which estrogen increases this susceptibility to cardiac dysfunction through analyses of heart rate variability, a non-invasive measure of sympathetic and parasympathetic balance of cardiovascular control.

This is the first report of using a witness stress paradigm in female rodents and is unique in that it recapitulates the increased vulnerability to cardiovascular dysfunction in an intact, cycling female population as compared to an OVX female. The results of this study will identify why females who undergo stress are more vulnerable to the development of co-morbid diseases as compared to men who undergo stress.
Zooplankton play a critical role in nutrient and carbon biogeochemistry and the export of material from the surface ocean to depth. However, there have been few studies that have focused specifically on phosphorus (P) concentrations and how they vary with zooplankton size class, depth, and season in the ocean. This data is crucial in order to create realistic models and expand our knowledge of how material is cycled throughout our oceans. Here we present P concentrations from two different seasons, across 5 different size fractions (0.2mm to 5mm) from 25 to 1250m at Station ALOHA located in the Central North Pacific. When analyzed across all size fractions, seasons and depths, P concentrations remain surprisingly invariant, averaging $270 \pm 55 \text{ umol P/gram dry weight}$. Molar carbon (C) to P ratios also remain relatively constant and close to canonical Redfield ratios, averaging $122 \pm 33$. Closer inspection of the data, however, show that P concentrations increase across size classes, with highest P concentrations in the larger, > 5 um, zooplankton (from 220 to >250 umol P/gram dry weight). At the same time, molar C/P ratios significantly decrease with increasing size class, from ~145 to 110. Combined, our results suggest that larger zooplankton are more efficient at retaining P relative to C and that this is likely related to a combination of zooplankton composition and nutrient status. We also found that P compositions experienced significant change when comparing certain size fractions at different depths, thus making depth play a critical role in P concentrations.

The Agulhas Current, a western boundary current, is a limb of the wind driven anti-cyclonic circulation of the south Indian Ocean. Near the tip of Africa, the current retroreflects shedding warm saline waters into the Atlantic Ocean. This phenomenon, referred to as Agulhas leakage, feeds the upper arm of the Atlantic Meridional Overturning Circulation. Fluctuations in this highly dynamic system impact the strength of overturning sequentially altering climate patterns. This study explores the relationship between small-scale fluctuations in sea surface temperature of Agulhas leakage from NOAA’s AVHRR in response to ENSO events classified by the Oceanic Niño Index. Our findings suggest Agulhas retroreflection sheds anomalously warm waters in response to El Niño and anomalously cool waters due to La Niña. Starting at the peak of an ENSO event the signal is transmitted at 12°S and 25°S from the Pacific Ocean into the Indian Ocean basin by Rossby waves. These waves travel westward until they reach Madagascar where they interact with source currents to complete the transfer of an ENSO signal into the Agulhas leakage region. The process occurs during a timescale spanning two years. Changes in the region of Agulhas leakage can be seen as early as 16 months after the peak of an ENSO event but the continued impact lasts no longer than 2 years following the event. The strength of an ENSO event and interactions with other events appear to affect the rate and strength of transmission of the ENSO signal to the point of Agulhas leakage.

My name is Anna Parker and I am seeking my Associate Degree in Science from the University of South Carolina Lancaster with Leadership Distinction. My pathway for leadership distinction is Diversity and Social Advocacy. My project consisted of completely renovating my campus’ lactation room. The goal of my project was to provide a safe, private, and sanitary room for lactating moms to use while on campus. I also wanted to inform my community about the many benefits of breastfeeding and show the mothers their school and community supported them. All of the hours spent researching, fundraising, and renovating proved to be successful given that my campus is now a Mother Friendly campus through The South Carolina Breastfeeding Coalition.
Parker, Ashley  
Mentor(s): Mrs. Laura Carnes  
Utilizing Maslow, Bandura, and Festinger: Psychological approaches for the greater good  

Through my experiences at USC Lancaster leading the Food Pantry and serving as a Peer Advisor at Lancaster (P.A.L.), I have found myself supremely interested in creating spaces and experiences to help others feel comfortable, safe, and successful. Today I will discuss how theoretical models based upon psychological principles have had an applicable impact upon my ability to lead as a peer and in the future. Specifically, I will focus on Abraham Maslow’s Hierarchy of Needs, Albert Bandura’s Social Learning Theory, and Leon Festinger’s Cognitive Dissonance Theory. I understand these three theories as more than psychological components, but also as a sociological phenomena that can create positive societal change.

Parker, Brice  
Mentor(s): Mrs. Moryah Jackson  
The UnDiet  

During my time studying Exercise Science, I discovered a passion for the study of health and fitness. In my classes, I learned about nutrition and how it affects daily life. I learned that diets are mostly ineffective and most commercial workout plans can be difficult to maintain. My presentation will focus on what I learned about health and fitness and how it applies to the everyday person. I will also talk about my leadership experiences.

Parnell, Sharidan-Blake  
Mentor(s): Ms. Lisa Camp  
When I Was In Third Grade, I Had a Pet Rock  

For Discover USC, I will present about how I used integrated curriculum throughout the rocks and minerals unit taught in my internship experience. I taught a 3rd grade class at H.E. Corley Elementary School and the rocks and minerals unit is a content standard. In the rocks and minerals unit, we discussed the difference between rocks and minerals, the properties of minerals, and completed an inquiry project with Pet Rocks. Each student cared for a Pet Rock and had to become experts on their properties and their common uses. The presentation will discuss how the class integrated science into the ELA standards during this unit. I will discuss the meaning of integrated curriculum as well. I will also focus on why it is important to integrate science into ELA curriculum. I will talk about the ways that students will be able to use concepts gained from learning about the main idea of informational texts to help them focus on important information about rocks and minerals. I will also include pictures that I took throughout the unit and Pet Rock Day.
Parris, Rebekah
Mentor(s): Dr. Christina Cox

Osmolarity of enteral nutrition and medications and necrotizing enterocolitis in neonates

Purpose: To determine if an association between osmolarity of enteral medications and feeding supplements administered to neonates and necrotizing enterocolitis (NEC) exists.

Methods: This single-center, retrospective study includes patients admitted to a level 3 NICU within 48 hours of birth between August 1, 2010 and August 1, 2015 diagnosed with NEC. Enteral medications and feeding regimens were evaluated if administered prior to NEC diagnosis. Statistical analysis includes descriptive statistics for patient demographics and Kaplan Meier analysis for total osmolarity and incidence of NEC.

Results: In 43 NEC patients, the average gestational age and birth weight was 28.97 (± 4.2) weeks and 1286 (± 881.2) grams, respectively. The average time to NEC was 29.33 (range: 6 – 99) days of life (DOL). Only 4 (9.3%) patients received solely breast milk one week prior to NEC, while 16 (37.2%) patients received formula at least once prior to NEC diagnosis. Twenty-seven patients (62.7%) received fortifiers, of which 88.9% received during the feeding prior to NEC. Twenty-one patients (48.8%) received at least one enteral medication 48 hours prior to NEC diagnosis. Additionally, 14 patients (32.6%) received both a fortifier and medication within 48 hours of NEC. The most commonly used enteral medications include caffeine citrate (n = 8, 18.6%), ferrous sulfate (n = 7, 16.28%), and multi-vitamins with iron (n = 6, 13.95%). Total osmolarity is being assessed.

Conclusion: Preliminary data suggests the majority of NEC patient receive hyperosmolar enteral feeding supplementation. Further analysis is needed to evaluate total osmolarity and incidence of NEC.

Patel, Neema
Mentor(s): Dr. Michy Kelly

Identifying which subcellular compartments in the brain express PDE9A and how that expression changes with age

Phosphodiesterases (PDEs) are a super family of enzymes that degrade cyclic nucleotides (cAMP and cGMP), intracellular signaling molecules critical for brain function. Among the PDE family, PDE9 has the highest affinity for cGMP and, thus, is a potential therapeutic target of interest. To better understand this potential, we characterized the subcellular localization of PDE9A in the brain and how PDE9A expression/localization changes with age. We show that PDE9 mRNA and protein are expressed significantly higher in cerebellum versus hippocampus, with particular enrichment in the Purkinje cell layer. In both hippocampus and cerebellum, we reliably detect the previously reported PDE9A5 isoform, but also detected two new PDE9 isoforms in the brain: PDE9X? (~120kDa) and PDE9X?? (~100kDa). Biochemical fractionation shows that all PDE9 isoforms localize to the nucleus and are significantly enriched in membrane vs. cytosolic. This subcellular compartmentalization is consistent with the fact that PDE9 regulates pools of cGMP that are downstream of particulate, but not soluble, guanylyl cyclases. Interestingly, the relative enrichment of PDE9 in nuclear versus membrane fractions significantly differs as a function of isoform, brain region, and age. Not only does the subcellular compartmentalization of PDE9A5 dramatically shift between postnatal days (PD) 7-28 from membrane to nucleus, but expression of both PDE9 mRNA and protein significantly decrease during this time period. PDE9 localization and expression patterns stabilize after PD 28. Together, these data suggest PDE9 is localized to preferentially regulated nuclear and membrane proximal pools of cGMP, and its role in brain function dramatically changes during early postnatal life.
Alzheimer’s Disease is a neurodegenerative disorder that is thought to be caused by Amyloid-β (Aβ²) aggregates. The study of Aβ monomers must be done theoretically with molecular dynamic simulations to provide the relevant conformations of Aβ in isolation and in the process of aggregation. The use of a statistical mechanic approach to model hydrogen bond potentials between bond acceptors and donors was implemented to analyze the interaction between two Aβ monomers. The model deals with discrete calculations with a self-consistent field theory that successfully considers the size, shape, conformation, and charge of each molecular species as well as incorporates the angle and distance dependence of hydrogen bonds within the energy function. A statistical analysis of the model provides results that concur with current established and compelling knowledge on hydrogen bonding interactions. This field theory is invaluable in describing the molecular interactions that drives the dimerization between Aβ monomers.

The Effect of Succination on Ubiquitin carboxyl-terminal hydrolase L1 (Uchl1) Deubiquitinase Activity

Multiple sclerosis (MS) is a chronic inflammatory condition resulting in neuronal demyelination and axonal loss. While there is no cure, a new treatment was approved by the FDA in March 2013 (Tecfidera®). The active component of Tecfidera® is di-methyl fumarate (DMF), a fumarate ester resulting in significant clinical improvements, but also nausea sufficient to discontinue use in ~10% of cases. Our laboratory studies the irreversible modification of protein cysteine residues by fumarate (succination) and I have previously conducted a proteomics-based investigation that identified 24 new protein targets of DMF in neurons and astrocytes. One such target is Ubiquitin carboxy-terminal hydrolase L1 (UCHL-1), an enzyme that hydrolyzes a peptide bond at the C-terminal glycine to release ubiquitin from monoubiquitinated proteins. Deficiency of UCHL-1 has been linked to neurodegenerative disorders such as Alzheimer’s, Huntington’s, and Parkinson’s disease. In order to determine the effect of DMF on enzymatic activity in vitro, I used recombinant Uchl1 in an assay monitoring the enzymatic cleavage of Ubiquitin-Rhodamine110-Glycine. The release of Rhodamine110-Glycine was measured fluorescently and is proportional to deubiquitinase activity. Preliminary results suggest DMF is not reducing enzyme activity; future studies will use immunofluorescence and confocal microscopy to determine if succination impacts the subcellular localization of Uchl1. Ongoing investigations are examining total levels of Uchl1 and ubiquitinated proteins in DMF treated neurons versus controls using immunoblotting procedures. The conclusion of these studies will elucidate if Uchl1 succination is altering its deubiquitinase activity, association with other proteins, or subcellular localization.
Patel, Ami  
**Mentor(s): Mrs. Anna Oswald-Hensley**  
**Professional and Civic Engagement**

Professional and Civic Engagement:

University Ambassador
I was asked to become a university ambassador for the University of South Carolina in January 2016, during the second semester of my freshman year. I was specifically selected for the role by faculty and other former ambassadors. I became an ambassador because I thought that it would be a great opportunity to become more involved in campus activities and student life. As an ambassador, I am a representative of the USC Sumter campus on and off campus. I also assisted new students at orientation and provided campus tours to prospective students. I believe that being a university ambassador has helped me gain leadership skills, get involved in campus life, and get to know more students around that attend USC Sumter. The leadership skills that I have gained from being an ambassador will be helpful in my future career.

Biology Club
Being a biology major, I wanted to be a part of biology club at USC Sumter. I became a member of the USC Sumter biology club in January 2016. I wanted to be a member of biology club because I thought that it would enhance my knowledge of the subject as well as introduce me to others who had the same interests as I do. As a member of USC Sumter’s biology club, I became and still am more involved with the campus community and others who are science majors. I believe that being a member of USC Sumter’s biology club gave me the opportunity to learn more about biology, helped me meet others who had the same interests as me, and get involved in campus life. The leadership skills and knowledge I learned from being a member of USC Sumter’s biology club will be helpful in my future career.

Patel, Shrushi  
**Mentor(s): Dr. Ann Ramsdell, Dr. Jacquyline Robichaux**  
**Long-lived Effects of Estrogen Exposure on Mouse Mammary Glands**

Estrogenic exposure is an established breast cancer risk factor, even in women exposed as early as the neonatal period. Despite this link, the mechanisms that cause estrogen-induced breast cancer risk are not well defined. To determine the long-lived effects of neonatal estrogen exposure, we used a mouse model in which neonatal female mice were administered 17-β-estradiol (E2). Following the neonatal E2 treatment, mice were analyzed for subsequent changes during puberty, a time when the rapidly growing mammary gland is vulnerable to perturbations that heighten risk for developing cancer later in life. We found that E2 treatment caused an overall reduction in mammary ductal growth compared to control (vehicle) treated mice. In addition, the attenuated ductal growth occurred in a left-right (L-R) asymmetric pattern, with left glands showing significantly less outgrowth and lack of differentiated structure. To determine if this was due to alterations in mammary epithelial cell differentiation, we used quantitative RT-PCR to analyze expression of genes that correspond to specific mammary epithelial cell subtypes. We also quantified the three major mammary epithelial cell sub-types by flow cytometry. Consistent with the L-R differences in histological outgrowth, we found that E2 treatment caused L-R asymmetric changes in gene expression. This was accompanied by a quantitative increase in the undifferentiated mammary stem cell population, with a concomitant decrease in the myoepithelial and luminal cell populations. Together, these findings link estrogen-induced changes in mammary cell lineages, primarily the stem cell component, with heightened breast cancer risk. Furthermore, these results indicate that left versus right mammary glands have differential response to estrogen exposure, which raises the possibility that human breast tissues and tumors may have L-R differences in response to endocrine-based therapies that are currently used in breast cancer prevention and treatment.
Patioilo, Michaela  
Mentor(s): Dr. Chris Rorden, Dr. Mike McCall  
The Effect of Multiple Concussions on Cognitive Performance in Athletes  

Among existing concussion and mild traumatic brain injury literature, there is a significant lack of data regarding how having at least one prior concussion affects cognitive performance (Collins et al., 1999). While some previous studies already highlight the negative effects after concussion, many of these studies are five or more years old. The objective of the present study is to assess whether a relationship exists between a history of concussion(s) and cognitive performance on a set of given tasks. In addition, this study aims to fill part of the gap in updated cognitive data post-concussion. Data collection will include an online self-report survey about participants’ health, sports, and concussion history, and a three-part cognitive assessment battery. This assessment involves a working memory test, a decision-making test, and a response inhibition test. By utilizing several different cognitive assessments, this study will address multiple aspects of cognition and identify performance areas affected by concussion. Finding an inverse relationship between the number of previous concussions and cognitive performance would be significant in the field of sports neuropsychology. Results that support the hypothesis that multiple concussions negatively influence cognitive performance would provide support for the vital need to increase concussion research to develop precautions and rehabilitative measures to minimize the effect of concussions on athletes.

Pautz, Kathryn  
Mentor(s): Dr. Hilary Lichterman  
An Educational Experience Abroad: Building a School in Nicaragua  

Throughout my time at the University of South Carolina I have been provided many opportunities to participate in meaningful, beyond the classroom experiences as well as within the classroom moments that have allowed me to cultivate my passion for education, while simultaneously developing a strong sense of purpose and self. I have also seen success and growth with my coursework through my within the classroom experiences. I am pursuing the Graduation with Leadership Distinction in Professional and Civic Engagement. My presentation will focus on my experience beyond the classroom and beyond the border, the trip I took to Nicaragua to build a school. I will also focus on the importance of Educational opportunities on a global scale. Through being involved in the Intramural Sports Program as a Supervisor, a member of Gamma Phi Beta Sorority, and pursuing a degree in Middle Level Education, I have been faced with continuous learning and educational opportunities. With these experiences, I was pushed and taken out of my comfort zone. In doing so I developed a deeper understanding and appreciation for education. Due to my experiences as a student and student teacher in the College of Education, combined with my involvement in my sorority, and as an Intramural Sports Supervisor, I feel well prepared to educate, inspire and mold our future generation.

Paxton, Mairead  
Mentor(s): Dr. Magdelena Grudzinski-Hall  
Dance Marathon: Dancing with a Purpose  

Dance Marathon has played a key role in my growth as person during my time at the University of South Carolina. Dance Marathon is the largest student run organization at USC that raises money for the local Children’s Miracle Network Palmetto Health Children’s Hospital located in Columbia, SC. Dance Marathon funds the Child Life program, which makes the hospital stay more enjoyable for both the children and their parents. During my freshman year, I signed up for the 24-hour Dance Marathon because I needed service hours and had heard that DM was an amazing experience but I never thought one organization could change my entire life. Becoming a part of the USC Dance Marathon family taught me how to be a leader, how to be selfless and give back to others, and it taught me to always push the limits and strive for the best. As a Team Captain and a staff member, I have gained the experience of working with over 100 diverse people at one time and effectively communicating with them while also working diligently to get everyone prepared for events during the year as well as main event. Most importantly, Dance Marathon has allowed me to show my passion for an organization while spreading the passion to others. My presentation will discuss how being in this student organization has impacted my experience at USC and has made me a better person by allowing me to be a leader and pushing me to make a difference in the world.
**Payero, Lisette**  
**Mentor(s): Dr. C. Nathan Hancock**  
**Determining the role of homologous recombination in replicative transposition of mPing**

Transposable elements are mobile segments of DNA that make up a large portion of plant genomes. Class II transposable elements use a “cut and paste” mechanism in which the element is excised and reinserted elsewhere in the genome, making them powerful agents in genome evolution. One of these elements, mPing has high transposition activity and despite the fact that mPing utilizes a “cut and paste” mechanism, its copy number has been shown to increase over generations, suggesting the presence of a replicative transposition mechanism. This experiment will test if homologous recombination (HR) repair, a mechanism in which homologous sequences from elsewhere are used to repair double strand breaks, repairs mPing excision sites with an mPing containing homologous sequence. We measured repair of mPing excision sites in yeast using a reporter system in which mPing disrupts the ADE2 gene, preventing cell growth until excision of mPing and subsequent repair of the ADE2 gene. Previous results showed that ADE2 restoration was higher in haploid cells than in diploid cells, suggesting that HR repair may be occurring in the diploids. To confirm the role of HR repair, we are performing transposition assays in HR deficient strains created by knocking out the rad51 gene. We predict that in the absence of HR repair we will see equal restoration of ADE2 function in the haploid and diploid strains. If we can confirm that HR repair is occurring, we will attempt to directly identify cases of replicative transposition by analyzing mPing copy number in our strains.

**Peacock, Tiffany**  
**Mentor(s): Dr. Kimberly Simmons**  
**African American Hair and Identity Analyzing the Natural Hair Movement and How African American Women View Black Hairstyles in 2017**

An identity and cultural aspect that has been unconquered territory to most African Americans today is the physical representation of African Hair. Throughout history, African American women have been pressured to assimilate to European styles of beauty by straightening their kinky-coily hair textures through chemical straightening, heating tools, or adopting protective styles such as wigs, weaves, braids, or twists. Various styles of altering the natural appearance of African hair have been created because the natural appearance or maintenance of African kinky-coily textures are discriminated against in American mainstream society. Often called ugly, unruly, and “unprofessional”; African hair textures are viewed as another aspect of African Americans which “need to be tamed” (Riggs, 1987).

Currently within the 21st century, African American women have been challenging the stereotypes and limitations of who or what defines beauty. More African American women are beginning to cut off their relaxed tresses and starting anew with the natural roots that were inherited from their African descendants. Stemming from the Black Power and Black is Beautiful movement and new waves within the Feminist movement, African American women are no longer accepting or tolerating how another culture will define their identity. By altering the natural kinky-coily texture for straight and looser hair styles, African American women were erasing their identities through self-hate techniques. With the Natural Hair Movement, Black women are embracing their identity and their natural hair appearance. An individual’s choice of hair style is symbolic and can be interpreted as a cultural symbol among all African Americans and minorities or color (Simmons, 2011).
Pease, Madison  
**Mentor(s):** Ms. Lisa Camp  
**University of South Carolina Pi Chi: Impacting More Lives Than One**

The Greek symbols of Pi Chi, on paper, are nothing more than that: letters. Although to the twenty-nine women that I lead and guided through sorority recruitment, I was a role model. Throughout this highly competitive leadership role, these women managed to shape me into the person I am today. I applied for this position because I felt that my part in the events that are sorority rush were not meaningful enough; I wanted to challenge myself and take a step out of my comfort zone. By doing so, it opened my eyes to the many other amazing people on this campus. Being involved in an organization like Greek life can make ones world seem small; we often tend to forget that there is a whole other student body beyond the brick gates that lead to the Greek Village. I had the chance to be inspired by other members of other organizations and not rely on what I was familiar with. While this was not easy, it taught me the importance of diversity. Being a Pi Chi meant I was not only representing the entire Greek community, but the University as a whole. My peers and I can all be associated with different groups and organizations, but still remain connected as Carolinians. Having been a Pi Chi will help me in accomplishing my many goals and aspirations in life by taking the countless lessons I learned about leadership and diversification, and applying them to my career after USC. The gratification and respect I have for my former Pi Chi sisters and the organization is unspeakable. The impact this role had on me will stay with me forever and continue to help me flourish and grow.

Peluso, Alexandra  
**Mentor(s):** Dr. Justin Moore, Dr. Michael Beets, Ms. Camelia Singletary, Dr. Glenn Weaver, Dr. Collin Webster  
**Implementation and Evaluation of Classroom Activity Breaks to Increase Physical Activity in Youth: Be a Champion!**

**PURPOSE:** As part of a larger study (Be a Champion!) to develop innovative strategies for the implementation of a comprehensive school physical activity program to increase all-of-day PA, the primary aim of this study was to determine the level of implementation of classroom-based physical activity (PA) opportunities by school-based implementation teams and associated changes in youth PA. A secondary aim was to determine the feasibility of direct observation strategies to capture these changes.  
**METHODS:** Five elementary schools (3 intervention/2 control) in a rural school district in central South Carolina participated in Be a Champion! Three intervention schools’ implementation teams developed action plans that included steps to increase classroom-based activity during the spring of 2016. A series of one-hour classroom observations were conducted in a stratified sample of classrooms across the five schools (min n=20 observations/school) utilizing the System for Observing Play and Leisure Activity in Youth (SOPLAY) and the System for Observing Student Movement in Academic Routines and Transitions (SOSMART).  
**RESULTS:** Overall, the direct observation evaluation strategy proved feasible. The results of the observation indicated considerable variability in the planning, implementation, and impact of the classroom focused activities which varied by classroom. Changes in PA were similarly variable within and between classrooms.  
**CONCLUSIONS:** The results of the present investigation suggest that a direct observation strategy can be employed to evaluate classroom-based PA promotion strategies, but that implementation by school-based implementation teams will vary by school and classroom. Strategies to increase the dose and fidelity of classroom-based PA strategies are implemented are under development.

Supported by a grant from the National Institute of Health (R21HL121692) and a Magellan Scholarship Award from the University of South Carolina.

Perez, Adrian  
**Mentor(s):** Dr. Jeff Dudycha  
**Assessing Visual Variation in Daphnia as a Result of Disparity in Eye Sizes**

Daphnia, as a research system, provide the opportunity to study the ecology of an organism at all levels—from genes to morphology to behavior. In the field of visual research, the Daphnia eye has been well characterized structurally and the next step is to bridge the gap between eye morphology and visual function so that we can build an understanding of how Daphnia use their vision to respond to their environment. The motion detection capabilities of Daphnia can be quantified in the lab using a visually mediated behavior known as the optomotor response. Motion detection can play a role in many of the essential behaviors of an organism, such as predator avoidance, mate detection, or foraging. Understanding interspecific variation of visual capabilities can provide insight into the different functional roles for vision in Daphnia species in nature.
Petrilli, Audrey  
Mentor(s): Prof. Theresa Harrison  
Leading For Others, Learning For Myself

To me, hospitality encompasses the ability to serve and enrich the lives of others through leading and loving. While studying Hospitality Management at the University of South Carolina I’ve had the opportunity to connect my extra-curricular activities and professional experience to skills I have learned within in the classroom. Using the knowledge from several analysis tools, personality profile assessments, and models in my coursework allowed me grow into a confident leader of the Beta Zeta Chapter of Kappa Delta. From the moment I joined Kappa Delta I fell in love with the members, the sense of community, and the future opportunities I knew this organization would bring me. My strong love for KD is what drove me to become a leader. As the Vice President of Community Service I had the ability to not only serve my organization, community, and constituents, but also myself. Having the opportunity to lead 400 college women in so many different ways developed me into the person I am today. The daily responsibilities associated with VP-CS parallel with the responsibilities of a professional leader, both requiring constant community outreach, time management, resourcefulness, and passion for leading others. My love for Kappa Delta will continue to grow stronger along with my love of leading hospitably as I continue to lead into my professional career.

Pettit, Elizabeth  
Mentor(s): Mrs. Asheley Schryer  
My Life-changing Summer as a Medical Intern at The Center for Birds of Prey

This past summer 2016, I served as a medical intern for the Center for Birds of Prey (CBOP) in Awendaw, South Carolina, which is located about 30 minutes north of Charleston. Since its founding in 1991, the CBOP is a non-profit public education and wild raptor and shore bird rehabilitation center that has treated over 7,000 birds in the past 25 years. As a medical intern, I worked five days a week learning about various husbandry and medical-related tasks, such as performing physical exams on intake, proper feeding and medical dosage techniques, administration of fluids and intravenous medications, carrying out blood and fecal tests, and analyzing X-rays for broken bones. As a pre-veterinary student, this experience was essential for me in further understanding the different aspects of animal care and veterinary medicine. Through this internship, I learned that I have a passion for caring for wildlife and that I wish to pursue this as a labor of love outside of my future veterinary career as a small animal orthopedic surgeon. My time at the CBOP was one of the most fulfilling times of my life, as I felt that I was truly making a difference in the world. The community and volunteer support surrounding the center was astounding, and I hope to continue supporting and working with the amazing employees, volunteers, and birds in the future.

Phillips, Victor  
Mentor(s): Mr. Ryan Lloyd  
Building Relationships

Everyone's college experience is different. In order to learn about the hidden aspects of a college student, you have to look deeper than what stereotypes of college portray. By ignoring the holistic personality of students, leaders can limit team performance. As a candidate for Graduation with Leadership Distinction in the Professional and Civic Engagement pathway, I want to convey the importance of building relationships. Throughout my experience, I have participated in impactful, beyond-the-classroom experiences that have helped cultivate my leadership skills while mastering the art of having authority without being authoritative. Specifically, my involvement as a Peer Tutor and a Program Assistant and Mentor helped me understand how to make education accessible to everyone. My position as a Peer Tutor was influential in developing my communication skills, working effectively on a team, and perceiving a vastly diverse group of people. Consequently, my experience is one of individual discovery, reflection, and introspection which I hope inspires future leaders.
Pineda, Guillermo
Mentor(s): Dr. Sofia Lizarraga
Modeling gene-environment interaction in autism-spectrum disorders with stem cell technology

Authors: Guillermo D. Pineda, Nick Marinelli, Pankaj Ghate, Sofia B. Lizarraga

Autism spectrum disorders (ASD) affects 1 in 68 children (Park et al., 2016), is associated with deficits in verbal communication, social behaviors, and the presence of repetitive behaviors. ASD represents a growing public health concern worldwide. The cost of taking care of ASD patients is an average of $1.4 million per individual during their lifetime. Behavioral intervention therapies can help some individuals but are not equally effective in all cases. A large proportion of ASD cases are of indirect genetic etiology; however, the relevance of the gene-environment interaction in the pathogenesis of ASD remains largely understudied. A number of studies point to a role of maternal immune activation in ASD etiology; yet the mechanisms that underlie this correlation are largely unknown. Animal models of maternal immune activation (MIA) exhibit abnormal behaviors reminiscent of ASD (Malkova et al., 2012). The increase in ASD-like behaviors in MIA models is mediated by IL-17A cytokine (Choi et al., 2016). IL-17A is a pro-inflammatory cytokine produced by CD4+T cells (TH17 cells). Despite the available data on the role of inflammation in ASD etiology there is very little known regarding how inflammation affects the development of human neuronal circuitry. We aim to determine the cell autonomous role of neuronal inflammatory mechanisms underlying defects in neuronal connectivity associated with ASD pathology. Our central hypothesis is that increased levels of IL-17A will impair the development of human neuronal connectivity. We are testing this hypothesis by using human stem cell derived neural models (Mariani et al., 2015; Mariani et al., 2012). In particular we are analyzing, the effect of IL-17A in neuronal cell fate determination, neuronal morphogenesis and gene expression in human neurons. We expect that determining the contribution of the different components of the Central Nervous system (CNS) and immune system will allow us to dissect the cellular mechanisms that underlie the role of neuronal inflammation in ASD pathology.

Pishko, Anna
Mentor(s): Dr. Magdalena Grudzinski-Hall
The Value of Community Service, Public Education, and Safer Sex: What I learned in College

My name is Anna Pishko, and I am pursuing a Bachelors of Arts in Public Health. My experience at the University of South Carolina has taught me an innumerable amount of things, but three ideas stand out the most; the importance of the peer education theater, my mental health needs to be a lifelong priority, and where a student grew up will affect the breadth of his/her public education. Join me as I explore these three important ideas through on campus peer leadership, global volunteerism, and a variety of off campus experiences.

Pita, Natalie
Mentor(s): Dr. Gerald McDermott
Argentina’s Trade Policies in the Context of Latin American Populism

This study is a qualitative and quantitative analysis of the trade policies during the Kirchner administrations in Argentina and uses this investigation as a tool for deeper understanding of Latin American populism. This research analyzes how the Kirchner trade policies continue the model set by former populist leaders in Argentina or how their policies redefine the definition of populism in Latin America. By examining trade on a level of openness and on a level of strategic versus non-strategic thinking, this research will answer the question of whether or not trade policies give insight into whether or not an administration has populist tendencies. After discussing the evolution of populism in Argentina, the research will use a detailed analysis of trade in order to present a more nuanced understanding of the so-called populism that arose in response to the neoliberalism seen internationally in the 1990s.
**Pita, Natalie**  
**Mentor(s): Mrs. Ashley Schryer**  
**Don’t Cry for Me, Argentina: Lessons from a Semester in Buenos Aires**

Because of my Cuban grandparents, I know firsthand the importance of engaging with people from different nations and understanding people with a variety of perspectives on life. My desire to learn the Spanish language fueled my study abroad in Argentina during the spring semester of my junior year, and I was surprised by how much I fell in love with the country. My courses helped me to understand the relationship between Argentina and the international environment, and I became especially interested in Argentina’s trade policy and how it fits into the international political economy. I will be going to law school next year to pursue international trade law, but I would not be on that path without the lessons I learned during my study abroad trips to Argentina and Spain, as well as during my trips for international case competitions to Canada and Ireland. Being in Argentina and interacting with people who have a culture so different than my own taught me that you cannot really have global mindset without understanding. Global mindset is an active collection of knowledge, meaning it is something that you are constantly building on and adding to. Before studying abroad in Argentina, I thought that if I could replicate the supply and demand graphs my economics teacher drew on the whiteboard, then I would be prepared to go out into the world. But I was missing a very crucial part: the real world is not that simple. I learned how everything I was taught in class fit into a bigger picture during my trips. And finally, I learned that change, especially in the area of law, doesn’t come easily.

**Potter, Kendall**  
**Mentor(s): Dr. Joe Jones**  
**Graduation with Leadership Distinction: Professional and Civic Engagement**

It was important to me that I make the most of my college experience, and throughout my four years here at the University of South Carolina, I believe I have taken full advantage of all leadership opportunities presented to me. Now taking those leadership experiences and compiling them into my e-portfolio for Graduation with Leadership Distinction in Professional and Civic Engagement, I have had time to reflect on the journey I have taken and where it is leading me. I would like the opportunity to share that journey with you. Along the way, I have taken away many key insights that have shaped the way I will conduct myself in my professional career. The main insights that I have highlighted in my portfolio are understanding what people need to grow, presenting information in the best way possible, and that team work really does make the dream work. I have developed the insights by pulling my within-the-classroom knowledge and experience I have gained as a Resident Mentor, Resident Mentor Training Leader, Senior Resident Mentor, Teaching Assistant, and Leadership and Staff Development Intern. My journey was not always clear or easy, but it was all worth it to get to where I am today.

**Poupore, Nicolas**  
**Mentor(s): Dr. Abigail Hogan, Dr. Jane Roberts**  
**Early Behavioral and Physiological Predictors of Autism in 12-month-old Siblings of Children with Autism**

Autism spectrum disorder (ASD) is neurodevelopmental disorder defined by social-communicative deficits and repetitive behaviors. With many studies proving the importance of early intervention for ASD, identifying behavioral and physiological markers of ASD may improve early identification of ASD and provide insights into the neurobiological mechanisms contributing to the disorder. This study investigated whether 12-month-old infant siblings of children with ASD (ASIBs) exhibited different profiles on a behavioral screening measure for ASD (the Autism Observation Scale for Infants (AOSI)) or atypical physiological regulation, as indexed by Respiratory Sinus Arrhythmia (RSA). The ASIBs were separated into two separate groups based on their 24-month ASD diagnostic outcome and compared to Low-Risk Controls (LRCs). One-way Analyses of Variance (ANOVAs) were employed to investigate group differences in AOSI scores and physiological regulation. For AOSI Total Score and for AOSI Marker Scores, a significant effect of group emerged, $F(2, 52) > 5.74$, $p < .01$. The groups did not differ on baseline RSA or RSA during the AOSI. To investigate RSA suppression during the AOSI (baseline minus AOSI RSA), paired-samples were run for the three groups. The ASIB-NonASD ($t(8) = 2.27$, $p = .05$) and LRC groups ($t(18) = 2.62$, $p < .05$) exhibited RSA suppression, but the ASIB-ASD group did not, $t(4) = 0.00$, $p = 1.00$. These results suggest that ASIBs diagnosed with ASD at 24 months have atypical behavioral profiles and physiological regulation at 12 months, and ASIBs not diagnosed with ASD also have profiles that are distinct from LRCs.
Being a Service Saturday Site Leader since my sophomore year at the University of South Carolina, I have been able to make a significant impact in both the USC community and the greater Columbia community. For my sophomore and junior years, my main impacts were the service at the various community service agencies throughout Columbia and the discussions with the volunteers on why service is important, and what their next steps could be in college to do more volunteering and service. Before my senior year, I was approached by a member of the Leadership and Service Center and asked how Service Saturday could be improved for the Site Leaders, volunteers, and community partners. After teaming up with a peer, our goals to improve Service Saturday were to make it more student-run, increase Site Leader accountability and comradery, and expand the idea of service for the Site Leaders. To achieve these goals, the position Senior Site Leader was created to both manage the Site Leaders and develop new ideas to further improve Service Saturday. To help boost accountability and the understanding of service, we created Site Leader Seminars, which are monthly discussions about topics ranging from diversity to poverty to altruism. I hope that the new Senior Site Leaders for next year will continue to make Service Saturday more student run and be more innovative to make the University of South Carolina even more community service oriented and have an even larger impact on the Columbia community.

Prebish, Steven
Mentor(s): Mrs. Anna Oswald-Hensley
Steven Prebish; GLD Abstract

University Ambassador
I was selected to serve as an ambassador for the University of South Carolina at Sumter in the spring of 2016. I am currently still working as an ambassador for the University today. As a student ambassador I have done various things to help better USC Sumter, and I truly think without University Ambassadors the school would not function as it does. The ambassadors run new student orientations, and in my opinion are the face of USC Sumter for new students. During these orientations it is our duty to show the new students around the campus and make them feel welcome. It is also our job to know the history of the campus, and be prepared to answer any questions. In a way we are a public figure as ambassadors, and the first new people the new students will meet. As a public relations major, my time spent as an ambassador has provided me with the opportunity to be in the public and promote my campus. In the future in the field of PR I will do a great deal of networking, and promoting the business I work for. It will be my job to make whatever company I work for look its best to the public eye, and being an ambassador has really shaped me to do that to the best of my ability.

Student Government
In my second semester at USC Sumter, I was elected to serve as the President of the Student Government Association. Since being elected a year ago I have learned a great deal in my time as SGA President. Working on student government has helped me in my ability to network and deal with problems. In any line of work one will always have to deal with people, and will always run into issues. In my time as President of Student Government, I have networked with state senators, legislators, and made many connections that could potentially benefit me in life. Making connections and networking is very important, and I have had the opportunity to do a great deal of networking because of my role as Student Body President. I have also learned how to deal with problems. In my future career, I plan to be dealing with people daily, and when dealing with people you are bound to run into some problems. As the student body president, students come to me with their issues, and expect me to be a voice for them. I deal with issues around campus and use opinions from students to help better the University of South Carolina at Sumter.
Printz, Allison  
Mentor(s): Mr. Alex Blauvelt, Dr. Charles Pierce  
Crossing Borders to Accommodation: A reflection on improving Intercultural Exchange Programs on College Campuses

More and more international students are choosing to attend colleges in the United States, and, as a result, more obvious issues with cultural differences both socially and educationally are being realized. With my experience on campus through experiences such as being a Career Center Ambassador, Orientation Leader, and Student Success Peer Consultant, I have had the opportunity to interact with International students as a resource. These opportunities, along with courses I have taken for my business degree, provided me useful insights that could be beneficial in improving intercultural programs and utilization of resources. I plan to attend a Graduate School for Higher Education, Student Affairs, and therefore I am pursuing Graduation with Leadership in Professional and Civic Engagement focusing on improving international students’ experiences that could extend into my post undergraduate career. With insights I’ve gained during my undergraduate experience, I could help international students feel more at home, stay focused on their goals through self-regulation, and help both domestic and international students be more friendly and accepting of diversity.

Pritts, Jill  
Co-Presenter(s): Allissa Desloge, Emily Babb, Claire Folk, Quinn Buss  
Mentor(s): Dr. Sarah Rothenberg  
Climate Change: The Influence of Halocarbons on Human Health

With growing environmental and economic implications, there is a need for increased education and awareness regarding climate change and the human role in reducing greenhouse gases. In our Global Environmental Health (ENHS/ENVS 323) course, our class was tasked with creating an educational presentation regarding the effects of Halocarbons on climate and human health. As part of the service-learning component of this course, we will present our poster on April 13th at the EdVenture museum in order to educate children about the causes of climate change and the significance of these changes on human and environmental health. Our presentation focuses on how halocarbons impact climate change, the ways in which human life is directly impacted, and steps that can be taken to reduce the quantity of halocarbons in the environment. Halocarbons are one of the most potent greenhouse gases and contribute significantly to the destruction of the stratospheric ozone layer, which permits more UV radiation to reach the Earth's surface. Increased UV radiation can lead to negative health outcomes including higher prevalence of skin cancer and corneal damage. By educating young students (K-12) in the community, we hope to increase their understanding of the role of halocarbons and greenhouse gases in climate change. This will influence their decisions in using aerosols and other producers of halocarbons.

Provax, Nicole - Supervisor(s): , , , - Mentor(s): Mrs. Lisa Camp, , , , - The Leaders of Tomorrow are the Students of Today -- This presentation will explore how the concepts I learned within the classroom helped to enhance my leadership abilities outside the classroom. At the University of South Carolina, I have had the opportunity to work in the Student Success Center as a Supplemental Instruction Leader for MATH122 for five semesters and as a Peer Assistant Mentor for one semester. I have also captained a mock trial team for two years and worked as a volunteer coordinator for Amigos del buen Samaritano. I attribute my success and continual improvements in these positions to concepts that I have learned in my courses, which I have actively applied to these roles. I have learned that reflection and silence can be more powerful than words, perseverance is necessary to succeed, and two heads are better than one. These lessons have complemented my leadership experiences and have challenged me to become a better leader.
Przywara, Sarah  
Mentor(s): Dr. Adam Pazda  
Red clothing leads to blaming the victim of sexual assault

Recent research has shown that clothing color can influence social perceptions. For example, men interpret red clothing on a woman as a signal of sexual interest and availability, regardless of the woman's actual sexual intentions. The present research investigated whether clothing color influences perceptions of culpability for victims and perpetrators of sexual assault. Participants were shown scenarios depicting a crime, accompanied by photographs of the victim and perpetrator. They were asked to rate how much responsibility the victim of the crime had, then they recommended a prison sentence for the perpetrator. Results indicated that female victims of date rape were blamed more for the incident if they were wearing red (relative to blue) clothing. Participants also assigned less jail time to the rapist when his victim was wearing red. This has important real-world implications regarding how clothing color can influence person perception.

Puckett, Daniel  
Mentor(s): Dr. Amanda Schwartz  
Variability in Research Findings on the Effectiveness of Test Suites

Code coverage criteria are commonly used to determine the adequacy of a test suite. However, studies investigating code coverage and fault-finding capabilities have mixed results. Some studies have shown generating test suites to satisfy coverage criteria has a positive effect on finding faults, while other studies do not. These mixed results indicate there are unknown factors that affect the ability of test suites satisfying coverage criteria to find faults. In order to improve the fault-finding capabilities of test suites, it is essential to understand what factors are causing these mixed results. Our research investigated one possible source of variation in the results observed: fault type. Specifically, we studied 45 different types of faults and evaluated how effectively test suites with high coverage percentages were able to detect each type of fault. In our research we identify four particular types of faults that, with statistical significance, were found less frequently than other faults. We also identify two fault types that were found more frequently. The results of our study advance the understanding of the relationship between code coverage and fault-finding effectiveness and provide specific areas to target in future research to improve the effectiveness of automated test suites.

Puckett, Sara  
Co-Presenter(s): Matthew Haslinger  
Mentor(s): Dr. Elainie Clanton Harpine, Dr. Adam Pazda, Dr. William Harpine  
Teaching Phonemic Awareness Improved Reading, Spelling, and Comprehension

The purpose of this study was to see if reading, spelling, and overall reading comprehension among at-risk first through third graders increases when intervention is made at this early elementary age. The intervention occurred through a group-centered after-school program that the children attended twice a week. Data was collected at pre-test, mid-point, and post-test. The data supports the hypothesis, showing the child's interest levels and ability to read more difficult words and to read more complex oral passages, with increased comprehension.
**Pye, Sarah**  
**Mentor(s): Dr. Maksymilian Chruszcz**  
**Structural and biochemical characterization of 4-hydroxy-tetrahydrodipicolinate reductase for development of antimicrobial compounds**

Neisseria gonorrhoea, the second most leading cause of sexually transmitted diseases, has developed resistance to all antibiotics used in its treatment. This prioritizes the need to develop new drugs and identify novel drug targets to combat this pathogen. Our research group aims to identify new drug targets and potential inhibitors of the bacterium using a combination of biochemical and structural approaches. We focus on the lysine biosynthesis pathway mainly because it is essential in microbes but there is no homologous pathway in mammals. Bacteria use lysine (or meso-diaminopimelate) to crosslink the peptidoglycan monomers in the bacterial cell wall. We hypothesize that disrupting lysine synthesis will induce defects in the bacterial wall similar to those caused by \( \beta \)-lactam antibiotics. 4-hydroxy-tetrahydrodipicolinate reductase (DapB) is one of the essential enzymes involved in the pathway. This study describes expression and purification of DapB from Neisseria gonorrhoea. Further, crystallization and structural studies for DapB are described.

**Raghava, Narayan**  
**Mentor(s): Dr. Swapan Ray**  
**Retinoid for protection of astroglial cells from oxidative stress induced apoptosis**

Many neurodegenerative diseases are associated with oxidative stress in the central nervous system (CNS). The oxidative stress, which cause the CNS cells undergo apoptosis, originates from reactive oxygen species such as the hydroxyl radical (\( \cdot \)OH), hydrogen peroxide (H\(_2\)O\(_2\)), and super oxide (O\(_2\)\(^{\cdot -}\)). The prevention of oxidative stress in the CNS cells including the astroglial cells is a key step in treatment neurodegenerative diseases and injuries. Retinoids, which are key chemical derivatives of Vitamin A, play many key roles in the body such as regulation of cell growth, cell proliferation, and cell differentiation, activation of tumor suppressor genes, induction of apoptosis. Recently, retinoids have been shown to possess neuroprotective capabilities and anti-apoptotic properties, which can be explored to prevent apoptosis in the CNS cells that experience oxidative stress causing significant apoptosis. The purpose of our study is to examine the anti-apoptotic effects of a retinoid, specifically all-trans retinoic acid (ATRA), on C6 astroglial cells that experienced oxidative stress from hydrogen peroxide (H\(_2\)O\(_2\)). In order to achieve this goal, different dosages (e.g., 50, 100, 150, and 200 \( \mu \)M) of hydrogen peroxide will be applied to C6 astroglial cells to cause oxidative stress and induction of apoptosis. Immediately, different dosages (e.g., 5, 10, 20, and 40 \( \mu \)M) of ATRA will be added to the cell culture medium to prevent induction of apoptosis in these now oxidative stressed cells. Decrease in apoptosis in the C6 astroglial cells under oxidative stress would indicate the capabilities of ATRA as potential therapy against neurodegenerative disease. We are currently conducting the experiments and looking forward to displaying our results of ATRA on decreasing apoptosis in C6 astroglial cells under oxidative stress.

**Rakowski, Brooke**  
**Co-Presenter(s): Taylor Bradley, Hunter Harley**  
**Mentor(s): Mr. Ryan Patterson**  
**Reforming Per Pupil Spending in American Public Schools Using the Social Change Model of Leadership**

This proposal and research looks at the discrepancies and disparages caused by inequitable per pupil spending in schools across America. The goal is to develop a solution to better equalize per pupil spending in areas of low income students to give them a fair education. This has been done by examining prior Court Cases such as San Antonio Independent School District v. Rodriguez and Serrano v. Priest which looked to take action against schools financing methods being in accord with local district wealth and find a solution that would allow for equal opportunity for all students. These cases set the precedent that education was not a guaranteed right of the constitution but rather an issue delegated to the individual states, therefore making national regulations for funding near difficult if not impossible shown by a piece of Michigan Legislation that was hoped to become the standard for reform of inequitable per pupil spending. By identifying the difficulty in creating national regulations, we attempted to find a solution that would be fair and optimally provide equal opportunity for all students.
Ramirez, Miranda  
Co-Presenter(s): Lauren Stiegler  
Mentor(s): Dr. Melanie Palomares  
**Developmental trajectory of quantity estimation**

We assessed how numerical estimation changed across development. We briefly presented dots (200 ms) to participants, 6-7, 8-9, 10-12 and >18 years of age, and asked them to estimate the number of dots. In the ones condition the dots ranged from 0-10. In the tens condition, the dots ranged from 0-100 in increments of 10. The results showed that the enumeration accuracy of children 6-7 years of age were low even at estimating numbers 1-10. While the data, enumeration accuracies of 10-12 year olds were not adult-like for estimating by tens. These suggest that estimation of quantity has a late maturation which remains inaccurate even in adulthood.

Ramsay, Frances  
Mentor(s): Mr. Alex Blauvelt  
**DisAbility: Working with and Becoming an Advocate for Children with Disabilities**

The Center for Courageous Kids is an organization in Scottsville, Kentucky where each summer, children with various disabilities and conditions have the opportunity to spend a week at camp at no cost to their parents. Sessions vary from oncology and hemophilia to muscular dystrophy, diabetes, physical disability, autism and more. I spent the summers of 2015 and 2016 working on staff, where I did everything from typical counselor care to showering, feeding, changing, and transferring children, depending on the week. This year, I have been working on my Senior Thesis, “DisAbility” which includes traditional research combined with stories from children and families that I have worked with, as well as photographs to demonstrate parts of the paper. Working at CCK and spending my senior year researching about similar populations has allowed me to increase my awareness for the disabled population, while working to become an active advocate. I have learned that “healthcare exists beyond the four walls of a hospital” both through working at CCK and through my paper. I want others to know how capable these children are, and that taking the time to work with them and give them “normal” experiences has the potential to boost their confidence and impact them for the rest of their life. I want to move forward as a role model for those who are unsure of how to interact with a child who is immobile or non-verbal, to demonstrate how our similarities far outweigh our differences.

Randall, Clarie  
Mentor(s): Mr. Ryan Lloyd  
**Young, Southern, and Queer: A Coming Out Process**

Coming out is not an instance; it’s a process, and it lasts a lifetime. For me, the beginning of this process coincided with becoming an LGBT Peer Advocate in the Office of Multicultural Student Affairs (OMSA) at the end of my first year at the University of South Carolina and is now part of my everyday life. This presentation will reflect on my most formative collegiate experiences with OMSA, as a member and leader within multiple progressive, LGBTQ-friendly/focused student organizations, and through a variety of queer events, discoveries, and incidences along the way. Within these spaces, not only have I come to more fully grasp the depth of the LGBTQ+ community and my place within it, but also now understand a multitude of other communities and their intersecting natures. By openly identifying as queer, I have facilitated the personal and radical acceptance of other aspects of my identity as well, namely southern-ness, a trait I long rejected even as a life-long Southerner. Being out in the South is not always (or usually) easy; especially in a state known for flying the Confederate flag at the state house until 2015 and with no laws to protect against hate crimes. However, in discovering the true depth and breadth of Southern culture, removed from stereotypes and internalized prejudices, I have found reason to explore and reclaim this identity, as well as reclaim space as a queer Southerner. Join me as I discuss what it means to be queer, Southern, and content with both of those identities.
Ransom, Gray  
**Mentor(s):** Prof. Hilary Lichterman  
**Applying Peer Tutoring skills to build greater professional leadership abilities**

Generally, a peer leader role is defined by the ability to impart knowledge and guidance to your fellow peers. As a Peer Tutor and Program Assistant for the Student Success Center, I have had the opportunity to deliver my knowledge of the subjects of Chemistry and Biology to people in desperate need of help and also be a mentor to my fellow tutors. In return, I have received numerous lessons on how to effectively communicate to increase productivity, how to receive criticisms and use them to your advantage, and that people from every different background have common threads that tie us all together as human beings. These bits of knowledge have been presented to me in various forms throughout my experience as peer leader, but they have all contributed to me improving myself as a leader of others. The purpose of my presentation is to display my experiences so that they may provide an established platform for other leaders or potential leaders to use to expand their abilities.

Rapp, Sydney  
**Mentor(s):** Dr. David Reisman  
**Mechanism of Wrap53 Promoter Induction in Response to DNA Damage**

In response to DNA damage, the p53 protein functions as a transcription factor for many different genes, allowing p53 to control the cell by regulating both cell cycle arrest and apoptosis. An antisense gene to p53, called Wrap53, is located on the complementary strand of DNA to the p53 gene. Studies have determined that Wrap53 mRNA regulates p53 expression by binding to the 5’ untranslated region of the p53 mRNA transcript (Mahmoudi et al. 2009). This binding increases the levels of active p53 in the cell, which allows the cell to respond to DNA damage. It has also been determined that treatment with cisplatinum, a DNA damaging agent, increases the level of the Wrap53 mRNA transcript. This increased expression induces p53-dependent apoptosis in cisplatinum-treated human U2OS cells (Yuan et al. 2011). My goal is to determine the mechanism of the Wrap53 promoter induction in response to DNA damage through research into the transcriptional regulation of the Wrap53 gene. The experiments we have been carrying out use a reporter plasmid with the Wrap53 promoter cloned upstream of a luciferase gene. This vector has been introduced into cells and used to determine how DNA damaging agents affect the activity of the Wrap53 promoter.

Thus far in my research, I have accomplished the following: cloned the WRAP promoter into the reporter vector, transfected the Wrap53 luciferase vector into U2OS cells (wild-type p53), HT116 KO cells (p53 null), and T98G cells (mutant p53) and treated all three types with DNA damaging agents. These agents include UV light, Cisplatinum, Doxorubicin, Etopside, Camptothecin and Actinomycin D. After treatment, the luciferase activity was measured using Bradford and Luciferase Assays. Preliminary results indicate increased activity of the Wrap53 promoter after treatment with the drugs in U2OS cells but not in T98G and HT116 KO cells. This is an important finding because the T98G cells have mutated p53 and the HT116 KO cells do not contain functional p53 at all, indicating a possible role for p53 in regulating WRAP expression. None of the cells showed increased activity when treated with UV light. This increased activity of Wrap53 in response to DNA damage supports the hypothesis that the Wrap53 promoter is transcriptionally regulated in response to DNA damage.
Rauch, Leisa  
Mentor(s): Dr. Sarah Miller  
Discovering a Hidden Passion

As a non-traditional student returning to college, these past two years have allowed many opportunities of self-discovery and self-reflection on who I really am and what I truly desire to accomplish for the future. I have had the opportunity to work as a Student Instructor with the PASS program tutoring Biology 250 and Biology 101 and 102 and as a Science Coach for the Occupational Scholar’s Program, OSP. I also worked as a lab assistant for Biology 250 and volunteered during the summer of 2016 as a tutor for the Biology 250 summer class. I have discovered that through perseverance, balance, and maintaining a teachable attitude, I have been able to help students adapt new study strategies and skills to help them become more successful in some of the more challenging science classes. As I have worked with students and reflected back on my own classroom experiences, I have discovered a hidden passion for teaching students at the college level along with my desire to become a Nurse Practitioner. Armed with the knowledge and experience I have gained over the past several years in the workplace, I have been able to incorporate these skills in my personal ability to excel and grow as a student while encouraging other students as they journey toward their chosen pathways. The encouragement of faculty at USC Salkehatchie has helped me to discover that I can be a successful leader and motivator to my fellow classmates, and have given me a renewed confidence to pursue my goals. Had I not participated with any of these opportunities to tutor, I would not have discovered this hidden passion for teaching and the desire to become a Nursing Professor.

Ray, Carey  
Mentor(s): Ms. Bethany Naser, Ms. Jourdan Harmon  
Servant Leadership: Vulnerability Leads to Growth

As an out-of-state student, coming to a large university, I was expecting to make a few new friends, but I never would have imagined I would be where I am today. My various leadership roles on campus introduced me to people I would have never met otherwise. My most significant experience was working with The Office of New Student Orientation. The wide variety of challenging experiences I faced during my time with this office, showed me that we are not all perfect, and our obstacles shape and define us. This led me to the realization that vulnerability in leadership, and in life, leads to connections and development. Being open about the challenges we face, and how we overcome them, also a door to open for others to do the same. The ultimate sign of servant leadership, is being vulnerable with those you serve.

Reed, Spencer  
Co-Presenter(s): Jennifer Huggins  
Mentor(s): Dr. David Hudgens  
How Local Businesses Connect With Students Through The University

As the city of Columbia continues to expand, and the student body at USC steadily increases, more businesses are drawn to this unique city. One aspect of Columbia that is very interesting is the seemingly perfect balance between small businesses and larger corporation’s presence and involvement in the community. With the progress being made in the local economy, new and developing businesses have realized that their success will be predicated on interaction and engagement with the USC student body. The research that follows discovers how these local businesses connect with students through the university. The advertising and marketing practices of these businesses are examined to discover how locally owned and operated clothing stores, restaurants, and even social delivery apps make the most of their relationship with faculty and students at USC. Furthermore, the significance the profit contributions by students are to their business model will also be examined.
Reid, Mary  
**Mentor(s): Mr. David DeWeil**  
**Growing through Peer Leadership**

My four years at the University of South Carolina has provided me multiple opportunities to grow as a leader and a person in and out of the classroom. When I applied to be a Resident Mentor my freshman year, I did so because I just wanted to stay on campus another year. While clearly this is not the best reason for applying to the position, three years later I have not regretting filling out that application once. Serving as a Resident Mentor has taught me so much about myself and the people I surround myself with. I was able to assist first year students transition to college, many like me who did not know a single person when entering Carolina. As I grew in the position, I took on more roles to help my fellow RMs including becoming a RM Training Leader and serving as President of RM Council. Both of these positions opened my eye to what others in the role were experiencing and what we could do as a collective group to help. As my confidence strengthened, I got more involved becoming a Changing Carolina Peer Leader (CCPL). The position allowed me to work with more Carolinians and educate U101 classes on healthy relationships and what it means to be an accountable bystander. The RM and CCPL role worked extremely well together as I was able to see what my residents were facing and take that into the programs I was planning through student health. Both roles were influential in developing my communication skills, my ability to work on a team, and most importantly they ignited my passion to help others.

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Reid, Christine  
**Mentor(s): Dr. Minsub Shim**  
**The Role of COX2 on Cellular Senescence**

Cellular senescence is a mechanism that arrests the proliferation of cells that are at risk of malignant transformation. However, recent evidence indicates that cellular senescence also plays a role in aging and age-related diseases. Cyclooxygenase-2 (COX2), an inducible isoform of COX, plays a key role in the synthesis of prostaglandins which regulate various physiological processes. Although COX2 is expressed at low or undetectable levels in most normal tissues, the expression of this enzyme is highly induced by various environmental stresses. Increased COX2 expression has also been reported in the tissues of aged humans and mice as well as in age-related diseases. We recently found that transgenic expression of COX2 promotes early-aging in mice. Here, we further explore the role of COX2 in cellular senescence. We found that the primary fibroblasts from COX2 transgenic mice exhibit increased levels of senescence markers. We also found that COX2 expression in normal human fibroblasts is highly induced in response to senescence-inducing stimuli. However, treatment with aspirin, a non-selective COX2 inhibitor, reduced the senescence in normal human fibroblasts induced by doxorubicin, a DNA damaging agent. In addition, doxorubicin-induced senescence was reduced in COX2 knockout mouse embryonic fibroblasts (MEFs) compared to wild-type MEFs. Our study suggests a novel role of COX2 as a mediator of cellular senescence associated with aging and age-related diseases.

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Renfrow, Meghan  
**Mentor(s): Dr. Amber Fallucca**  
**Pediatric Therapy: A Subjective versus Objective Approach to Treatment**

As a senior Exercise Science major, I have taken on a 300-hour internship experience in which I have been able to shadow, assist, and complete projects for various Occupational, Speech and Physical Therapists at a pediatric therapy center called Therapy360. Having known for years that I wanted to pursue a career in therapy, this was the perfect fit for me during my final semester of undergrad. I have been able to consistently observe various patients that come for a large variety of reasons; from developmental and cognitive delays to more severe syndromes and disorders, this opportunity has allowed me to further analyze multiple treatment styles and approaches to each session with every patient. I have learned that while each therapist has their own unique method of interaction with clients, an overarching theme that every staff member utilizes is the benefit of treatment that is molded specifically to the patient at hand. When faced with multiple clients with the same diagnosis, it can be tempting to provide objective and identical treatment methods to each patient; however, I have recognized the significance in attending to all patients in a manner specific to their personal needs, not just their diagnosis. With this patient-specific subjective approach, therapists are able to have far more productive sessions with clients, setting reasonable goals that both push and progress each child's unique development. I plan to apply this knowledge that I have gained through my internship as I take steps toward my own career in the healthcare field.
Renfrow, Malory  
Mentor(s): Dr. Amber Fallucca  
Clinical Experience: Multiple Forms of Therapy Working Together

As a part of my EXSC 444 course, I completed a 300-hour practicum at Vital Energy Wellness and Rehab Center in Lexington, SC. Vital Energy offers Occupational, Physical, Aquatic and other alternative therapies. During my practicum, I observed and assisted physicians in both physical therapy and occupational therapy. I chose this particular internship because it allowed me to see both occupation and physical therapy working together, the two carriers I am interested in. My internship impacted me in a variety of ways, most importantly solidifying my confidence in entering this field as my future profession. My practicum at Vital Energy has been very significant in expanding my knowledge in physical and occupational therapy, as well as many other alternative forms of therapy. The owner of Vital Energy, Hima Dalal, incorporates a large variety of therapy treatments that I have never seen prior to beginning my practicum and that are unique to our site. With role models like the therapists at my practicum, I feel even more confident in why I want to pursue a career in physical therapy. My next step is to carry all the valuable knowledge I have gained from this experience in a outpatient setting and further my experience in an inpatient setting before applying to graduate school for physical therapy. I hope to potentially work in a hospital environment to allow myself to see a different side of therapy, as well as strengthen my depth of understanding in this field before applying to graduate school.

Reszczynski, Olivia  
Mentor(s): Dr. James Carson, Mr. Dennis Fix  
The Role of Ovarian Function and Interleukin 6 in the Regulation of Skeletal Muscle Oxidative Metabolism in Tumor Bearing Mice

Introduction: Cachexia is a complex metabolic syndrome resulting from an underlying disease (cancer) that involves the unintentional loss of bodyweight, including muscle and fat mass. The IL-6 family of cytokines have an established regulatory role in cachectic signaling in several preclinical mouse models. Studies regarding cachexia and IL-6 have largely been conducted in male mice; however, our lab has noted sex differences in the cachexia development and IL-6 response using the ApcMin/+ mouse. Elevated plasma IL-6 in tumor bearing mice increases muscle inflammation and decreases oxidative metabolism. The decrease of muscle oxidative metabolism during cachexia has been established in the male ApcMin/+ mouse model however, very little has been done to examine the role of ovarian function and IL-6 in the regulation of oxidative metabolism in the female.

Purpose: The purpose of this study is to investigate the role of ovarian function and interleukin 6 on the regulation of skeletal muscle oxidative metabolism through overall oxidative capacity, mitochondrial biogenesis and dynamics in tumor bearing mice.

Methods: Female ApcMin/+ mice were divided among four groups: control (n=13), sham+IL-6 overexpression (n=10), OVX-vector (n=10), OVX+IL-6 (n=8). Mice underwent electroporation of an IL-6 overexpression or control vector at 13 week of age. At 18 weeks mice were sacrificed and hind-limb muscles were collected. The tibialis anterior muscle was cryo-sectioned and mounted for H&E staining. Mitochondrial content dynamics were examined by COX assay and western blot.

Results: A main effect of IL-6 increased MHC IIA positive myofibers and decreased myofiber cross sectional area. Ovariectomy increased COX enzyme activity which was attenuated by IL-6 overexpression. Additionally, ovariectomy decreased pgc-1 protein expression. There was also main effect of ovariectomy to increase muscle FIS-1 protein expression independent to IL-6 overexpression. These results suggest a role for ovarian function in the regulation of skeletal muscle oxidative metabolism.
Rhoads, Spencer  
Co-Presenter(s): Nicholas Webster, Parker Brown, Drayton Clutters, Eric Farr  
Mentor(s): Dr. David Cardenas  
Sports Sports Facility Upgrades and the Correlation to Increased Revenue and Attendance

The purpose of this study is to see whether or not upgraded sports facilities lead to higher attendance rates and an overall increase in revenue. The data will be collected through interviews at a University of South Carolina baseball stadium during a game, and through recorded research of stadiums around the country. We will evaluate attendance records before and after facility upgrades to make our conclusions. Through simple random sampling, our interview will target sports fans ages college and up at the baseball game.

Rhodes, Demetrius  
Mentor(s): Dr. Swati DebRoy  
Mathematical Model to Characterize Childhood Obesity in Schools

Nearly 1/3rd of children in the United States are classified overweight or obese. Children with a high body mass index (BMI), an indicator of excess body weight, are more likely than their normal weight counterparts to have insulin resistance, high blood pressure, asthma, depression and poor self-esteem. In addition, obese children are more likely to become obese adults. The burden of obesity and related health conditions varies among different populations. It is more prevalent among minority groups, persons of lower socioeconomic status and residents of rural areas. For nearly a decade, BMI has been measured among elementary and middle school children in Beaufort and Jasper County, SC, and analyzed by race, gender and socio-economic status. This effort has revealed an extremely high rate of obesity, prompting a research effort to understand different aspects of this epidemic and formulate effective interventions to revert the current trend.

In this poster we apply a well-established SIR (susceptible-infected-recovered) differential equation model to childhood obesity data in schools of Beaufort and Jasper County, SC. Obesity has been interpreted as an infection where social influence to attain and maintain a weight status is viewed as an infection. The model is used to estimate infection parameters using the epidemiological data from the schools and quantify aspects of the obesity epidemic in the Lowcountry. We also intend to characterize the prevalence of obesity in different schools based on their overall distribution of race and socio-economic status.

Riggins, Lindsay  
Mentor(s): Mr. Alex Blauvelt  

Throughout my undergraduate career, I have had many incredible opportunities both inside and outside of the classroom. It is through these opportunities that I am able to pursue graduation with leadership distinction on the professional and civic engagement track. I have been able to see how some of the key concepts and theories I have learned in class directly related to my accomplishments in the internships I have had. However, after carefully analyzing these connections, I was able to draw up deeper conclusions between success in not only the retailing industry, and success for life in general. Lastly, I will be explaining how understanding these connections have allowed me to see a problem in our society’s special education system, and how I intend to address this problem in my coming years post graduation. There is a lot to learn from understanding the success of retailing, and I hope to teach you a few of the things success in retail has taught me.
Riley, Timothy  
Mentor(s): Prof. Cheryl Armstead  
Reinterpreting Nocturnal Blood Pressure Functioning among Male Pre-Medical Students

Sleep related dips in BP less than 10%, are referred to as blunted. Blunting has been found to predict adverse cardiovascular events later in life among young adults, particularly minorities. Stress is implicated in blunted BP responses during sleep. We originally assessed the association between nocturnal blood pressure and blunting using a Suntech-II ambulatory monitor (ABPM). Additionally, office manual blood pressure, and laboratory cardiovascular reactivity to a MCAT simulation stressor among male pre-medical students were investigated. Data was originally interpreted using JNC 6 blood pressure (BP) categories. JNC-7/8 categories increased the risk ranges for pre-hypertension and hypertension I-II status. The current research reinterprets our original findings based on JNC-8. Student stress questionnaires were completed by 13 pre-med students, prior to a laboratory office visit. ANCOVAs controlling for age, exercise, BMI by White/Non-white ethnicity were conducted. Post-hoc comparisons were performed. Waking SBP and DBP measures among non-White males showed were significantly more likely to fall within pre-hypertensive ranges. Non-Whites showed significantly more blunted sleep DBP than Whites. Greater lack of financial resources was associated with a higher percentage of abnormal readings during sleep DBP. DBP, but not SBP, reactivity to the MCAT stressor was predictive of office, but not sleep DBP. Our study suggests that JNC-8 ranges should be adapted for the interpretation of 24-hour ABPM in high stress risk populations, and provides evidence that abnormal DBP sleep blunting, but not SBP, may be implicated as a risk factor for pre-hypertensive status among minority pre-medical students. Study limitations are considered.

Ringham, Karna  
Mentor(s): Dr. Jeff Twiss, Ms. Elizabeth Thames  
Post-transcriptional regulatory mechanisms for neuronal ARE mRNAs

Development and regeneration of neural connections in the brain, spinal cord, and peripheral nervous system is determined by a delicate balance in the timing of gene expression. Over the past three decades there has been an increasing recognition of regulatory steps between when an mRNA is generated and when it is translated into protein; these 'post-transcriptional' mechanisms are critical for regulating gene expression in neurons. Data from our and the Perrone-Bizzozero lab have uncovered a competitive relationship between KH-type splicing regulatory protein (KSRP) and HuD for determining the survival of mRNAs with 3'UTR AU rich elements (ARE) during brain development (Bird et al., 2013). Interestingly, Neuritin (nrn1) and Growth-associated protein 43 (Gap-43) mRNAs compete with one another for binding to HuD. On closer inspection of this interaction, we found that Nrn1 ARE binds to HuD with a higher affinity than does Gap-43 ARE. However, Gap-43 is expressed at higher levels during development and after injury, which allows it to out compete Nrn1 for binding to HuD in vivo. This interaction with HuD stabilizes Gap-43 and Nrn1 mRNAs and contributes to their transport into axons. On the other hand, KSRP destabilizes bound mRNAs by targeting them for degradation. In initial characterization of these mRNAs’ interactions with KSRP using a fluorescence polarization assay (FPA), I have found that Gap-43 binds directly to KSRP, but at a lower affinity than seen in its interactions with HuD. This KSRP binding was further validated by RNA electrophoretic mobility shift assay (REMSA). Ongoing experiments will define the interaction of Nrn1 with KSRP and determine if Nrn1 and Gap-43 compete for binding to KSRP. The data derived from this work will bring a greater understanding of post-transcriptional regulation that helps to drive neural development and repair.
Rizor, Elizabeth  
Mentor(s): Dr. Jill Stewart  

Resting-state functional connectivity differs based on level of motor function in individuals post-stroke.

Functional MRI (fMRI) is often used to determine resting-state functional connectivity (RsFC), an indicator of brain activity between two regions. Currently, it is not known if RsFC differs based on level of motor function after stroke. The objective of this study was to determine if RsFC between motor and sensory brain regions differed between individuals with different levels of arm function and if these values correlated with motor status. Sixty-three individuals with left-hemisphere stroke underwent fMRI and performed three measures of hand function: Box and Blocks (BBT) test, Grip Strength, and Stroke Impact Scale (SIS). BBT performance was used to separate the participants into three functional groups: Low, Moderate, and High. A one-way MANOVA and LSD Post Hoc test was performed to determine if RsFC differed between the three groups. A Pearson's correlation test was performed to determine if mean connectivity values correlated with motor function (principal component of the three behavioral tests). Interhemispheric connectivity and ipsilesional connectivity differed between groups (p<0.05), with the Low function group showing decreased interhemispheric and increased ipsilesional connectivity compared to the High function group. Mean interhemispheric connectivity significantly correlated with motor function across all groups (r=.447; p=.000), while mean contralesional connectivity only significantly correlated with motor function in the Low group (r=.770; p=.002). These results suggest that interhemispheric and ipsilesional RsFC differ based on level of arm motor function. They also suggest that those who are more severely impaired may have compensatory activity in the contralesional hemisphere to support arm function.

Roberts, Madison  
Mentor(s): Prof. Sueanna Smith  

Prescription Opioid Abuse

Prescription opioid abuse has become a more prevalent problem since the initial rise of Oxycotin in the 1990s. There are an alarming number of people that not only fall victim to addiction, but have fatal interactions with prescription opioids. Current solutions to the problem are focusing on limiting the amount of prescription opioids that patients will legally have access to, however, this is simply not helping. Instead, I argue that this issue can be remedied by replacing highly addictive drugs with less addictive substitutes, by offering better treatment programs, and by strengthening Prescription Monitoring Programs.

Robinson, Hunter  
Mentor(s): Prof. Ashley Martin  

Communication In Production Meetings

While on spring break I will be attending the South Easter Theatre Conference and plan on partaking in many different workshops as well as a design competition about stage management and leadership in the theatre. As a senior stage manager, it is exciting to hear from professionals and make the connection between my classroom work and what happens in professional theatres.

The independent study I am currently working on is communication in a production meetings. This goes hand and hand with the show I am also head stage manager of at the moment. I conducted interviews with five different people. From professional stage manager to leadership professors. It was important to me to hear from many different people on how they thought meetings worked the best. I then created a survey for everyone in my meetings to fill out after the meeting was over. I have planned how each production meeting is going to be run slightly different over the course of the production. I am excited and interest to see the responses I get back from the people reviewing me.

I hope to bring what I learn in the workshops at the conference back to implement into my independent study. I picked this topic as my independent study because it is something I personally struggle with and wanted to gain knowledge and get better at it while I was still in a student atmosphere.
Robinson, Amelia  
**Mentor(s): Ms. Tricia Kennedy**  
**Student Teaching in a First Grade Class**

During the Fall 2016 semester, I completed my full time student teaching for the early childhood education professional program. I student taught in a first grade classroom at Pontiac Elementary School in Richland School District Two. During the semester, I shadowed and taught lessons with my coaching teacher. For a full two weeks, I had complete control of the classroom, and had to plan and teach all of the lessons for the day. I completed a two-week unit plan that gave a detailed outline for what I planned to teach in all subject areas. When building my unit plan, I had to take into account many things. For example, I had to consider my students’ interests, as well as my students’ understandings and capabilities. I also had to align my plans with state standards. After many revisions, I came to my final unit plan. During the implementation of my two-week plan, I discovered many things about myself, as well as my students. I discovered how critical a teacher could be in the lives of her students. I discovered how much I love to teach, especially younger children. I discovered how unique each of my students are, and the best methods for teaching each individual student. It is so important to get to know your students, their likes, dislikes, and cultures, and incorporate that into the classroom. Even though it was challenging at times, it is definitely the right career path for me.

Robinson, Leah  
**Mentor(s): Prof. Hilary Lichterman**  
**Everybody is Different**

For this past Spring semester, I have had the pleasure of doing my internship with the Drayer Physical Therapy Institute at the Irmo location in Irmo, South Carolina. As a senior undergraduate Exercise Science major hoping to peruse Physical Therapy as a career, this clinic was the ideal place to learn. At this clinic, the therapist see a variety of patients ranging from as young as 8 years old to as old to about 80 years old. Here, I have the opportunity to work closely with these patients and create relationships with them that may carry them through their road to recovery. The neat thing about this clinic and the variety of patients they see and the different amount of injuries that we see. Even though we may have some injuries that are similar, each person progresses and rehabs differently. As a learner, I enjoy spending time figuring out why one technique may work for one person, and not for the other. This helped me better understand anatomy, nervous, and the neuromuscular system. This internship has been a wonderful opportunity to expand my knowledge beyond the classroom.. I am ecstatic to take the next step into my career and eventually apply to Physical Therapy school with the knowledge I have gained from here.

Rodriguez, Mariela  
**Mentor(s): Mr. Luis Sierra**  
**Finding Solutions Through Service: My Journey as a Community Service Ambassador**

How do we not get angry when we are constantly berated with problems through social media, news outlets, and word of mouth? The longer we scroll, the angrier we become, the more hopeless we feel. Yet if we changed the way we share problems, in that we shared solutions and ideas instead, then we can change the discussion. As a Community Service Ambassador I promised to do 150 hrs. of service by the end of April. I committed a majority of my hours at the Sexual Trauma Services of the Midlands. STSM is a non-profit that serves sexual assault survivors and their families by providing intervention, advocacy, and counseling. My role as a volunteer and an advocate includes answering hot line calls and making hospital visits. I advocate for the rights of sexual assault survivors by standing by them when they need my support; to answer questions, to connect them to resources, or to just be there. Not only do I help survivors but I inform the community about the role STSM plays and the importance they have on the community. Through my service at STSM and in the Columba community I learned that the best way to take a stand is to take action through service and inform others on how they can help as well.
Rogers, Jane  
Mentor(s): Prof. Daniel Freedman  
Children with Hidden Disabilities

I have been a camp counselor at a camp for children with diabetes. During my time as a counselor, I have seen how children with type 1 diabetes are able to empower and connect with each other through a common link—having a “hidden disability.” Diabetes is not usually seen by the “naked eye” or by a stranger, the presence of this disease only becomes known until someone with the disease makes it known or an observer notices it.

Rogers, Elizabeth  
Mentor(s): Ms. Laura Galloway  
Get Lost, Get Found: How I Discovered My Purpose Through Community Service

People serve to help others: that is at the very core of community service. However, we don’t realize that when we serve others, we also gain knowledge of ourselves. One of Mahatma Gandhi’s most well-known quotes is, “The best way to find yourself is to lose yourself in the service of others.” I never really understood what that meant until I became involved in community service. Though I have served in various capacities my entire life, it wasn’t until my college years that I found how much service impacted me. Through mission trips to Kingston, Jamaica, and through pursuing a career in education, I came to the realization that my passion in life lies in the service of others. Being able to aid those who do not have the equal access to opportunities and resources has become something that I want to work towards, and strive to apply to my future position as a librarian. Losing myself in service to others has allowed me to find myself and my purpose in life.

Rogers, Elizabeth  
Mentor(s): Mrs. Stuart Hunter  
My Purpose is Passion: How Passion in Leadership Allowed Me to Effectively Serve

There’s a saying that passion is the trigger of success. In context, it is referring to the success of the person who is emanating the passion. But I would argue that the success is not only of the passionate individual, but the people who the individual interacts with. Leadership is a skill that is wanted by all and achieved by many. Passion, however, is a trait that is a rarity. I have participated in various leadership roles throughout my undergraduate, but the positions that impacted me the most are those that I am passionate about. It is through this passion that I have found the most joy in leadership. Serving as the Missions committee chair for Sigma Alpha Omega and working with various writing centers over the past three years has shown me the affects my own joy can have on others in helping them find their own passion. Ultimately, I believe that that emanating joy reveals to others your passion and allows you to most effectively impact those around you through your service. It is through these experiences that I learned this, and I hope to carry that belief with me towards all my future endeavors.

Rohlfs, Ashley  
Mentor(s): Ms. Maegan Gudridge  
Learning the Ropes of the Medical Field

As a psychology major with a cognate in biology and interest in medicine, my time here at USC has been dedicated to discovering the basics of science and human life while gaining the tools necessary to succeed in the medical field as a Physician’s Assistant. Over the past four years I have not only learned and succeeded inside the classroom, but beyond the classroom as well. I recently obtained my Certified Nursing Assistant certification in which there was a clinical in a long-term care facility. During the two weeks of clinical, I came to learn how to care for elderly residents on a wide spectrum of health. No two aged people were the same or had the same health. I had to evaluate each patient individually not based on his or her age, but on their current state of health. I was able to take what I learned inside the classroom and not only apply what I learned in my experiences, but use my knowledge to come to new conclusions that made me view and appreciate my career field in a different way. I came to find that many factors come into play when diagnosing a patient, and each patient varies especially with their disabilities and age.
Root, Meghan  
Mentor(s): Dr. Amber Fallucca  
**The Impact of Research: My Point of View**

I worked in the Eberhart, Rodriguez, and Raabe Eye pathology research laboratory at Johns Hopkins. I performed research in the eye pathology lab. We would get samples from surgeries, biopsies, etc and then have to “gross” the specimen and then look at it under a microscope and try and determine what, if anything was wrong with the patient. I worked in this lab because I have an interest in healthcare and I wanted to have a research experience that was beneficial to my future career. Throughout my time working in the lab I was able to learn and reflect on the difference I could be making in someone’s life. It really made me think about the fragility of life and death and how important it is to realize how privileged we are to be alive. The research going on in the Eye Pathology lab is working towards learning more about different types of eye cancer and other various diseases that have the opportunity to help millions of people.

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Rosa, Alana  
Mentor(s): Dr. Kate Holland  

AUTHOR(S): A. Rosa, A. K. Holland, C. Blanco, D. W. Harrison

Objective : High levels of trait aggression have been associated with decreased performance on tasks measuring executive function (Holler & Kavanough, 2012), which have been associated with diminished regulatory control of the frontal lobes over posterior cerebral regions. High trait aggressive men were predicted to demonstrate poor task performance and evidence heightened sympathetic tone upon exposure to cognitive stress relative to low trait aggressive men.

Participants and Methods: Undergraduates (n=98) completed screening measures including a medical history questionnaire, the Buss Perry Aggression Questionnaire, and a Cognitive Estimation Task (CET). High aggressive (n=7) and low aggressive (n=8) men completed a grip strength task before and after completing a mental subtraction task. Systolic blood pressure (SBP) measures were taken between experimental manipulations.

Results : Aggression was a significant predictor of performance on the CET (F(1, 43)=4.85, p=.03). Aggression was also a significant predictor of the number of medical symptoms reported (F(1, 95)=5.36, p=.02). Regarding data from laboratory protocol, a main effect for Trial for grip strength across 5 trials was found (F(4, 52)=16.31, p=.01), indicating fatigue across 5 trials. A Condition x Hand interaction was found (F(1, 13)=4.29, p=.05), indicating increased grip strength at the left hand in the post stress condition, and a decrease in right hand grip strength in the post stress condition. A main effect was also found for SBP (F(1, 14)=6.15, p=.02) indicating that both high and low aggressive individuals experienced a decrease in SBP after stress.

Conclusions : Results from the regression analyses reveal that high levels of trait aggression may be associated with impaired executive function as well as poor health outcomes. The Condition x Hand interaction provides evidence of increased right parietotemporal activation upon exposure to cognitive stress. The finding of decreased SBP post stress is likely due to the removal of anticipatory stress.
Rosenthal, Jake  
Mentor(s): Ms. Laura Galloway  
Transforming my Identity through Culture

I am pursuing Graduation with Leadership Distinction in the Global Learning Pathway and would like to share the experiences and insights I’ve gained during my time at USC and studying abroad. In the Fall 2016 semester, I spent 3 months in the capital city of the Czech Republic, Prague. VSE, or The University of Economics, offered us the usual business core, but with an emphasis on an international curriculum. These unique classes, along with my Finance and Speech classes at USC, have allowed me to build my understanding of how the world is interconnected. These opportunities have taught me more than I could have comprehended four years ago. Lessons including the value of academics, importance of relationships, strong character, and how to be a better overall version of myself. It also taught me what life is like outside of the United States and to appreciate everything that we have back at home. Living in a completely different culture not only improved the person I was, but it helped guide me towards the person I am.

Rotheiser, Jessica  
Co-Presenter(s): Tret Burdette  
Mentor(s): Dr. Stephen Morgan  
Infrared spectroscopy detection of magnetic tape degradation

Identifying degraded magnetic tapes is a challenge to the preservation of historical recordings because attempting to play such tapes can destroy valuable data when tapes stick to recording heads. U.S. cultural heritage institutions have over 46 million tapes, of which 40% are in unknown condition. If degradation can be detected, tapes can be restored for digitizing by baking. Our laboratory showed that combining attenuated total reflectance Fourier transform infrared spectroscopy and multivariate statistics provides a fast, objective, and non-destructive method to assess a tape’s playability. This previous model classified Library of Congress (LC) tapes with a 92-94% accuracy but showed poor separation with non-LC tapes. Our hypothesis was that separate models can be devised for classifying degradation for different tape formulations. Replicate spectra were obtained from multiple locations along the tape to determine degradation, which was compared to playability results. Principal component analysis was used to reduce the dimensionality of the projected spectral data to maximize the explained variance in an easily visualized space. This project addresses a vital conservation goal to promote the use of technology to preserve tapes for future generations.

Rowan, Ansley  
Mentor(s): Dr. Lara Ducate  
On the Doorstep of Diversity

Through my role as a Resident Mentor, I was challenged to use my knowledge from my Women's and Gender Studies classes and my training as a Diversity Peer Educator to create my own presentation on gender roles and stereotypes. I capitalized on the opportunity to create a presentation that would engage first year students in dialogue that promotes an awareness of self and awareness of others while allowing me the professional development opportunity to connect with campus partners in order to become more educated on the topics presented. This presentation is now an annual Diversity Dialogue that has garnered recognition for its ability to create a safe space for students to discuss their experiences and opinions on a complex topic, lending to a fascinating dialogue year after year and a facilitated learning experience about gender bias and stereotypes. Facilitating a dialogue on a diversity topic brought together my knowledge from my Women's and Gender Studies classes, my love for presenting, and my skills that I developed through being a Resident Mentor and Diversity Peer Educator. This experience taught me to lean into the discomfort that can come with tough conversations and to be willing to facilitate amongst your peers. Through my preparation research and meetings with campus partners, I found my passion for teaching and guiding students towards topics that they aren’t familiar or comfortable with, helping them to access their community through dialogue and to access their school through its professionals that will help them learn more. This experience and the skills I gained through presenting helped shape my career goals, turning me towards masters programs in Higher Education and Student Affairs where I hope to continue engaging students in impactful dialogue and creating meaningful presentation that teach students about one another and themselves. I have learned that, here at the University of South Carolina, learning never ends and being a role model starts with teaching others and testing your limits.
Roy, Erica  
Mentor(s): Prof. Theresa Harrison  
If Not For KD

The world is filled with massive misconceptions about sorority organizations and I’ve found myself trying to combat those misconceptions. Sadly, much of the public has the predetermined mindset regarding many negative facets associated with a sorority or sorority women. Through my experience as a collegiate leader of Kappa Delta Sorority, at a highly established SEC chapter, I’ve had the honor of neutralizing many of the obtuse misconceptions associated with it. Becoming the Vice President of Operations for Kappa Delta was perhaps the best thing to ever happen to me. I was able to practice and execute the knowledge presented to me through my management major and leadership studies minor through my executive role in a chapter of 400 members. I fell in love with KD full circle: the people, the principles, the pride, and the passion. This organization developed me into the servant leader I am today. Kappa Delta’s devotion for growth, confidence building, and inspiring young women to be the best versions of themselves embraces the true value of a sorority. The responsibilities and daily activities serving two consecutive terms as the Vice President of Operations could be easily compared to those of an executive manager of a corporation. I strongly believe that leadership skills are the essential component missing in many new graduates; I am confident in my professional development as a young leader due to the experience Kappa Delta has given me. Sororities represent development, dedication, enjoyment, and constant surrounding of uplifting nature that inspires us to triumph: professionally, personally, and civically. For that, I thank KD.

Ruber, Alexis  
Mentor(s): Dr. Jessica Klusek  
Reduced Eye Contact and Social Anxiety in Women with the FMR1 Premutation

Background: Mothers of children with fragile X syndrome (FXS) have the FMR1 premutation, which affects approximately 1 in 151 women[1]. These women display elevated social anxiety [2], which has been linked with more gaze anxiety and avoidance in other clinical groups[3]. While several clinical reports have suggested women with the premutation have reduced eye contact[4, 5], no studies have examined this empirically. Like their children with FXS, women with the premutation may be slow to warm-up socially, with better eye contact toward the end of social interactions[6]. This study compared eye contact of women with the FMR1 premutation and control women, examining group differences, possible relations to social anxiety, and whether a warm-up effect occurred.

Methods: Eye contact during the first and last minutes of a semi-structured conversational sample was rated independently by two blind raters on a 5-point scale; consensus scores were produced. Social anxiety was measured with the Liebowitz Social Anxiety Scale[7].

Results: A mixed model testing group, condition, and their interaction indicated significant effects of group (p=.012) and condition (p<.001); their interaction was not significant (p=.556). A second mixed model adding social anxiety as a predictor indicated no significant effect of social anxiety (p=.415).

Conclusion: Women with the FMR1 premutation had overall reduced eye contact during the initial and final conditions. A warm-up effect occurred across groups. Social anxiety was not related to reduced eye contact in either group, suggesting reduced eye contact is a feature of the premutation phenotype independent of social anxiety.

Ruggiero, Christopher  
Mentor(s): Prof. Qian Wang  
Electrospinning curcumin-gelatin-TFE nanofiber for skin therapy

Electrospinning is gaining attention because of the versatile applications of the resulting nanofibers. These fibers may be made from a wide variety of polymer solutions and can be modified towards a particular function. Studies have indicated that gelatin nanofibers may be beneficial in treating wounds, and incorporating various pharmaceutical agents may further enhance this property. Curcumin in particular has received some attention for its anti-oxidant, anti-oncogenic, and therapeutic effects. Our lab developed a curcumin-gelatin solution using 2,2,2-trifluoroethanol (TFE) as the solvent. This solution was then successfully spun into nanofibers of varying diameters from a range of concentrations. The next stages of the experiment will be to evaluate the release profiles and determine the impact of the nanofibers in vitro and in vivo.
Russell, Madison  
**Mentor(s): Dr. James Cutsinger**  
**The Value of Religious Symbols and Education in Modern Medicine**

In his article on “The Secularization of American Medicine,” Roy Branson argued that medicine could only achieve its full potential made possible by modern technology if physicians abandoned their priest-like infatuation with the mystery and prestige of their profession. He believed that doctors used their position to inflict moral judgment on society and dictate normal versus sinful behavior. He plead for a removal of all religious symbols in medicine and a move towards a secular, socialized health care system in America. I will argue instead that religious symbols in medicine provide tremendous value to patients and practitioners alike. Religious symbols tie modern medicine to its traditional, religious past, and help maintain ethical standards in a rapidly-changing world. Finally, the ethical argument for socialized health care finds more support from religion than from secularism.

In the latter half of the paper, I will argue that American medical schools need to create a curriculum for developing religious competency in medical students, and propose a means of doing so. The Association of American Medical Colleges recently changed its admissions test to place more emphasis on the “human and social components of health.” Religion is a key aspect of the social determinants of health, and healing is often enhanced by religious experience. Even non-religious patients turn towards religious elements in times of sickness—patients frequently seek alternative medical treatments that were originally used in Hinduism and Buddhism. Despite this, American medical doctors, especially specialists and psychiatrists, value religious faith and experience less than their patients. Thorough training on the history, culture, and ethics of religious medicine will enhance doctors’ ability to help their patients through times of crises.

Ruvala, Richa  
**Mentor(s): Dr. Roger Newman-Norlund**  
**Cooperation Station**

Autism spectrum disorder is a serious developmental disorder that impairs the ability to communicate and interact. This can be particularly disheartening to parents and caregivers as they are not able to experience the type of connection with their children that other parents and caregivers do. Dr. Newman-Norlund and his team have developed games for children with autism to improve their communication and teamwork skills. This suite of games is called the “Cooperation Station” and is freely available to download. As a part of his project, I developed a website which is used to i) inform the public about the games, ii) raise awareness of the nature social impairments in children with autism and iii) share the research and effectiveness of the games as discovered by other students working on the project. With technology being such an integral part of everyday life in today’s society, an aesthetically pleasing, user-friendly website designed specifically with parents of children with autism in mind allows the project to grow and become more accessible to children with autism. In order to code the website, I learned about the process of web development using HTML, CSS, Javascript, Bootstrap, and Adobe applications through YouTube videos, online courses, and with the help of the faculty at the University of South Carolina. I designed the webpage and a logo for the application suite using sketches, and later implemented the ideas onto the screen using coding programs such as Atom and design programs such as Adobe Photoshop and Illustrator. I tested the webpage on multiple web browsers and computers to test its effectiveness on different screen sizes and formatting options. This website allows the games which were created with skill and hard work by Dr. Newman-Norlund and other students to be accessible to schools, therapists, and parents for their children.
Autism Spectrum Disorder (ASD) and fragile X syndrome (FXS) are childhood-onset neurodevelopmental disorders that show a considerable overlap in behavioral symptomatology but arise from different genetic and environmental influences (McDevitt, 2015). Current research has been able to identify many correlations between the two disorders in terms of cognitive and behavioral functioning, but few studies have directly analyzed the effectiveness of medical treatment on these symptoms. Select studies have shown that medications such as SSRIs and antipsychotics are helpful in treating overlapping symptoms between these two disorders (Hagerman, 2014). The primary aim of this descriptive study is to assess to what effect target symptoms reported by parents correlate to assessed symptoms measured using psychological performance standards within adolescents diagnosed with FXS and ASD. The Child Behavioral Checklist (CBCL) will be the psychological assessment data used to score both high-risk groups on scales associated with disorders categorized within DSM-IV. Reported medications will be collected from a parent reported Family Background Questionnaire (FBQ) and will include dosages and primary symptoms believed to be targeted such as anxiety, hyperactivity, and attention. The CBCL scores of adolescents with FXS and ASD that fall within clinically significant ranges will be compared to reported symptoms on the FBQ for which they are receiving drug intervention. Further, adolescents who may have scored within a syndrome scale but reported not to be receiving drug intervention per the FBQ for CBCL scored symptoms will be analyzed. The findings of this study could potentially influence the effectiveness of future treatment of symptoms within adolescents diagnosed with FXS and ASD.

Samuel, Katherine
Mentor(s): Mrs. Stuart Hunter
Public Health in India

My presentation on which this abstract will introduce focuses on my semester abroad in Bangalore, India including the learning and cultural experiences I have brought back home. I chose to go to India for multiple reasons. In high school I studied abroad with Rotary International Youth Exchange to Tenerife, one of the Canary Islands of Spain. I had an amazing senior year of high school abroad, learning the culture and the Spanish language. I decided that for college I wanted to expand past my comfort zone, figuratively, and expand borders, literally, to Asia. I no longer wanted to be a Western World Traveler, but instead a World Traveler. Second, I have been involved in a student organization at the University of South Carolina called Indian Cultural Exchange- a social organization of which I was the philanthropy chair my sophomore year. As a Public Health major, I carefully selected India, knowing that it is a developing country. I gained vast amounts of insight into public health and safety in the developing world. The gap between the impoverished and the wealthy leading to health disparities, the abundance of pollution, and the cultural differences that exist within a single nation were most impactful. My presentation includes photographs and descriptions of the public health initiatives and lack thereof in Bangalore, India and surrounding areas including Mumbai, Delhi, and Varanasi- home of the famous Ganges River. A worldwide effort is required by dedicated global citizens to improve our current conditions of health disparities, pollution, and cultural diversity acceptance. Studying abroad in India has developed a deeper sense of importance of advocacy and social reform which I hope to achieve in my professional and personal future.

Sanders, Ariana
Mentor(s): Mrs. Laura Carnes
Campus leadership experiences in three parts: Caring, communication, and contingency

Through my experiences at USC Lancaster as a Peer Advisor at Lancaster (P.A.L.), I have had the opportunity to assist hundreds of students with their transition to collegiate life. As I reflect upon this experience, and my coursework for my Associate in Science Degree, I begin to understand leadership as encompassing three areas: 1) the importance of meeting basic needs (caring), 2) communicating effectively (communicating), and 3) addressing individual needs contingent upon the situation at hand (contingency). Today I will discuss these three area in relation to my campus leadership experience, and how I plan to apply these areas a future small business owner.
Sandreuter, Anna  
Mentor(s): Mrs. Stuart Hunter  
Intern to Hire

In November of 2016 I took an interview with Chernoff Newman to be a public relations intern for the fall semester. Having had previous internships, I had an idea about what a public relations internship would entail. However, I have been astounded by my personal growth and professional opportunity during this internship. As a public relations intern with Chernoff Newman, I assist in the creation of consistent messaging on all news media and social media campaigns by developing monthly content calendars. I'm responsible for frequently managing and uploading content to Wordpress on behalf of clients. I support the development of creative concepts with the account team and client, including social media engagement strategies, pitch angles, content ideas, target partnerships and events. This includes post campaign analysis and creating social media reports on engagement using Sprout Social. As a public relations major, we are taught many of these same skill sets in the classroom. As an intern, I am able to gain meaningful insights as to what it means to use these same skills to create a product for a client. The assignments that I have completed in class allowed me to hit the ground running when I started my internship with Chernoff Newman. By connecting these skills and experiencing them in the real world, I am able to confidently accept the challenges that my post-graduate career will inevitably present. The first challenge I plan to meet is applying to a global public relations after graduation.

Schlee, Caroline  
Mentor(s): Dr. Caryn Outten  
Overexpression and Purification of Iron Regulators Aft1 and Yap5 from Yeast

Iron homeostasis in eukaryotic cells is controlled in part by two important proteins, Aft1 and Yap5. Aft1 is involved in the processes when there is low iron in the cell, while Yap5 contributes when there are high levels of iron in the cell. In order to purify these proteins in a more successful and stable manner, each was put on a plasmid and transformed into yeast strain 334 that had been shown to be useful in other experiments. Once the plasmids were transformed into yeast, the process of finding the best induction conditions began. Two main conditions were used, and the high optical density (OD) growth in the morning, induction in the afternoon, and growth overnight was found to be the most successful so far. Three Western Blots were performed with varying conditions and in two of them, no bands were visible. In the third Western Blot trial, protease inhibitors were used during the extraction of the protein, which allowed for proteins to be visualized on the Western. However, these bands had moved much too far down the gel and their identity could not be determined. In future experiments, the plan is to dilute the samples and use a higher percentage gel in order to better visualize the bands present. In the long term, the goal will be to eventually purify Yap5 and Aft1 for use in future in vitro binding experiments.

Schofield, Eva  
Mentor(s): Dr. Robert Davis Moore  
Importance of Progressively Intensive Exercise Protocols in Concussion Rehabilitation

Concussion is defined as a complex pathophysiological process affecting the brain, induced by biomechanical forces (McCroy et al., 2012), and affects up to 4 Million people in the US annually (Langlois, 2006). Most individuals will recover within weeks of injury, but up to 20% of those injured will exhibit a cluster of symptoms known as post-concussion syndrome (PCS; Cantu, 2012). PSC is resistant to medication and requires different forms of therapy to effectively reduce symptoms and promote recovery. Recent research indicates that progressive exercise protocols may be beneficial for symptom reduction. Current protocols exercise patients to the point of symptoms exacerbation to gauge rehabilitative gains. This can negatively affect protocol adherence and overall recovery. The aim of this research was to implement a progressive exercise protocol designed to promote recovery without inducing symptoms. This poster presents findings from two studies using said protocol. In the first study, 31 patients completed the protocol and their symptoms were evaluated pre-, mid- and post-intervention. Results revealed a significant decrease in the number and intensity of symptoms. In study two, 12 patients completed the same protocol, but underwent a more extensive neuropsychological and neurophysiological assessment. Results revealed that from pre-to-post intervention patients reported a significant decrease in symptoms of depression and anxiety, and exhibited increased cognitive performance. Patients exhibited a significant increase in the neuroelectric index of attentional resource allocation (P3b). Together, these results suggest that progressive sub-maximal exercise protocols can be successfully in alleviating affective, cognitive and neurophysiological alterations without regularly inducing symptoms.
Schofield, Rhiannon  
Mentor(s): Dr. Elizabeth Easley, Dr. Sarah Sellhorst  
Impact of High School Athletic Participation on Physical Activity in College Students

Role identities, such as athletic identity, have been used as helpful concepts when understanding an individual’s behavior. It has been reported that students who consider themselves athletic spend more time engaged in moderate to vigorous physical activity (MVPA). Purpose: The purpose of this study was to determine if a difference existed in MVPA and average daily step count between college students who were identified as student athletes in high school and those who were not. Methods: Subjects at a small, commuter-based campus completed a demographic survey. Subjects were excluded if they participated in collegiate athletics. Each subject wore an accelerometer (Actigraph GT3X, Pensacola FL) around their waists at the anterior axillary line of the right hip during all waking hours for seven consecutive days. Independent sample t-tests were used to determine whether differences existed in time spent in MVPA and average daily steps between groups. Results: There was no significant difference in MVPA and steps between those who participated in high school athletics (n=40, 264.38 ± 146.44 min/wk and 7109.07± 3097.25 steps/day) and those that did not (n=26, 246.73 ± 129.99 min/wk and 6832.22 ± 2990.42 steps/day), p=0.619 and p=0.720, respectively. Conclusions: This study showed no difference between previous high school athletes and those that did not previously participate in high school athletics. This may be attributed to the lack of organized sport opportunities and a reduction in athletic identity during college.

Supported by a Research and Productive Scholarship Grant from USC Lancaster.

Schreiber, Dawn  
Mentor(s): Dr. Randy Lowell  
USC Union Players: Promotion, Production, and Product Management

USC Union Players had been performing plays for the community for several years at USC Union. The goal of the theatre department is to foster awareness of the arts and to increase involvement between the college and community. However, student involvement had rapidly declined, which heavily impacted the theatre department. Theatre is truly a dying art form because of the lack of knowledge and involvement. My goal in the production of the play was to return the theatre department to the college and community. I spent many hours working with Professor Anderson, the director of the theatre department, to get students involved with auditions and practices, along with building props. This allowed students following me to pick up where I left off and aided in the transition from one play to another. To promote the plays, I worked with cornerstones of Union’s community, including the local radio station and local newspaper. I was even able to get local business owners to lend items that could be used as props which further increased community involvement. Combining all of the resources I had accumulated, my final role was to produce the play.

My experience working with the USC Union Players has helped educate me on the value of arts, increased my communication skills, and demonstrated the importance of community involvement. This experience was life changing and very educational. I look forward to elaborating on how I have benefited from this experience, both personally and professionally.

Schultz, Katherine  
Mentor(s): Dr. Carol Boggs  
Factors Affecting Pollinator Density- Does Everyone Get a Fair Share?

If nectar intake is optimized, different taxa of pollinators should be distributed among their patches of habitat such that nectar availability is roughly the same for each organism within a size class. In order to test whether the nectar available per pollinator was the same across patches of low and high flower density, pollination activity was observed weekly at six differentially mowed patches over the course of six months at McCrady South Carolina National Guard Reserve Training Center. Monthly estimates of flower densities for each species were made for each subsite, with five to six subsites per patch. Within separate taxonomic categories of pollinators, (e.g. butterflies and bees), we expected that species with low dispersal ability exhibited a significantly larger difference in mean pollinator density between patches of high and low flower availability. We also expected that specialist pollinators had more nectar flowers per capita in patches with high flower density compared to patches with low flower density. Flowers per capita is expected to have been higher in patches with large distances between flowers than in patches with high flowers per unit of area.
Schumann, Emily  
**Mentor(s): Dr. Magdalena Grudzinski-Hall**  
**From Mentoring Peer Leaders to Caring for Future Patients**

My time at the University of South Carolina has been defined by growth and transformation. Beginning as a Supplemental Instruction Leader my sophomore year, I gained confidence and leadership, while assisting fellow students succeed in historically difficult courses. Now, as a mentor for the program, I offer feedback to other leaders and help them continually improve in their position. Trying to determine my next steps after USC, I explored the areas of research, consulting, and lastly, medicine. After shadowing various doctors, volunteering at the free medical clinic, and traveling to Peru on a medical service-learning trip, I discovered my passion for medicine and desire to improve the quality of patients’ lives. My professional and civic engagement at USC has given me the affirmation that I can become a personable, collaborative, and compassionate physician.

Schwehr, Andrea  
**Mentor(s): Prof. Asheley Schryer**  
**Understanding Leadership: How it has Prepared Me for the Future**

Leadership is a common word that is often thrown around. It is an action or position many thrive to reach. When I started school at the University of South Carolina, I began to search for leadership opportunities. During my third year, I served as a University 101 Peer Leader for two semesters. Each class was unique in its own ways and presented different challenges and opportunities for growth. In serving in this role, I learned what it truly meant to be a leader. I knew the textbook definition but it took experience to fully understand it. I learned what it meant to provide help and support. I gained a greater understanding of what it meant to be flexible and how to deal with unforeseen circumstances. Collaborating took on a whole new meaning. Through this experience, I learned that leadership encompasses many aspects and it is more than a simple position. With this foundation, I can continue to grow as a leader and apply it to my future endeavors: becoming a lawyer.

Schwehr, Andrea  
**Mentor(s): Dr. Brad Epperly**  
**Efficiency of the European Court of Justice**

The European Court of Justice was first established in 1952 as the highest court in Europe. Today, it has over four times more member states and it is tasked with interpreting and applying European Union law. While it has completed hundreds of cases over the years, it leads us to wonder: is the ECJ operating at its maximum efficiency? This paper begins by giving a brief overview of the Court and the types of cases it is entrusted with. By studying the number of completed cases per year and analyzing other indicators for every year since the Court’s establishment, a standard for the demand and supply of the Court is outlined. It is in this comparison of supply and demand that we find a way to measure efficiency. Since its founding, the Court has slowly become more efficient and there are many factors that point that the Court will continue to improve.
Schwichtenberg, Katherine  
Mentor(s): Mrs. Stuart Hunter  
My Washington Semester Experience

During my junior year at USC, I participated in the South Carolina Washington Semester Program where I interned in the United States Senate while living in Washington, D.C. I worked in Senator Richard J. Durbin's office, who represents my home state of Illinois. As any intern on Capitol Hill will tell you, there is no typical day. I worked full time, and every day was a new experience. My duties included attending hearings and briefings, preparing memos for the staff, assisting with administrative tasks, and conducting constituent tours. I even got to help out with a Stanley Cup viewing event in our office. As a political science major, I have always had an interest in public policy and the federal government, which is what drove me to apply for this internship opportunity. This allowed me to experience the legislative process firsthand and learn about how it functions, instead of simply hearing about it in a classroom. More importantly, I learned how to interact with supervisors in a professional setting such as Capitol Hill, since I was provided with many substantive tasks during my time in the office. I also interacted with constituents on tours and over the phone, where I also developed my professional skills. The policy process is fast-paced and constantly evolving, but having a part in the process is also incredibly rewarding. This internship truly reaffirmed my passion for politics. As a result of this experience, I hope to work with legislation in some capacity after my time at Carolina.

Scott, Koral  
Mentor(s): Mrs. Anna Oswald-Hensley  
Just Listen

University Ambassador: In the Spring of 2016, I was presented with the opportunity to be a University Ambassador after being recommended by one of my professors. Some of my duties consisted of leading campus tours and educating future students about our campus history here at USC Sumter. I have had the opportunity to participate in student activities as well as interact with people on campus to ensure they have the best experience at the university. Having the opportunity to participate in campus life has enabled me to become more social. With the assistance of those around me, I have built my communication skills, matured as a person, and educated myself on how to become a productive leader.

University 101 Peer Leader: In the Fall of 2016, I decided to graduate with Leadership Distinction. Through this decision, becoming a Peer Leader here at USC became one of my goals. This program has allowed me to assist in a university 101 class and interact with new students. Not only do I answer the many questions incoming freshman have, I also have the opportunity to make a difference in the lives of the students I come into contact with. In all the work I have done, the opportunity to present to a class has helped me the most. In learning the importance of transparency and critical thinking, I have developed better listening skills that have helped me enjoy making new connections with everyone I meet. To date, I have enjoyed all the contacts I have made on campus both inside and outside the classroom.

Scott, Emily  
Mentor(s): Mr. Drew Newton  
Synthesizing a Professional Membership Organization Experience and My Collegiate Experience

During my undergraduate experience, I work for Gudmundson Consulting, a small political consulting firm in Columbia, SC. My boss lobbies on behalf of two Professional Membership Organizations; South Carolina Association of Nurse Anesthetists and South Carolina Association of Criminal Defense Lawyers, as well as is the Executive Director for the South Carolina Association of Nurse Anesthetists. In my undergraduate career, I also served as two positions on the Executive Council of my sorority, Alpha Gamma Delta. As a Political Science and French Double Major with a Leadership Studies Minor, I’ve had a lot of within the classroom experiences that introduced me to theories of leadership, group dynamics and how to effectively motivate my peers. I’ve discovered that these theories I learned in class are not just things I learned for a test, but practices that can truly enhance any membership organization, either professional or collegiate. With this guided mindset, I now realize that my experiences of working for the Executive Director of a Professional Membership Organization and serving on the Executive Council of my sorority require a lot of the same skills and practices in order to be effective. Both my positions have impacted me in a very profound ways- I’ve realized leadership is a skill and a practice that is useful in almost every setting. I’ve learned new and more effective ways to communicate. And I’ve realized that I work best surrounded by other passionate people. These realizations are fundamental takeaways I will forever be grateful my time at USC has presented to me.
Seder, Caroline  
Mentor(s): Ms. Lisa Camp  
Mind, Body, Soul: Researching and Understanding the Whole

As a Public Health major, I never expected to find my true niche in the field of psychology. During my senior year at the University of South Carolina, I had the opportunity to work at both the Parenting and Family Research Center and the Psychology Services Center. At the Parenting and Family Research Center, I worked in two separate labs: under Dr. Prinz and Dr. Flory. In Dr. Prinz's lab, I worked as a behavioral coder. Through this experience, I learned that compartmentalization and confidentiality are what research is centered around. As a coder, I was blinded to what the study is about and faced challenges of being compartmentalized. As a whole, this experience helped me develop and refine my skills as a researcher. Additionally, I worked in Dr. Flory's lab as a research assistant. In this position I was responsible for data collection for the CDC funded project the “Project to Learn About Youth.” Over the course of this experience I realized that Public Health and Psychology are fields that coexist. Along with these two experiences I was lucky enough to have the opportunity as an Assistant Child Care Clinician at the Psychology Services center. During this experience I learned the importance of the developing child and how vulnerable development can be at certain stages in life. These experiences have helped me understand where my passions lie and where I want to go in the future with my career.

Senn, Jonathan  
Mentor(s): Dr. Gabriel Terejanu  
Validating in vitro models for Aflatoxin production in maize using a new open field sample database

Aflatoxin is a hazardous fungal byproduct that effects many crops but especially corn. Though the toxin is responsible for millions of dollars lost, reduced health outcomes, and even death, few models yet exist to predict Aflatoxin concentrations in preharvest corns. Here, machine learning models including linear and logistic regression are trained on climate data and historical Aflatoxin samples and used to generate predictions nationwide.

Shea, Samantha  
Mentor(s): Mr. Ryan Lloyd  
Self improvement by one percent every day

Throughout my time at the University of South Carolina I have had the privilege to get involved in many different leadership opportunities offered within the classroom and beyond the classroom that will impact my future in a positive manner. Many of these experiences that I sought out have been leadership roles within the many student organizations on campus. These opportunities have prepared me tremendously for a professional career path one day and have completely shifted my mindset about what I am capable of achieving. The journey I have taken throughout my time here began freshman year as the Director of Student Organization Outreach for the Homecoming Executive Commission and led to huge opportunities later down the road such as the Public Relations Vice President of my sorority. As a current intern at Brittons of Columbia and Student Government Elections Commission Marketing and Outreach Chair, I recognize the effect of these experiences impacting my growth. I found that these various roles outside of the classroom gave me the opportunity to test the concepts learned within the classroom. My experiences have taught me problem solving skills, adaptability, how to deal with student apathy, the importance of networking, and time management skills. In this presentation, I will further elaborate how these rewarding experiences have led to learned insights on how leadership roles promote growth, build confidence, and motivate you; and how I will implement this professional and civic engagement development in my life post graduation.
For our Environmental Health Science class we will be educating K-12 students on the effects of climate change, specifically Nitrous Oxide. We are focusing on the anthropogenic sources of N2O, a large percentage of which comes from agriculture. Other sources include biomass burning, fuel combustion, nitric acid production, and fertilizers. We are also going to be illustrating the health and environmental effects associated with nitrous oxide and climate change as a whole. Finally, we will present ideas for the mitigation of climate change and nitrous oxide.

Impact of a Birkman Method® Intervention on Pharmacy Preceptor and Faculty Self-Awareness and Self-Confidence

Objectives: To determine the change in self-awareness and self-confidence among preceptor and faculty members at the South Carolina College of Pharmacy (SCCP) upon implementation of a Birkman Method® assessment and training.

Method: SCCP rotation preceptors and faculty members were recruited to participate in the Birkman Method® intervention. The intervention involved completing a pre-intervention survey, taking the Birkman Method® assessment, reviewing the results, attending a 2-hour live training from a certified Birkman training consultant and completing a post-intervention survey. The pre- and post-surveys were identical with the exception of a question that referred to future utilization of results. The pre- and post-surveys were compared for each participant to determine changes in self-confidence and self-perception accuracy.

Results: Both groups had statistically significant increases in self-perception accuracy, which was used as a surrogate for self-awareness changes. With a maximum self-perception accuracy score of 6 points, faculty members experienced an increase in self-perception accuracy an average of 1.20 points (p = 0.0020) and preceptors experienced an average increase of 1.77 points (p<0.0001).

Implications: The Implementation of the Birkman Method® program at South Carolina College of Pharmacy facilitated increases in self-awareness among faculty and preceptors. Further analysis will determine longitudinal effects, but these results provide promising indications that through the implementation of a standardized personal development program, PharmD programs can create a culture among students, faculty, and preceptors that is dedicated to increasing self-awareness.

Bridging the Gap Between Human Empathy and Healthcare for Children through Education

Wholesome neurological development of children is dependent on the parenting practices implemented at home. An estimated 16% (376,000) of people living in Richland County, SC live in poverty, making it harder to create healthy environments for pediatric growth. Heart and cerebrovascular disease as well as cancer contributed to the most frequent causes of death, suggesting a serious medically related issue in the community. The vulnerability felt by children enduring these harsh conditions is unescapable. Ensuring that our community’s child population has affordable access to treating medical illness and to outlets for treating emotional trauma is a priority. Being selected to help lead the Dance Marathon organization, one that raises money and awareness of pediatric disease and emotional advancement, was an opportunity to cultivate all my passions to benefit these children. Being responsible for over 1,000 college students granted the opportunity to teach others to adopt similar values, those of which signify compassion for less fortunate children. Yet the impressionable impact the organization made on me was unpredicted. Witnessing the life-changing effect caused by loving and supporting the children in the hospital motivated the creation of the first Psychology of Hate, Psychology 589, course at USC. After having my proposal accepted by the Dean of Psychology, I worked with Dr. Kitchen to create the course curriculum. With the children’s best interest and knowledge learned from Dance Marathon, the course intended to help create a better environment for children by educating students about stopping perpetuated prejudices and having admiration for people in our community.
Shoemaker, Adrianna  
Mentor(s): Dr. Mathieu Deflem  
The Effects of Parental Incarceration on Children's Education

Mass incarceration is a controversial and prominent issue in the United States, but often the effects of parental incarceration on children are largely overlooked. The number of children who experience parental incarceration in the United States has multiplied five times between 1980 and 2012. My research focuses on how parental incarcerated impacts children's well-being and opportunities, with a specific focus on their educational opportunities and achievements. The project specifically examines findings from various secondary sources and academic works to produce a comprehensive overview of the effects of parental incarceration on children. I investigate not only how parental incarceration effects childhood but, on the basis of a life-course perspective, also evaluate the lingering effects of parental incarceration. My project was funded through the Magellan Scholar program, and I am also relying on this research to pursue graduation with Distinction in Sociology. I am currently finishing my undergraduate degrees in Sociology and Philosophy, and will begin graduate studies in Special Education in the Fall of this year. This project serves as a valuable transition between my undergraduate and graduate career.

Shuster, Mareena  
Mentor(s): Dr. Denise Wellman  
The Importance of Invisible Influence

The University of South Carolina offers a wide array of opportunities that facilitate the growth of students personally and professionally. One of the most influential opportunities is to serve USC as a University Ambassador. As a prospective student, I was drawn to USC because of the experience I had with an Ambassador, and I wanted that ability to influence others. The main responsibility of an Ambassador is to act as a spokesperson for USC by advancing an understanding of the University. By doing so, I have been able to engage with prospective students and their families. I have guided over 70 campus tours while providing valuable information to incoming students. I have been able to share my passion for the University with others while making lasting friendships with fellow ambassadors. The Visitor Center has also given me the opportunity to further develop organizational and administrative skills and enhance my knowledge of the University. More importantly, I have discovered myself. I have become more flexible and adaptable, more willing to work effectively as a team member, and I have enhanced my leadership and public speaking skills. I have developed these skills through daily interactions with diverse audiences, allowing me to influence others as they make an important decision, which has been extremely rewarding. The Ambassador experience has given me the strength to be a leader, confidence to share my opinions, and comfort in an array of situations, all of which I plan to use in my professional and personal life.

Sillyman, Jacob  
Mentor(s): Dr. Patrick Scott  
Robert Burns's Farewell to Scotland: Changing Plans in Changing Genres

For literary biographers, there is often a desire to form a coherent narrative of the subject's life, but a fragmentary collection of primary resources to draw from. This dilemma has interested me as I, in conjunction with Dr. Scott, have been annotating an early biography of the Scottish poet Robert Burns (1759-1796) written by another Scottish poet James Hogg (1770-1835). Hogg's posthumously-published Memoir of Burns (1836) quotes heavily from earlier accounts, including quotation from Burns's own writing. Research on this project has made clear how much an author's poetry, biography, and correspondence can be interrelated in subsequent interpretation. This paper explores this interaction in a pivotal incident in Burns's life, in early fall 1786, the night when he set out on the Greenock road expecting to leave Scotland for a position on a Jamaican plantation. One major source is his poem "Farewell Song to the Banks of Ayr," but is this "farewell dirge" a window into Burns's experience that night, or has the poem itself authored the biographer's, and Burn's own, interpretation and remembrance of the events themselves? Through textual analysis of several major biographical renditions of the night, Burn's own autobiographical correspondence, and the relevant poems, I present a case-study on the reciprocity of biography and art, and how this reciprocity can create a narrative that gets distilled into "fact."
Simons-Guerra, Melanie  
Mentor(s): Dr. Bert Ely, Mr. Aaron Clarke  
Characterization of Newly Isolated Bacteriophage that Infect Caulobacter crescentus

I was able to purify and characterize 14 novel bacteriophages that were originally isolated by students in the bacteriology class from environmental samples. Bacteriophages are a type of virus that infects bacteria. The specific host bacterium for these phages is Caulobacter crescentus, a common bacterium that helps clean the water in ponds and streams. After purifying the phages, I generated a high titer phage stock and isolated the DNA. The purified DNA was then subjected to pulse field agarose gel electrophoresis to determine the size of the bacteriophage genomes. The genome size of the fourteen gathered samples varied from 150 to 300 kb. In addition we were able to show that the phages with larger genomes tend to have smaller plaque sizes. A plaque is the zone of clearing produced when a bacteriophage infects the host bacteria. The next experiments will be to determine the nucleotide sequence of the largest phage genomes and construct a phylogenetic tree for evolutionary analysis. This information will be particularly interesting since our preliminary results suggest that the largest phage genomes have a very different evolutionary history. If this is true, we will be able to learn something about phage genome evolution by comparing the larger genomes to the smaller genomes that we have already sequenced.

Sims, Nadia  
Mentor(s): Dr. Shalone Malone  
How Helping Others, Helped Me

“The best way to find yourself is to lose yourself in the service of others,” by Mahatma Gandhi is a quote I have taken to heart in my experience at the University of South Carolina. A passion of mine has always been, and continues to be, reaching out and providing a voice to those who believe themselves to be otherwise voiceless. In my time as a student at the University of South Carolina, I have taken advantage of the various opportunities of campus involvement and leadership roles made available to me in order to pursue this passion. I have held many impactful roles as a: Resident Mentor in Patterson Hall of the Carolina Women’s Community, Vice President of the College Democrats of South Carolina, Chair of Marketing and Communications for Women LEAD, Secretary of the Theta Gamma Chapter of Alpha Kappa Alpha Sorority, Inc., and more. Along with my extracurricular activities on campus, I have also been actively involved in my community and political process either as a volunteer, policy intern, or fellow. My time and experiences as a student leader at Carolina add up to much more than just bullet points on a resume. In my presentation, I want to discuss how active involvement on campus and in service organizations, have helped to develop my leadership style and have prepared and encouraged me to pursue a path in which I am able to make meaningful, worthwhile contributions to society, much in the same way that I have been able to in my Carolina and Columbia community.

Sims, Jacob  
Mentor(s): Dr. Cun Wen, Mr. Benjamin Ruiz-Yi  
Determination of material properties of photoinitiated polymers using high-throughput methodology.

Discovery of new materials can be a costly and time consuming process that typically results in material searches in a narrow parameter space. Due to these limitations, various high-throughput methodologies have been developed in order to rapidly and systematically probe multi-parameter spaces in an experiment. One material system that can benefit from this methodology is UV cured polymer materials, specifically thiol-ene sealants. UV cured sealants have been considered for use in the production of aircraft, but important material properties must be known, such as elastic modulus and ultimate tensile strength. The project tasked was to expedite the synthesis and characterization of these materials using established methodologies. The use of robots to automate the synthesis process helped this goal to be reached; any changes in synthesis could be done through a computer input and performed immediately. Low cost measuring devices built from kits were then used to perform the testing, these produced results in line with the industrial equipment normally used. Without sacrificing significant amounts of time or resources, additional units can easily be built and used to further expedite testing. The applications of this project will have direct impact within industry: allowing for efficient and cost effective testing for any variety of polymer.
Singleton, Tyler  
Mentor(s): Dr. Nikki Wooten, Dr. Edith Williams  
If You Don’t put it in Your Mind, then it Don’t Matter: A Qualitative Study of Coping Self-Efficacy in African American Women Diagnosed with Lupus

Background: Systemic lupus erythematosus (SLE) is a chronic debilitating autoimmune disease that disproportionately affects African American women. This study explored the “lived experiences” of coping self-efficacy among African American women diagnosed with SLE.

Methods: A semi-structured interview guide was used to conduct qualitative interviews with 10 African American women who were diagnosed with SLE and receiving medical care at the Medical University of South Carolina (MUSC) about SLE disease management and overall wellbeing. Responses were audio recorded and transcribed. Transcriptions were analyzed using NVivo 10 using a codebook. Thematic coding was used to identify significant quotes from the interviews.

Results: Major themes of self-awareness, religious activities, a sense of community, stigma, empowerment, and peer perspective were identified.

Conclusion/Implications: Given the desire of SLE patients, particularly African American women with this chronic illness, for increased awareness, understanding, and empathy from providers, employers/colleagues, and family members, this qualitative study of the contextual experiences of African American women with SLE contributes to knowledge about SLE and raises awareness concerning the trials of SLE disease management experienced by African American women.

Slawinski, Michelle  
Mentor(s): Mr. Luis Sierra  
The Happiness Effect: A Reflection

Last year I was 1 out of the 16 million Americans who experienced depression. Not many people know the extent to how broken I was or that I was struggling at all. Not only losing a sorority sister to suicide but also, plunging into every organization, community service experience, and leadership position forced me to change my outlook on life for the better. Researchers in London found that monthly volunteers were 7% (16% weekly) happier than individuals who did not volunteer at all. Through my personal experience I fully support the notion that volunteering positively enhances mental health. With my presentation I will discuss how immersing yourself at USC can help lead to a healthier outlook and also, highlight some programs and organizations here at USC that have contributed to my success today. Mental health is heavily stigmatized against. I hope by speaking out we can see how ‘happy’ can often just mask the hidden.

Smalls, DeAnni  
Mentor(s): Ms. Lisa Camp  
The Journey: Embodying the various aspects of Leadership

With college comes growth. That being said, no two people will have the same exact experience. From the classroom to campus involvement, and other extracurricular activities, this phase garners a social, professional, and internal transformation. My journey at the University of South Carolina—Columbia has molded me into the leader that I am today. As a student pursuing Graduation with Leadership Distinction in Professional and Civic Engagement, it is my goal to foster growth through inclusion and an understanding of why it is needed. Outside of the classroom, I have met other leaders who have refined my own leadership style; more specifically, my experiences as a student Senator, a member of the Homecoming Commission, and a Resident Mentor have helped me foster better diversity, communication, organization and partnership skills. My leadership journey has been one of promotion, encouragement, and internal reflection; all of which I hope will be used inspire current and future leaders at USC.
Smith, Nicole
Mentor(s): Dr. Celeste Caulder, Dr. Phillip Mohorn, Ms. Elisabeth Caulder, Ms. Alyssa Berganini
Appropriateness of Empiric Antibiotic Therapy for Discharged Emergency Department Patients.

Purpose: The practice of antimicrobial stewardship can be defined as optimizing clinical outcomes while working to minimize the consequences of antimicrobial therapy such as resistance and superinfection.1,2 The emergency department (ED) is not always included among antimicrobial stewardship program (ASP) initiatives. The primary purpose of this study is to determine the percentage of appropriate empiric antimicrobial therapy for discharged ED patients for pre-specified infections: community acquired pneumonia (CAP), sexually transmitted infection (STI), skin and soft tissue infection (SSTI), and urinary tract infection (UTI).

Methods: Patients who presented to the ED were identified by the corresponding ICD-9 codes used for the diagnosis of CAP, STI, SSTI and UTI during the study period. Data was collected from the electronic medical record and managed using REDCap, an online data management tool.

Results: The major infection type seen in the ED was SSTI at 93%. At ED discharge, 87% of patients received antimicrobial therapy. Upon ED discharge, 58% of the antimicrobial agents were appropriate based on guidelines, culture data and dosing. Thirty percent of the antimicrobial agents were not appropriate and 12% of patients did not receive antibiotics. The main reason for inappropriate therapy was inappropriate agent (79.2%) and of the inappropriate agent, 88% was too broad spectrum.

Conclusions: Antimicrobial agents prescribed to discharged ED patients was inappropriate 30% of the time. By including the ED in stewardship initiatives, there could possibly be an increase in antimicrobial therapy prescribed and a decrease in readmissions due to infectious causes.

References:

Smith, Cates
Mentor(s): Dr. Hildy Teegen, Dr. Lite Nartey
IFC Investment Success Factors

This project will add to our understanding of development projects across the world by creating a basis for analysis that incorporates more than just direct (principal) stakeholders, by including key contextual factors involved with a project’s success. Our research will help the IFC and World Bank Group as a whole in evaluating why certain projects have been successful or unsuccessful by giving them a better understanding of the context surrounding their investments. It will also provide a means for private corporations to better gauge the risk of involvement with a project by increasing the understanding of what factors contribute to project sustainability and thereby the likelihood of the firm recouping its costs.

Smith, Kimberly
Mentor(s): Ms. Theresa Harrison
Dank Je pour Les Souvenirs (Thanks for the Memories)

During my time at Carolina, I had the chance to study abroad both at the American Business School Paris in France and the University of Groningen in the Netherlands where I spent a semester in each city. For my first semester abroad spent in Paris, my goal was to improve my confidence in speaking French. I had been taking French for 6 years at that point and I wanted to put my knowledge to the test by immersing myself and living with a French host family. I was focused on personal growth and becoming a more independent person. My next semester abroad in Groningen, my goal was to expand my understanding of global business and apply the skills learned to pursuing an international career. Because my classes at the University of Groningen were focused on collaboration, I got the chance to work in many group projects with students from around the world. With the level of diversity and teamwork I saw, I knew that these were values that I wanted to find in the company I work for and ultimately use in my career. I was focused on professional growth as I made strides to improve my skills in working with diverse teams. Both of these study abroad experiences have helped me become a well-rounded and capable Carolina graduate ready to start her international career and continue growing as a global citizen.
Cardiac Activity and Negative Affect in Infants with Fragile X Syndrome

Fragile X syndrome (FXS) is a trinucleotide CGG expansion in the FMR1 gene of the X chromosome, resulting in a lower expression of the protein FMRP. The symptoms of FXS include intellectual and emotional disabilities, such as autism, anxiety disorders, and behavioral problems. FXS has also been characterized by physiological dysregulation, including hyperarousal. Additionally, infants with FXS exhibit increased negative affect, such as excessive fussiness and inconsolable crying, and this is tied to anxiety later in development. Given that approximately 86% of males and 77% of females with FXS meet the criteria for an anxiety disorder, understanding the early predictors of anxiety can improve the chances of early intervention. The purpose of this study is to examine the associations between physiological arousal and negative affect in infants with FXS and typically developing (TD) infants at 12 months of age. In this study, a heart-monitoring device was used to record respiratory sinus arrhythmia (RSA) and heart rate (HR) during a stranger approach task. Distress vocalizations (e.g., crying, whining) during the task were coded from video as an indicator of negative affect. We hypothesize that infants with FXS will exhibit physiological dysregulation and more distress vocalizations during the stranger approach and that physiological dysregulation will be correlated with distress. These findings would provide important information on the early signs of anxiety and emotional dysregulation in infants with FXS.

Helping with Hooves: An Integrative Study on the Benefits and Limitations of Hippotherapy in Pediatric Populations with Sensory Motor Processing Disorders

Purpose: The intent of this study is to identify the behavioral and motor benefits of hippotherapy in pediatric patients with sensory processing disorders (SPD) as a means of supplemental evidence to its efficacy as a treatment modality.

Background/Significance: Research has shown there are behavioral, cognitive and motor benefits of hippotherapy for patients with SPD. However, most existing research has a small sample size, is specific to one disease, and spans less than three months. Little research has examined how limitations in awareness of this therapy can affect client outcomes. The duration of this project is 6 months, which will provide greater insight to long-term benefits. It also involves a broad patient population of all patients with SPD.

Methods: Data collection was completed at the site via surveys, and data was received physically and/or mailed from each site. Surveys included the Pediatric Symptom Checklist (PSC-17) model, the Gross Motor Function Classification System (GMFCS) model, and open-ended demographic questions. Both the parent and the responsible therapist completed the three portions of this survey. Surveys were completed at the beginning of the project, after three months, and after six months. All surveys were de-identified using a numeric system, with labeling corresponding to a patient number (Patient One, Patient Two, etc.). Analysis of results was conducted from Columbia, SC, and the Statistical Package for the Social Sciences (SPSS) software was utilized to quantify the de-identified data received.

Results: Data collection is currently being conducted, with preliminary data expected to be completed by February 30th. Preliminary data and statistics will be prepared by the conference date.

Conclusions: Future implications include further research into the benefits of hippotherapy as evidence to its effectiveness. Additionally, further research is needed on interventions to help overcome potential limitations, and assess these interventions for their efficacy in improving client outcomes.
Lifelong Learning

Over the past four years here at the University of South Carolina I have grown in a variety of ways. This growth occurred through leadership in organizations, scholastic commitment, and personal exploration. First, by stepping up onto an Executive Board for half my college experience, I learned about delegation and decision-making. In addition to these lessons in life and leadership, I experienced a second moment of vast growth through a USC study abroad program. While in another country, I learned about the importance of supportive teamwork during times of crises, a lesson that has frequently been applied back to course work here at Carolina. This course work is what initiated my third, but not final, instance of growth. One class in particular pushed me to discover my own internal motivation to learn more about the world around me, setting off a drive for continual learning that will foster personal growth for years to come personally, professionally, and everywhere else. Through taking on class challenges, enhancing my involvement in multiple organizations, and pursuing global learning opportunities, I experienced many instances of personal development. My engagement on campus both in and out of the classroom helped me change, adapt and grow immensely throughout college. The real-world concepts and characteristics that I realized during undergraduate education will propel me into the next stages of life with a dedication to lifelong learning.

Women May Fall: A Study of Shakespeare's Female Characters Through Rhetoric and Performance

Though they make up arguably less than 15% of the total characters in William Shakespeare’s written works, his women encompass a wide spectrum of character types, including everything from queens to beggars to shepherdesses. As part of my Honors College Thesis and as my last performance project at the University of South Carolina, I chose to research Shakespeare’s women, including historical connotations and character type, as well as the rhetoric surrounding them. This lead me to choose six Shakespearean plays, three tragedies/histories and three comedies, that match up with each other in terms of female characters and the types they embody. Through these three pairings, I conducted three workshop sessions working with female actors from the University of South Carolina Department of Theatre and Dance in order to determine and examine the importance of the use of rhetoric when performing Shakespeare, as well as experiment with the dynamic of women taking on several roles as Shakespeare’s female characters in order to find the similarities and differences between them. Through this project, I have gained a greater understanding of both Shakespearean performance as a whole and the roles that text analysis and experimentation take when determining what it means to truly perform Shakespeare’s work.

The Motivation of the First Generation College Student to Graduate from College in America

This study surveys undergraduates and examines motivational factors of first generation students. Although the number of first-generation college students continues to grow, the graduation success rate is abysmal. According to a 2011 study by the Pell Institute for the Study of Opportunity in Higher Education, 42.3% of first generation students dropped out of college within six years of enrolling. Only 17.9% obtained a bachelor’s degree. By studying motivational factors of this group, colleges can use information to help increase graduation rates.
Smith, Alyssa  
Mentor(s): Dr. William Jackson  
Cloning a reporter plasmid to test a siRNA targeting HIV-1 Vif

The Viral infectivity factor (Vif) is a HIV-1 accessory gene that assists in viral replication by facilitating the degradation of the host cytosine deaminase Apolipoprotein B mRNA editing enzyme catalytic subunit 3G (A3G). A3G, in the absence of Vif, is packaged into progeny virions and, following virus entry into a host cell, results in virus inactivation by causing cytosine to uracil mutations during reverse transcription of the viral mRNA. An effective way to down-regulate HIV replication is to use small interfering RNAs (siRNA) that target mRNA degradation through the RNAi pathway. To take advantage of this pathway, a small hairpin RNA (shRNA) targeted to HIV-1 Vif located at nucleotides 5551-5571 of the HIV-1 genomic clone NL43 (Accession number M19921) was created and cloned into the retroviral vector pSRNG, placing it under the control of the RNA Polymerase III H1 promoter. The goal of this project is to test the activity of Vifsi5551 using a β-galactosidase reporter assay. For this assay, the Vif NL42 target sequence from nucleotides 5500 to 5600 was amplified from pNL4-3 and cloned into the 3’ untranslated region (3’ UTR) of β-galactosidase expressed from the CMV promoter (pCMVβgal) creating pCMVβgalvif55-56. This reporter plasmid will next be used to measure the ability of Vfsi5551 expressed from pSRNG-Vifsi5551 to induce target cleavage.

Snelling, Brianna  
Mentor(s): Dr. April DeLaurier  
ctsk:mCherry-iTol2: a transgenic line to study the role of osteoclasts during bone development in zebrafish

The goal of this project is to use transgenic lines to study the activity of osteoclasts (bone-resorbing cells) in the developing zebrafish. Fluorescent reporter lines that tag specific genes in cell populations allow for specialized study of cells and cell functions during development. This project aims to use mCherry as a reporter gene for cathepsin K (ctsk), which is a gene specifically associated with osteoclasts. This fluorescent tag will allow observation of ctsk and osteoclast activity in the developing embryo. The genetic construct will be made containing the upstream regulatory elements of ctsk to drive the expression of mCherry. The completed construct will be injected into 1-cell stage zebrafish embryos to generate germ lines of fish expressing mCherry. This will allow us to observe the role of osteoclasts during development. These lines can then be crossed with a previously constructed transgenic line that labels osteoblasts (bone forming cells; sp7:EGFP), and we can use the resulting transgenic lines to study how osteoclasts and osteoblasts work together during development and through adulthood. Understanding this mechanism has implications for future study of the role of osteoclastic resorption during development, and forms a model for studying human diseases involving resorption, such as osteoporosis.

Spires, Lauren  
Mentor(s): Dr. William Jackson  
Developing a HIV-1 Dependent Lentiviral Vector that Expresses an Innate Human Anti-Retroviral Gene

HIV-1 is a retrovirus encoding 15 proteins, which include three structural proteins (Gag, Pol, and Env), two regulatory proteins (Tat and Rev), and four accessory proteins (Nef, Vif, Vpr, and Vpu). This study focuses on Vif (Viral Infectivity Factor), and how it interacts with apolipoprotein B mRNA editing enzyme, catalytic polypeptide-like 3G (A3G). A3G induces extensive cytosine to uracil mutations, resulting in guanine to adenine substitutions, while Vif prevents A3G incorporation into virions by inducing A3G ubiquitination and proteasomal degradation. My project is to create a fusion gene incorporating D128K A3G and the selectable marker puromycin-N-acetyltransferase using the Thosea asigna virus T2A peptide cleavage sequence. This fusion gene will then be cloned into the lentiviral vector, pLRRed(INS2)R, which we have shown to express a Renilla luciferase/eGFP fusion gene in a HIV-dependent manner.
Spoone, Adam  
**Mentor(s):** Mr. Jay Pou  
**GLD Professional and Civic Engagement Experience**

As a senior in my final semester, I look back at my old self and see I have become far more different than my freshman self. I have grown in all ways possible, both personally and professionally. When deciding to graduate with leadership distinction, I chose the Civic and Professional Engagement path because I knew that it aligned perfectly with my career choice. As part of Graduation with Leadership Distinction, there are a few main areas of growth that I would like to focus on for my presentation on Discovery Day. Over the course of the past three years, I learned so many aspects and traits of what it means to be a leader. Setting up meetings, being on time, leading by example, and many more are some of the traits and responsibilities I have taken upon myself since stepping out of high school. Finance and the education behind it is another area where I grew tremendously. When coming to USC, for years I thought I wanted to major in Pre-Pharmacy and become a Pharmacist; I quickly realized this was not the case. I switched to a Finance and Global Supply Chain double major and have not looked back since that decision. Finally, my overall concept of business and developmental strategies of business are the last main conceptual parts I took in as a student here at USC. I have worked many jobs and have been able to apply some, if not all, of my developed attributes.

Sprague, Michelle  
**Mentor(s):** Dr. Darin Freeburg  
**Creating Knowledge about Knowledge Creation; Internalizing Knowledge Management Through Internship**

The creation of knowledge has four steps: socialization, externalization, combination, and internalization. This information was imparted on me during the academic elective, SLIS 410 Knowledge Management. In the class I was taught, among other things, that codified (explicit) knowledge becomes ingratiated into the mind as hard to express (tacit) knowledge when a person engages in doing, using, or making in the internalization stage. However, it was not until I was engaging with knowledge management principles as a Knowledge Specialist Intern for TCube Solutions Inc., that I internalized the process of knowledge creation. In other words, I created knowledge about knowledge creation during my internship. By participating in the acquisition, refinement, storage/retrieval, dissemination and presentation of information for TCube’s proprietary knowledge repository, I engaged with my explicit knowledge about knowledge management that I learned in the classroom and built tacit knowledge into my mental schema. Specifically, I engaged with the acquisition and refinement of knowledge while gathering content from Subject Mater Experts and translating that content into a standardized form. I participated in storage/retrieval by learning about the repository’s underlying technology. I experienced dissemination by being involved in the repository’s organizational launch. Finally, I was involved in the presentation of information by creating training modules about the system in conjunction with adult learning theory. By internalizing knowledge management principles through internship, my undergraduate education has been augmented, and I am better prepared to serve as an information professional.
Spraker, Jeff  
Mentor(s): Dr. Raymond Thompson  
International Survey Of Stand Up Paddle Boarding

Stand up paddle (SUP) boarding is a relatively new sport that combines surfing with paddle sports. Though several websites and books have been published about SUP, there is very little empirical evidence published about SUP. PURPOSE: The purpose of this study was to assess the participation characteristics of SUP boarders and whether these characteristics vary by gender. METHODS: An electronic survey was administered through SurveyMonkey. Participants were recruited through SUP clubs and organizations worldwide. Data were analyzed by Chi Square. An alpha of ≤.05 was considered significant. RESULTS: Out of 611 respondents, 576 men and women (48.8% vs 51.2%) completed questions regarding SUP participation. While SUP participation was not different between men and women by age, more men reported ≈6 yrs of SUP activity than women (29.2 vs 15.6%, p<.05). More men reported ≈10 months of SUP activity per year than women (61.7% vs 41.5%, p<.05). Men tended to report more miles paddled per month than women (chi sq = 13.38, p=.037). Women were more likely to report formal training in SUP technique (63.9 vs 52.9%, p<.05) as well as fewer SUP-related injuries than men (50.5 vs 64.6%, p<.05). A trend was observed for more men to compete in SUP races while women were more likely to participate in recreational and fitness SUP activities (p=.058). CONCLUSION: The greater number of injuries reported by men may be explained by greater total training volume for competition and lower probability of proper technique.

This work is partially supported by a grant from the University of South Carolina Magellan Scholar Program

Stahlman, Ellen  
Mentor(s): Dr. Sabra Custer  
A Pilot Program to prove HIV PEP to sexual assault survivors

Background/Purpose  
In South Carolina, sexual assault is a significant issue. Untreated survivors of sexual assault have the potential to contract multiple infectious diseases, such as HIV. Effective post-exposure prophylaxis (PEP) can prevent HIV transmission; however many survivors experience financial barriers to afford PEP, such as limited resources or limited/no health insurance. South Carolina has minimal measures set in place for sexual assault survivors who cannot afford PEP. Considering South Carolina’s high rates of sexual assault and HIV, this issue must be addressed.

Methods  
State guidelines and policies for New York, California, and South Carolina were researched to compare current HIV PEP guidelines. Additional methods utilized included observation and interviews with key stakeholders.

Results  
SOVA, the state agency providing help to sexual assault survivors, in cooperation with local hospitals and infectious disease providers, initiated a pilot program in 2014 to address PEP funding for sexual assault survivors. This program will ultimately help decrease incidences of HIV transmission via sexual assault.

Conclusion/Implications  
Reducing HIV infections associated with sexual assault will improve quality of life statewide. Although HIV is no longer fatal, it remains a chronic illness that requires lifelong treatment. This pilot program reduces a major barrier to PEP and should achieve broad availability of PEP for survivors in need. The SOVA pilot program plans on seeing an initial 50 patients and then hopefully being expanded statewide.
Stern, Elan
Mentor(s): Prof. Elise Lewis
My Story

In just a few short months, my time as a student at the University of South Carolina will come to an end. I will have completed my studies with a bachelor in Sport and Entertainment Management, and begin focusing on the next part of my journey. My e-portfolio is a unique presentation of everything I’ve done, seen, and accomplished as a student, and I will continue to build onto it with the added experiences I have. Specifically, my e-portfolio represents my path on graduating with leadership distinction. It includes an “about me” and “leadership” section, with three distinctive key insights I have learned and managed through as a student. It will supplement my legacy I’ve tried to impart on my University, and with it, will continue to live on as my online résumé for the near future. My hope is that the experiences I’ve lived through and knowledge I’ve gained will aid those pursuing similar paths, and influence those who are seeking similar leadership roles to go out and grab them.

I’ve attempted to tailor my experiences at Carolina to fit my professional direction and suitable skillset. These experiences have included the likes of indulging in unique interactions with my professors, completing an array of introspective internships across the country, and beginning a professional fraternity from scratch. These have all built me into a stronger leader, and have taught me distinctive ideas that can all be found in my key insights section. As I continue to progress in my journey as a graduate with leadership distinction, I hope to continue having these experiences, and to be able to make the most out of them.

Stiegler, Lauren
Mentor(s): Dr. Melanie Palomares
Is the Process of Estimation Affected by Knowledge?

Estimation is a practical skill that is used in everyday situations. Recent studies have shown that the ability to estimate dots is correlated with higher mathematical skills. We wanted to see if participants were able to accurately and precisely estimate quantity when they were given varying degrees of “Knowledge”, what they know about potential answers. One set of participants had no information about the distribution of number of dots (None Condition). We compared these data to conditions when participants were given information about the range of possible responses, from 0 to 150 (Range Condition) or the exact responses (Target Condition). We also varied distribution type. In the linear distribution, the numbers increased by 16, {0, 16, 32, 48, 64, 80, 96, 112, and 128}, while in the logarithmic distribution the numbers doubled, {0, 1, 2, 4, 8, 16, 32, 64 and 128}. Participants were shown dots on a screen for 100 ms and were simply asked to estimate the number of dots shown. Across all conditions, results showed that adults significantly underestimated numbers greater than 16, regardless of distribution type. Although the known condition had the highest proportion correct, the range condition had a similar pattern to the none condition. These results suggest that adults have poor representation of large numbers, a characteristic commonly seen in young children.

Stokey, Tyler
Mentor(s): Ms. Meghan Conroy
Working with Non-Profit Startups

Starting a new business or organization is very tricky; each one will encounter its own unique set of trials and risks. Non-profits—which are usually focused on social objectives as opposed to profits—especially face these sorts of challenges in matters of growth and sustainability. Through my internship with Project Cyma, a non-profit start-up created by a recent USC graduate, I was able to expand on what difficulties lie in early non-profit growth, and how they can be overcome. My work with Project Cyma revealed to me that while each organization is unique in terms of its scope and goals, there are usually other groups with a similar mission to your own. Connecting with these groups is very important for growing organizations, since they are often willing to share knowledge, experience, and even resources for the sake of reaching the goal they share with you. Financial or operational support from for-profit organizations, and even sometimes the government, can also be very beneficial in some cases.
Stoll, Taylor  
**Mentor(s): Dr. Hilary Lichterman**  
**GLD: Student Leadership as a Gateway to Success**

Becoming more involved in the University of South Carolina’s Dance Marathon as a junior was easily the best decision I made throughout my four years at Carolina. Serving on the Morale team before being promoted to a staff position on the internal productions committee has shown me the importance of teamwork, authentic leadership, and caring for others. Fellow leaders in this organization encouraged me to push myself to become more involved on campus by becoming a University 101 Peer Leader and studying abroad in Australia. Throughout these experiences, I have learned how to become a more effective leader, taken advantage of opportunities to grow, and gained valuable hands on experience in health care settings. I plan to use these experiences and continue growing in this knowledge while pursuing a Doctor of Physical Therapy degree from the Medical University of South Carolina over the next three years. My portfolio offers a deeper glimpse into how my experiences at Carolina have positively impacted my academic career, improved my leadership skills, and set a firm foundation for my future in the health care field.

Stone, Brittany  
**Mentor(s): Dr. Wendy Valeiro**  
**Examining the Implementation of A Music Learning Theory for Newborn and Young Children (Gordon, 2013) in Spain**

Though Music Play (Valerio, Reynolds, Taggart, Bolton, and Gordon, 1998) practitioners may be found around the world, to date no one has examined the unique characteristics of Music Play classes in Barcelona, Madrid, and Vic, Spain. With the intent of enhancing Gordon’s Music Learning Theory (Gordon, 2013), the purpose of this study was to identify unique characteristics and theory advancements in Music Play classes taught by Alba, Marisa, and Eli. Following were the guiding research questions: (1) What led Alba, Eli, and Marisa to teach Music Play classes in Madrid, Vic, and Barcelona, Spain, (2) How do repertoire, choreographed and unchoreographed movements, language, and props impact Music Play Classes in Spain, and (3) How do the facilities, assistants, parent involvement, and classroom morale influence Music Play classes in Spain? Study participants included Marisa, Alba, Eli and the child and adult participants in their early childhood music classes held at Música con Corazón, Escola de Música I Conservatori de Vic, or Escola Municipal de Música del Prat, respectively. I was a participant observer in those classes. Data sources included my observations written in a reflective journal, video-recorded teacher interviews, surveys from parents or caregivers, and video-recordings of music classes. After transcribing all video-recorded data, I coded all data, categorized it with regard to patterns and examined it for emergent themes. Those themes include (1) Construction of Curriculum and Classes, (2) The Spanish Influence, (3) Parents’ Impacts in Class. Preliminary findings support the implementation and exploration of Gordon’s Music Learning Theory for Newborn and Young children in Spain by Marisa, Eli, and Alba. Replicating this study with other internation practitioners would further clarify the understanding of their implementation and exploration of that theory. Music educators may benefit their practices by learning from the ideals of Marisa, Eli, and Alba.

Stone, Brittany  
**Mentor(s): Mr. Alex Blauvelt**  
**The Uniqueness of the Music Education Profession**

In the music education profession we have the unique opportunity of teaching a diverse groups of students, and meeting many to all students in the school. During my internships I learned the value of collaborating with other teaching professionals. Teachers with different specialties worked together to plan musicals and concerts, as well as find solutions to complex behavior problems for individual and groups students. I learned how to manage a classroom and differentiate instruction for learners on different levels with different skill sets. At both placements I was able to engage musically with students through teacher designed curriculum using voices, body percussion, boomwhackers, and mallet instruments.
Stone, Haley  
Co-Presenter(s): Michaela Day  
Mentor(s): Dr. Kristina Ramstad, Dr. April Delaurier  
**Determining the optimum DNA extraction technique for avian tissues**

A large variety of methods are available to extract DNA from diverse tissue types and taxa. Researchers seek to identify and use techniques that (a) yield a large volume of high quality DNA from their samples, (b) are cost effective, (c) are time efficient, and (d) do not require use of dangerous chemicals. In our lab, we study avian population genomics, which involves extraction of DNA from tissue samples. We are motivated to learn the optimal method for obtaining quality DNA from our samples, in a safe, low-cost and time efficient manner. In this study, we compared four different DNA extraction methods (phenol/chloroform, Qiagen DNeasy®, Omega Bio-tek EZNA®, and HotSHOT) in three tissue types (blood, toepad, and feather) from three different avian species (wood stork, Mycteria americana; owl, Family Strigidae; and cedar waxwing, Bombycilla cedrorum). We compared the methods for the quantity and quality (effective PCR amplification) of extracted DNA, cost per reaction, process time, and use of dangerous chemicals. Preliminary results suggest that EZNA® and HotSHOT methods often yield higher quantities of DNA than Qiagen DNeasy® or traditional phenol/chloroform extractions. These two methods are also the cheapest and fastest of those tested and do not require use of corrosive chemicals (eg, phenol). Further tests are underway to determine if these results vary between fresh and archival tissue samples.

Streeter, Lauren  
Mentor(s): Dr. Allison Randel  
**Does Music/Art Effect Children with Autism Differently Across Age?**

A surveillance study, according to the CDC's Autism and Developmental Disabilities Monitoring (ADDM) Network, identified 1 in 68 children (1 in 42 boys and 1 in 189 girls) as having autism spectrum disorder (ASD). About 1 in 6 children in the United States had a developmental disability in 2006-2008, ranging from mild disabilities such as speech and language impairments to serious developmental disabilities, such as intellectual disabilities, cerebral palsy, and autism. Therefore, the number of special needs students present in a music educator’s classroom are rising. As more teachers are coming into contact with these students, more research is recently being developed. So far the majority of studies are music therapy based in one on one settings. So results are different from what is found in group classroom settings. This research uses oriented goals to seek the enhancement of social skills and enjoyment in children diagnosed with Autism Spectrum Disorder or Developmental Disorders, through the use of group-led music and art activities. The results from this study will help to improve the study design for future study so we can learn how music and art effects youth with developmental disabilities.

Strickland, Courtney  
Mentor(s): Dr. Daniel Fogerty  
**The contribution of visual cue synchrony to recognition of interrupted natural and vocoded speech**

Currently, it is unclear how well individuals are able to integrate visual cues with a temporally degraded auditory signal to support the recognition of speech in adverse listening conditions. This experiment furthered our understanding of the importance of visual speech cues and how the temporal properties of this modality facilitate processing and perceptually filling-in missing temporal information. This study determined how temporal synchrony of visual speech information affects understanding of interrupted sentences. Two groups of listeners were tested that heard either normal or cochlear implant simulated (i.e., vocoded) speech. Each listener group completed three conditions: interrupted auditory-only speech, auditory speech with video presented synchronously with the auditory interruptions, and auditory speech with video presented asynchronously with the interrupted auditory signal. Participants verbally repeated the sentence after each stimulus. Results demonstrated no significant difference between performance on synchronous and asynchronous audio-visual conditions. However, a significant benefit of visual information was observed in both conditions, particularly for the vocoded listener group. The high contextual predictability of these sentences, in addition to near ceiling performance for the normal speech group, may have reduced the potential effect of visual temporal synchrony. In conclusion, it may be important to study factors such as the predictability of the sentences and the intelligibility of the normal condition to determine how they influence the contribution of asynchronous or synchronous multimodal cues for speech recognition.
Stringer, Kristen  
Mentor(s): Mrs. Anna Oswald-Hensley  
Leading the Way for Successful Students

Work Study has provided me with the basic skills to operate and function within an educational environment such as a library and office setting. I began work study my first semester, freshman year at the University of South Carolina Sumter campus. My freshman year, I was a switchboard operator; this was the first job I ever had. I have learned basic office skills such as answering and transferring phone calls, sorting and stamping mail, and using Microsoft Office. It is now my sophomore year and I am currently working in the Anderson Library. I have learned how to check in and out books, print, copy, and I help patrons of the community with the computer and answer questions in regards to our campus. I decided to become a work study because I needed a reliable job that is willing to be flexible to my class schedule. By having a job on campus, I am able to work during my breaks between classes within a professional setting. I was willing to work for minimum wage because it was not just about the financial aspect, but also about me gaining experience. Through work study, I have gained great relationships with my bosses and other coworkers, and that has opened the door for other job recommendations. I am hoping my work study experience will qualify me for other job opportunities on the Columbia campus and will enable me to get jobs within the educational field.

I joined the USC Sumter Biology club my freshman year and now I am the Treasurer and Vice President. I keep track of any money we raise for the club, figure out the cost of any activities we want to do, help organize and run our meetings while keeping everyone focused on the topics at hand, and work to draw in new members by getting students involved within our community. I was inspired to take charge in this organization because of the positive impact the SciAnts have had on the community. We helped clean up a family’s house and yard that was affected by the flood we had in October, 2015 and on Earth Day we planted a tree on campus. By going on hikes around the community, we teach our fellow students to have a greater appreciation for nature, which will inspire and empower them to help maintain our beautiful, natural world. I hope to join other clubs geared towards helping the environment and the community once I transfer to the Columbia campus.

Strom, Joelle  
Mentor(s): Dr. Rekha Patel  
The effect of PACT mutations that cause the neuromuscular movement disorder dystonia 16 (DYT16) on PACT-PKR interactions

PACT regulates PKR activation and apoptosis in cells exposed to stress signals. PACT is phosphorylated in response to cellular stress and phospho-PACT associates with PKR efficiently to induce PKR activation, eIF2a phosphorylation, and apoptosis. One of the PACT mutations, P222L, found in DYT16 patients, causes increased PACT-PACT and PACT-PKR interactions under endoplasmic reticulum stress conditions and therefore causes higher levels of apoptosis. Using co-immunoprecipitations, yeast two-hybrid protein-protein interaction assays, and co-localization of PACT and PKR in human cell lines, we are investigating the molecular mechanisms and the effects of other known PACT mutations found in DYT16 patients. The long-term goal of this project is to understand how mutations in PACT cause DYT16. Understanding the molecular etiology of DYT16 is expected to aid the development of newer therapeutic options.
Struckman, Heather  
Mentor(s): Dr. Michael Gower, Mrs. Kendall Murphy  
Isolation of Foreign Body Giant Cells from Tissue Engineering Scaffolds

Our lab develops tissue engineering scaffolds from FDA approved polymers for implant into the adipose tissue. Scaffolds are engineered for cell, gene, and drug delivery allowing us to modulate a range of cellular processes at the implant site. However, scaffold implantation results in an unavoidable inflammatory response, which can impair the scaffold’s intended effects. One cell type involved in the inflammatory response is the foreign body giant cell (FBGC). FBGC are formed when several macrophages fuse together after a single macrophage fails to engulf the foreign material alone. The FBGCs could decrease the effectiveness of the scaffold implant as a drug delivery vehicle, which motivates our studies to understand how FBGCs manipulate the scaffold environment. To accomplish this objective, I developed a protocol to isolate FBGC from a polymer scaffold implanted in the fat of mice. Scaffolds were excised from the tissue and then de-cellularized with a collagenase solution. FBGCs were then isolated from the cellular suspension based on F4/80 expression using fluorescent activated cell sorting (FACS). The sorted population was confirmed to be FBGC based on morphology using wright stain. Morphological analysis revealed that many FBGC were damaged during FACS. This problem might be resolved in the future by isolating FBGC using size exclusion with filters. Future work will focus on isolating undamaged FBGC and studying their effect on scaffold drug delivery in vitro.

Strzyzewski, Lauren  
Mentor(s): Dr. Marj Pena  
The Role of Lipocalin2 in Liver and Lung Metastasis of Cancer

Lipocalin2 is a member of the lipocalin family of siderophore-binding molecules that can mediate iron trafficking. It acts during the innate immune response and has been implicated in conflicting roles in metastasis, leaving its role undefined. In breast cancer LCN2 was shown in previous studies to both inhibit or promote metastasis. In a previous study at the Center for Colon Cancer Research, LCN2 was found to significantly increase liver metastasis of the poorly metastatic MC-38 colon cancer cell line. The ability of LCN2 to promote metastasis of colon and other cancers to the lung was tested, determining its functionality as a multi-organ determinant of metastatic growth. The effect of elevating circulating levels of LCN2 on metastasis was tested on mouse models using MC-38 colon adenocarcinoma cells, 4T1 breast cancer cells, and B16-F10 melanoma cells using C57Bl/6, Balb/c, and B6 mice. Isolated using endotoxin free methods, pV1J-LCN2 plasmid was utilized for in vivo electroporation of the mice, with the cancerous cells injected using tail-vein, mammary fat pad, and subcutaneous injections. Its empty vector, pV1J was used as the control. Blood serum and in vivo images were obtained weekly, along with caliper measurements of the primary tumor. Mice were sacrificed after 3 weeks and the lungs, liver, and spleen were weighed and examined for metastasis post-mortem. Preliminary results indicate that LCN2 promoted a significant increase in tumor mass in all three cell lines. Though some metastasis was observed, further studies are required to determine the extent of the metastatic potential of LCN2.
Sullivan, Catherine  
Mentor(s): Ms. Lisa Camp  
Dance Marathon: Communicating The

USC Dance Marathon (USCDM) is one of 300 university and high school Miracle Network Dance Marathon programs in the country, benefitting Children’s Miracle Network Hospitals. USCDM fundraises for the Child Life Program at Palmetto Health Children’s Hospital, Columbia’s only freestanding children’s hospital, through student fundraising, sponsorships, corporate partnerships, merchandise sales, and mini high school dance marathons. As a public relations student, my passion lies in nonprofit communications and advocacy. For my final year as a member of USCDM, I was elected as a member of the public relations committee, which works to build and maintain university, community and media relationships, produce consistent social media strategies and promotional efforts, as well as design all merchandise. Strategic messaging and two-way communication is key to stakeholder, volunteer, and donor engagement, and we implemented a yearlong “Limitless” campaign to tie our organization more closely to the university and to a consistent message. We succeeded in a number of categories in our 2016-2017 program, including surpassing our public goal of $700,000. Our organization reached many historically large numbers, including number of registered participants, fundraising during our 24-hour Day of Miracles, and corporate partnerships and sponsorships. This was all made possible through our communication strategy that focused on our “why” – the reason we all fundraise and participate – being limitless for the kids. Through Dance Marathon, I have learned the importance of thoughtful campaigns, open communication, creative strategy and sharing your “why” about joining the movement.

Swiecki, Allison  
Mentor(s): Dr. C. Nathan Hancock, Dr. April DeLaurier  
Application of Tol2-based Activation Tag Constructs for Zebrafish Mutagenesis

Transposable elements are segments of DNA that can move from one region to another within the genome. The Tol2 transposon from Medaka fish has successfully been used for transgenesis, integrating foreign DNA, into a wide variety of vertebrates. Our goal is to develop Tol2 into a mutagenesis tool for gene discovery. Mutagenesis by transposon insertion, called transposon tagging, enables the discovery and analysis of gene function by causing mutations. Activation tagging, a type transposon tagging, is when a strong enhancer is positioned within the transposon. Activation tagging is used to learn about the function of genes by inducing overexpression. This is significant because many genes may otherwise be hard to study because of lethality or redundancy. Activation tagging has never been used for zebrafish, but is commonly used for gene discovery in plants.

Zebrafish can serve as vertebrate development models, therefore activation tagging within zebrafish allows for the discovery of genes that are important for vertebrate development. A Tol2-based activation tag, with a h2afx promoter sequence inserted in the middle of Tol2 terminal inverted repeats (TIRs), was engineered using various molecular biology techniques (PCR, digestion, and sequence analysis). Additionally, a DNA construct encoding Tol2 transposase, which will allow transposition of the activation tag to occur, was produced. The integration of both constructs into zebrafish embryos is performed to measure transposition rates and look for altered gene function. To develop more active constructs for zebrafish mutagenesis, yeast transposition studies are also being performed in order to identify methods to increase transposition rates.
Swimmer, Kaitlyn  
**Mentor(s): Dr. Edie Goldsmith**  
**Identification and Putative Function of Fibroblast Activation Protein and Relevance to Post-Myocardial Infarction Remodeling**

Fibroblast Activation Protein (FAP) is an integral membrane serine protease whose expression is elevated on activated fibroblasts in the stroma surrounding tumors and other wound healing processes. FAP has been shown to cleave denatured as well as native collagens as well as fibroblast growth factors (i.e. FGF-21). However, whether and to what degree FAP alters MMP activation and hence relevant to post-MI remodeling is unclear. This study tested the hypothesis that FAP can activate proMMPs, such as proMMP-2, and thus provide a novel initiation mechanism for MMP-mediated post-MI remodeling. I worked on parts of this project which qualitatively and quantitatively validated that FAP is produced in excess in infarcted hearts, including western blots, fluorescent staining, and BCA Assays. Through this project and working in the lab, I learned about many cellular processes and to think critically about how and why experiments worked or didn't.

Taylor, Katlyn  
**Mentor(s): Mrs. Laura Carnes**  
**Early Start: A first generation student's perceptual journey through college**

As a freshman, I chose to enroll in TRiO Program's Early Start experience. Early Start served as the catalyst to change the way I perceived and valued my college experience. By joining TRiO, I surrounded myself with a positive support network. I chose to interact with peers, faculty, and staff who made good decisions which in turn positively enhanced my character, self-image, peer network, and ultimately my career goals. I will highlight my collegiate experiences and communicate how social networks and altruism changed my perception of college from solely a monetary benefit to one that benefits an individual holistically.

Taylor, Emily  
**Mentor(s): Dr. Jay Patel**  
**Servant Leadership Leads to Lasting Purpose**

I strive to lead a life of character, integrity, and purity. I have grown to be confident in what I believe, and have learned to use discernment to make wise decisions. Looking back on my years leading to college, I had a quiet confidence that people along the way saw that encouraged me into leadership positions that I never thought I was capable of holding. When I decided to move over 500 miles away from my home in Cincinnati, Ohio to attend the University of South Carolina, I did not realize that I was in for four years of the greatest experiences, a period of immense growth, and a place where I would find the causes and areas of this world in which I am truly passionate. In my time at USC, I have had the privilege of serving in two organizations, USC Dance Marathon (USCDM) and Alpha Chi Omega Fraternity, through which my passion for serving and loving others well has been solidified. The past two years in USCDM, I served as a Morale team member my Junior year, and this year I was a member of the Family Relations committee. I have learned to lead with compassion and with a purpose. Dance Marathon taught me that no child should ever feel like they are fighting a battle alone, and every child deserves the opportunity to have the best life possible. I want to become a Physician Assistant and someday work in a Children's Miracle Network Hospital and serve more children because I have been personally touched by the stories of our 24 Miracle children. Dance Marathon also gave me a family of 150 students who share the same love for the kids at Palmetto Health Children's as I do, and who want to strive every day to make miracles happen for them. On the other hand, serving as VP New Member Education and Chapter President for Alpha Chi Omega taught me that when you lead by service and love for the women around you, you have the potential to help them in the direction of becoming the Real, Strong Woman they were always capable of being. I am forever grateful for these two organizations that brought me incredible memories, but also taught me I am much more capable of making a difference in the lives of others than I ever thought possible.
Background: An increasing number of women are surviving breast cancer. For women diagnosed with hormone receptor positive (HR+) breast cancers, healthcare providers commonly prescribe up to 10 years of adjuvant hormonal therapy (AHT) after completion of surgery, chemotherapy and/or radiation. AHT is important in reducing the risk of the breast cancer returning, but often, not without a burden on the patient’s quality of life. This burden of factors, such as side effects, lead many breast cancer patients to discontinue their AHT, which may increase their risk of death. Given the role that healthcare providers (HCP) play in prescribing, educating, and supporting patients on AHT, it is important to elicit their perspectives as part of the solution to improving long-term AHT adherence.

Purpose: This study describes HCP perceptions about the barriers and facilitators to breast cancer patients adhering to AHT.

Methods: From April to December 2016, we conducted semi-structured qualitative interviews with 21 HCPs in South Carolina who worked in oncology settings and/or with breast cancer patients taking AHT. We applied content analysis techniques to examine the interview transcripts for the frequency and context of pre-selected keywords identified by Murphy et al.’s (2012) systematic review of factors correlated with AHT adherence.

Preliminary results: To date, we have searched 12 of 20 HCP interview transcripts. The top three most frequently discussed barriers are the patient’s perception, side effects, and support. We found that when side effects are mentioned, HCPs most frequently discuss hot flashes, weight gain, and early onset of menopause. There are additional reports of vaginal dryness and decreased libido.

Implications for enhancing quality of life: Breast cancer patient’s quality of life could be improved through better management of side effects and other barriers to adhering to AHT. HCPs can play an important role in overcoming these barriers.

Taylor, Jacob
Mentor(s): Prof. Tricia Kennedy
Jacob Taylor’s GLD Presentation: Professional and Civic Engagement

Over the past three years, I have participated in two internships within sales and operations which actively expanded upon the professional foundation I have established with my organizational involvement. During my time at the University of South Carolina I was able to serve as a University 101 Peer Leader as well as president for my professional business fraternity. Through these experiences I discovered how operations principles can be applied outside of manufacturing to deliver efficient teamwork, greater interpersonal understanding, and effective leadership. My internship with BAE Systems has served to solidify these values due to their practice in a corporate environment. My passion to help those around me and continuously improve has benefitted from these experiences and they will continue to shape my character as I expand upon them in the future.

Taylor, Natalie
Mentor(s): Dr. Sanjay Ahire
Carolinas HealthCare System process improvement project
Thoerner, Ashley  
Mentor(s): Dr. Hilary Lichterman  
Resident Mentoring and Global Connections

For the past three years, I have been honored and humbled to serve as a Resident Mentor for the University of South Carolina Housing. My first years as a Resident Mentor (RM), I was at Capstone where I had freshman residents. Most of the RM training sessions centered around freshmen success and how to deal with diversity issues related to more domestic matters. But, for the past two years, I have been an RM at East Quad, which serves as the primary housing for the International Accelerator Program students. A majority of these students are entering the US for the first time, and their English skills are developing. It has been a challenging but rewarding experience to work with these international students, as they have a completely different need set than what domestic freshman residents requires. It is hard to train a small batch of RMs in these matters, and it has caused us to experiment with different approaches in order to help engage these international students. The best methods we have found is to have cultural showcases so that these students can be involved with their Residence Hall by sharing their cultures with others. These showcases and my own experience abroad have heightened my curiosity for the world, and it has also given me the insight that the world is becoming smaller and smaller. In the professional world, it is now becoming a necessity rather than a privilege to be a global citizen as it is unavoidable to not have some international experience.

Thomas, Sean  
Mentor(s): Dr. Melissa Moss  
Probing the effects of insulin on amyloid-β aggregation.

Studies have shown insulin to have a positive effect on Alzheimer’s Disease patients. I have been seeking to determine why, from a biochemical perspective, this appears to be the case. I have looked at the effects of insulin on the aggregation of amyloid-β oligomers and fibrils and on the morphology and toxicity of these aggregates.

Tilton, Gracen  
Mentor(s): Mrs. Ashley Byrd-White  
Personal Growth Through Leadership Abroad

One of the most important goals and challenges for higher education is having the ability to integrate learning between university courses and extracurricular activities, such as internships or work experiences, over time. Through the Professional and Civic Engagement pathway, I was able to reflect on the various connections that were made between my integrative and applied learning. After two internships; one, spent abroad with an organization called Forum Nexus, I was able to expand my cultural understanding and global awareness, while defining myself as a young professional. Throughout my time as a peer leader with Forum Nexus, I was able to become a more effective communicator through connecting with each of the students on an individual level. Understanding how their transition into life abroad contributed to their own personal growth, I was able to reflect on my own personal achievements and development. Acquiring this leadership experience as an undergraduate has given me the opportunity to apply my appreciation for other cultures and utilize the various management skills I possess to my fullest potential in future endeavors.
Tobin, Sarah  
**Mentor(s): Dr. Kasia Pawelek**  
**Impact of a waning vaccine and altered behavior on the spread of influenza**

Influenza remains one of the major infectious diseases that targets humankind. Understanding within-host dynamics of the virus and how it translates into the spread of the disease at a population level can help us obtain more accurate disease outbreak predictions. We created an ordinary differential equation model with parameter estimates based on the disease symptoms score data to determine various disease stages and parameters associated with infectiousness and disease progression. Having various stages with different intensities of symptoms enables us to incorporate spontaneous behavior change due to the onset/offset of disease symptoms. Additionally, we incorporate the effect of a waning vaccine on delaying the time and decreasing the size of an epidemic peak. This study further provides information on pharmaceutical and non-pharmaceutical interventions during an influenza epidemic.

Town, Margo  
**Co-Presenter(s): Serena Stoneberg, Coleah Bellamy**  
**Mentor(s): Prof. Rui Qi, Prof. David Cardenas**  
**Millennial travel trends and the insight into the sharing economy**

There has been a developing interest in how exactly millennials will shape the future. This generation has sculpted new ways of seeing the world around them and the advancement of technology has certainly helped shape their perspective. As students learning about the hospitality and tourism industry, we have taken interest in our Millennial Generation and how we will shape the travel business. The evolving trends of millennials shifting away from traditional travel methods can mean a great deal to this industry. This research will take an in-depth insight into the rising interest of the sharing economy. This can be described as a socio-economic ecosystem built around the shared effort between humans with their available physical and intellectual resources. Often, prices are offered in interval pricing opportunities, at times, rates may appear to consumers at a much lower rate than at other times of the year and also even different from other providers. Technology has made data about tourism services more widely available, thus opening the door for physical assets to be consumed as services via platforms such as VRBO, Airbnb, and Uber. Technology has also reduced many of the costs associated with traditional retailing and service methods such as transaction costs and taxes, thus making sharing assets cheaper and easier and therefore possible on a much larger scale. This research will focus largely on what factors push this generation towards taking part in shared economy and how that is a factor that helps determine their overall destination. In order to represent the population of millennials, we will use convenience sampling by asking students at the University of South Carolina questions about what factors were considered when planning their spring break trip. This survey will focus on the sharing economy and how many students considered this option of travel over traditional travel methods.

Tran, Leon  
**Mentor(s): Dr. Carol Boggs**  
**Alternating Mate-Location Strategy of Gillette’s Checkerspot (Euphydryas gillettii) in Response to Female Availability**

Patrolling behavior by male insects involves actively searching for potential mates, and perching behavior is a sit-and-wait strategy for locating potential mates. Male butterflies of some species alternate between mate-location strategies. The Gothic, CO population of Euphydryas gillettii (Nymphalidae) was observed in order to understand the environmental factors and female availability affecting male choice of mate-location strategy. Observational data was collected on male and female behavior throughout the day using mark-release-recapture methods and visual observations using binoculars. Weather data and perch height temperatures were collected in order to understand environmental influences on strategy alternation. Higher air temperatures and low female availability are expected to be correlated with a decrease in the proportion of males employing a patrolling strategy females, while lower air temperatures and high female availability are expected to be correlated with an increase in the proportion of males employing a perching strategy. These relationships result in strategy alternation of mate-location in males in an attempt to maximize reproductive success.
Trebilcock, Jennifer  
Mentor(s): Dr. Dawn Wilson, Mr. Tyler McDaniel, Ms. Lauren Huffman  
Associations of Authoritative Parenting, Socio-Economic Status, and Parent Body Mass Index on Child Body Mass Index

Obesity in adolescence has been associated with a higher risk of developing chronic diseases (e.g. hypertension, diabetes) later in life. Obesity rates are disproportionally higher in African-American adolescents as compared to Caucasian adolescents. Authoritative parenting has been defined as balancing high levels of control with high levels of warmth; previous studies have shown this to be an important factor in understanding health behaviors in youth. The purpose of this study was to test associations between authoritative parenting, parent emotional support (encouragement for healthy eating), socioeconomic status, and parent BMI on child z-BMI. Both adolescents and their parents completed survey to assess parenting factors and demographics. A total of 148 African-American adolescents (Mage=13.6 years; BMI%=96.6) and their primary caregivers (Mage=43.4 years; BMI=37.41) were included in this study. Participants were enrolled in the Families Improving Together (FIT) for Weight Loss randomized controlled trial (National Institutes of Health Grant #R01HD072153). Correlation analyses revealed there was a significant positive association between parental emotional support for diet and child z-BMI (r=.251, p<.01), suggesting higher parental emotional support, the higher the child BMI. Interestingly, this is consistent with some previous research which has shown that emotional support may be seen as parental nagging by youth. Additionally, there is a significant positive association between parent BMI and child z-BMI (r=0.281, p<0.05), suggesting higher parental BMI, the higher the child’s z-BMI. No other significant correlations were found. These findings suggest that parent BMI may be an important factor to consider when developing future obesity interventions in African-American families.

Troxell, Brooke  
Mentor(s): Dr. Jessica Green  
The effect of displayed emotion on cue gaze time with human and nonhuman faces

The purpose of this study is to investigate the effect displayed emotion has on target identification when both direct and averted gaze are used. Previous studies have shown that gaze direction can be used to shift visual attention (Frischen et al, 2007, Psychological Bulletin). The shift in attention is thought to reflect a socially evolved automatic response used to orient oneself to the same object that other people are looking at (Adams et al, 2010, Journal of Experimental Social Psychology). Since it is hypothesized that perceived gaze direction is a socially evolved cue, and emotions are also a vital part of human societal interactions, we wanted to see if different emotions, not just fear, have an influence on the shifting of visual attention and the pathways that the information is processed. Additionally, we are examining whether human faces and nonhuman faces have a consistent effect on the shifting of attention through whether they produce the same patterns of response times. Response times will also be compared to the amount of text and instant messages sent and received and the frequency with which they use emoticons. Some neurological and psychiatric disorders, such as autism, have characteristic symptoms that involve not being able to interpret social cues and emotions on other faces (Jong et al, 2008, Journal of the American Academy of Child and Adolescent Psychology). Understanding how facial and emotional information is processed in the brain by non-autistic people, could produce cures or therapies to aid autistic persons in social functioning, which is a main part of human function and survival.

Works Cited
Truesdale, Summer
Mentor(s): Mrs. Laura Carnes
Structural mobility and academic performance: Preventing early attrition

Structural mobility and academic performance: Preventing early attrition
Summer Truesdale, Bachelor of Arts, Organizational Leadership
As I approach graduation and examine my future role in society, I am struck by the enormous impact structural mobility has upon all of our opportunities within society. As I completed my Graduation with Leadership Distinction E-Portfolio, and reflected upon the components of structural mobility, I became aware of how interconnected education and social networks are for the betterment of society. Individually, each is powerful, but combined together both education and social networks have the power to be truly transformative on both individual and societal levels. With that in mind, I am working with the Director of Student Engagement and Success at USC Lancaster to implement an early intervention program for first time students, with a predicted grade point average of a 1.5 or less. The goal of this program to provide these students with adequate social and educational resources in order to increase their potential for success at USC Lancaster. During my Discover USC presentation, I will highlight the importance of this plan along with my recommend solutions, and a detailed plan for implementation.

Trusty, Briana
Mentor(s): Dr. Kevin Hull
How News Organization Are Using Instagram to Engage Audiences

Since its creation in 2010, Instagram has quickly become one of the most used photo-sharing app in the world (Blystone, 2015). The social media platform boasts a daily active user count of over 400 million people and over 40 billion photos have been shared on Instagram since 2010. The platform has not only changed how individuals across the world are able to interact with each other, but also how organizations are able to interact with individual users. News organizations, in particular, have been struggling to determine where they fit in when it comes to maintaining a social media presence. Since social media is relatively uncharted territory for news organizations, it has inadvertently posed the question of how they should be using social media. According to a 2016 Pew Research Center study, 38% of adults said they get their news from digital media platforms which include apps and social media (Lu & Holcomb, 2016). It is worth determining just what sort of “news” they are receiving. For this reason, the purpose of this study is to determine how news organizations are using Instagram. Instagram posts were collected from 25 randomly selected television stations from five equal sections of the broadcast television market. From those 25 stations, the 10 most recent pictures from each station’s Instagram account were examined using content analytic methods (n = 250). Results demonstrate that news organizations are primarily using Instagram to post behind-the-scenes pictures of their news staff (24.8%) and artistic photos (21.2%). This demonstrates that television news departments are not frequently using Instagram as a news delivery tool (just 14.4% of posts were “news”). Therefore, it appears that television stations are positioning their Instagram accounts to be more entertaining than informative.
Ullman, Kathryn  
Mentor(s): Mrs. Stuart Hunter  
Bienvenido to New Experiences

In January 2016, I left my comfort zone and headed to Barcelona, Spain to spend a semester studying and exploring new cultures. I decided I wanted to get more out of my experience and fully immerse myself into the city. I had the opportunity to volunteer at Jovellanos Primary School throughout my semester in Barcelona, working every week with a classroom of six-year-old students eager to learn the English language. The days I spent volunteering were some of the most rewarding moments of my abroad experience. I created “lesson plans” and topics that I would discuss with the Spanish students. I made slideshows including pictures of my family, my home state, and maps so they could understand where I was coming from. It was so humbling to see the students get so involved and be so interested in American culture. To see how proud they were when they could say a sentence in English was something I will never forget. The English professor encouraged us to speak in only English, so with me not being a fluent Spanish speaker and only knowing basic Spanish phrases, it was nice to be able to speak in my own language and have the young students be learning from me at the same time. Not only did they learn from me, but I also learned immensely from them and this experience. It brought me out of my comfort zone and gave me the confidence to engage myself as much as possible while abroad. I also had the opportunity to travel to twelve European countries and more than 30 cities. My experiences allowed me to develop a global mindset, both personally and professionally, within and outside the classroom. I realized the importance of making my own assumptions about the world, and appreciating other cultures and others around me. I have reflected on my global experiences and the impact they have made on me and know that I can adapt and thrive in an unfamiliar environment in the future. Global learning has had an incredible impact on me, and I strongly believe that any student would benefit from a study abroad experience.

Utset, Elizabeth  
Mentor(s): Ms. Theresa Harrison  
GLD: Study Abroad Experience in China

Ever since I had the opportunity to visit China for the first time when I was fourteen, learning Chinese and achieving fluency in the language became one of my deepest passions. During my junior year, I spent my two semesters studying abroad at East China Normal University in Shanghai, China. Between my semesters, I made my way to a small organic farm located outside Chengdu, China, and worked there for a month as a foreign volunteer. After my second semester, I worked as a teaching intern at a kindergarten in Nantong, China. I went in to my experience expecting language to be one of my greatest takeaways; yet, I was astounded by how much the experience shaped my learning in ways that I did not originally anticipate. I found myself breaking down language and cultural barriers, moving from struggling to find the confidence to ask “Nihao-ma?”, to fluently discussing democracy, human rights, current events, and hopes and dreams in Chinese with people whose opinions differed greatly from mine. I grew to become a local in cities that once made my feel hopelessly different, confused, and alienated. I endured loneliness, culture shock, and homesickness, and I grew to appreciate each of these negative emotions for helping me to love my time abroad, even in its imperfectness. After having many opportunities to teach English and develop my own teaching style, I opened my mind to the possibilities of pursuing a career in higher education on an international level. But, most importantly after one of the most challenging years of my life, I am incredibly independent, fiercely adventurous, happily spontaneous, and deeply appreciative of the small things that make everyday life beautiful.
Valerio, Maria  
**Mentor(s): Mrs. Ashley Byrd-White**  
**Professional and Civic Engagement through Political Communications**

My collegiate experience at the University of South Carolina has awarded me with valuable classroom knowledge, and equipped me with the skill set to gain valuable beyond the classroom experiences. During one of my internships, I had the opportunity to serve as a media and communications intern for Congressman Joe Wilson's (CD-02) Re-election Campaign. There, I observed and participated in the relationship of politics and media first hand. I combined information learned in my political science major classes and my journalism minor classes to create various press items, plan events, and research public opinion and policy. My experience on this congressional campaign enabled me to gain valuable leadership roles on creative projects and general organizational and peer leadership skills that transfer to my student organization leadership and work beyond the classroom. My internship experience with Rep. Wilson allowed me to combine interests in politics and media and to discover my passion for political communications. With this presentation I highlight the leadership, communications skills, and confidence gained from that internship and how they have influenced the continuance of my scholarly education and employment aspirations.

Vallabhapuram, Hemant  
**Mentor(s): Dr. John Jensen, Prof. Pat Hanly**  
**Integrated Managerial Process Construction and Improvement (IMPCI) Strategy**

Organizational creation and development is a pivotal factor in the perpetual growth of society. The purpose of this presentation is to illustrate the “Integrated Managerial Process Construction and Improvement (IMPCI) Strategy” that I created to found and sustain Delta Kappa Epsilon Fraternity and implement methods to reaching record breaking student engagement statistics through the Student Government Elections Commission. The University of South Carolina affiliates both organizations as they are committed to the enhancement of community and societal prosperity.

USC students continuously pursue the construction of organizations however if there is an absence in a structured process and strategic implementation, said organizations can have high potencies in defaulting which puts members, their long-term and short-term objectives, and overall credibility at risk.

After utilizing entrepreneurial strategies learned from my curriculum at the Darla Moore School of Business to formulate visions and mission statements for the Fraternity and Elections Commission, I found a variety of strategies using the Lean Six-Sigma DMAIC method to continuously improve both processes to achieve maximum longevity.

Said internal and external process improvements allowed for efficiency in receiving Fraternity Charter and admitting over 100 quality members within only two years of existence. Furthermore, the improvements granted the success of the record breaking Elections Commission’s student engagement goals, as 90+ individuals filed for candidacy with over 6K in student voters.

These successes were highlighted by the compelling usage of the IMPCI Strategy as it supported the achievements in all entities. This strategy has further proved to provide stability in maintaining procedures to adequately adhere to the completion of organizational aspirations by detailing the Define, Measure, Analyze, Improve, and Control phases. The blend of Lean Six-Sigma principles with implementation techniques shows clarity and credibility to prospective student leaders.
Vaughan, Bryana  
Mentor(s): Dr. Randy Lowell  
Piedmont Physic Garden: Renewing Community Connections

In researching internship opportunities for Graduation with Leadership Distinction with my advisor, Dr. Randy Lowell, we came across an internship at Piedmont Physic Garden. This seemed perfect for me because it would involve planning events and writing various assignments, which began on January 10, 2017.
Piedmont Physic Garden is a nonprofit botanical garden in Union, SC. The family of Dr. Paul K. Switzer, a physician who practiced in Union for almost 60 years, founded the garden in 2014. Piedmont Physic Garden is modeled after London’s Chelsea Physic Garden, founded in 1673. Chelsea Physic Garden plays a significant role in educating over 5,000 school children a year and retaining one of the largest medicinal plant displays in the world. The goal of both the Piedmont Physic Garden and Chelsea Physic Garden is to educate individuals on gardening, healthy lifestyle, and to create a beautiful environment for the community to enjoy.
My role at Piedmont Physic Garden is to assist with any given assignment. For the most part, I create newsletters, blogs, articles, agreements, and a variety of other publications. I am also involved with event planning and gardening.
My internship at Piedmont Physic Garden has been educational and life changing. I look forward to elaborating on how my work at the garden has positively affected my communication skills, connections with the community, and importance of educating others. I have benefited from this experience tremendously, both personally and professionally, as I continue to develop as a leader.

Vaughan, Stephanie  
Mentor(s): Ms. Maegan Gudridge  
Valparaíso’s Cultural Landscape: How History Influences Identity

In Fall 2016, I was able to study abroad in Viña del Mar, Chile. While studying abroad, I experienced the culture and learned about the history of Viña del Mar, as well as the neighboring port city of Valparaíso. Through a city street art tour, I was immersed in Valparaíso’s unique cultural landscape that the country’s history has created, and how it has influenced the culture of the city over time. The courses that I have taken at both the University of South Carolina and the Universidad de Viña del Mar, helped provide me with a framework to understanding how the history of an area can directly and indirectly influence the culture and landscape of the area. In this presentation, I will discuss the concept of a cultural landscape as well as how the social and political history of Chile has molded Valparaíso into a vibrant, artistic port city.
Columbia, South Carolina provides cultural and historical attractions that pull tourists to visit each year. One of the most well known areas in Columbia is the Vista, an area filled with shops, restaurants, and bars, located on Gervais Street. The Vista makes for a relaxing afternoon spent well with family or a fun night of dancing and entertainment and friends. The South Carolina State Museum is located just west of the Vista on Gervais Street. The proximity of the museum to this popular district is beneficial for bringing in more attendees. The museum building was built before the Vista was established and embodies the historical culture of South Carolina. Over the past five years, the museum has seen a bit of a drop in attendance, specifically in the 18-35 age range, also known as ‘millennials’. The State Museum was looking for ways to bring more millennials through their doors.

Food trucks have been increasingly popular in the last five years. In fact, food trucks have especially gained popularity on college campuses. (Universities Glom Onto food trucks, 2012). Fourteen percent of respondents to a survey say that they employ food trucks on college campuses (2012) to cater to the demands of their students. After examining these figures, it was apparent that the State Museum could successfully start a small gathering of food trucks one night a week to encourage millennials and college students to come to the museum, thus boosting their attendance. Admission to the museum’s exhibits could be advertised as part of a package deal on food truck night. For example, if a group of students purchases tickets to the museum, the tickets could include a voucher that is good for a free meal at one of the select food trucks.

Ideally, this endeavor would create a partnership between the state museum and the food trucks employed. For food trucks, their best opportunities are festivals, multi-truck roundups and catering (Freed). Their exposure to college students, who particularly love this trend, would help the museum with attendance. It would create product placement in person at the museum. A student who likes a food truck they visited during food truck night may also consider hiring that food truck for an organization’s event. They are also likely to return to the museum to eat at the food trucks they like and visit some of the exhibits.

In late 2016, the State Museum started renting space to one or two food trucks during their Friday night laser light show. The purpose of this research is to examine how the incorporation of food trucks has affected the attendance over the past 3 months at the South Carolina State Museum.

The University of South Carolina is full of sustainable practices, technology, and features. This investigation involves observing the Columbia campus, and in what ways the institution is actively practicing sustainability. For the purpose of this presentation, sustainability refers to the efforts made to help save money, energy, and the environment. USC already takes many sustainable measures, such as bottle-refilling water fountains and a garden from which the dining halls use produce. For as much as the university does, this research will also examine what more USC could do with regards to sustainability.
Villacreses, Camila  
Mentor(s): Dr. Francis Spinale  
Discovery Through Undergraduate Research

I have participated in undergraduate research at USC under Dr. Frank Spinale since the summer after my sophomore year. I assist in our laboratory which concentrates on cardiovascular surgical research in animals. The motivation behind my participation in research is a drive to learn more about the connection between discovery in biological research and how it leads to advancement in medicine. In this experience, I learned about specific concepts behind molecular biology, as well as correct procedures behind conducting research, how to use statistics in data analysis, how to conduct and measure an echocardiograph, and how to conduct my own research project and then present my findings – which I was able to do at the American Heart Association in November of 2016. This experience has been significant to me because it has shown me the impact that research can have on medical treatment and how important it is to continuously support discovery and advancement. Going forward, I am working on a manuscript for the project I was given in which I will be published as first author. I look forward to supporting and perhaps participating in research as a future physician as well as using medical research findings in my practice as a physician.

Villareal, Valerie  
Co-Presenter(s): Savannah Crow, Cameron Dobson  
Mentor(s): Prof. Hayley Efland, Prof. Laura Maas, Ms. Laura Galloway  
Gamecocks Fight Hunger with a Sustainable Mindset

To put it in the most blatant way possible: there are people in South Carolina who are hungry. The city of Columbia has the highest rate of food insecurity in the state of South Carolina. With the help of our mentors in Sustainable Carolina, Hayley Efland, Laura Maas, and Laura Galloway, we were able to take on a Feeding Children Everywhere project. This project was designed to feed 25,000 children in the Midlands — the food going directly to one of Columbia’s most known food banks, Harvest Hope. We were able to incorporate the three pillars of sustainability into this project — making sure the event was economically, environmentally, and socially responsible. The result of this project shows that we are able to address hunger in larger quantities with the help of the community. As we continue our work around this initiative, we hope all Columbia residents become more aware of a problem that lies deeply in our city and decide to take action in sustainable ways.

Vitt, Jade  
Mentor(s): Mr. Drew Newton  
Establishing A New Athletic Program While Establishing New Skills

In 2013, the University of South Carolina added beach volleyball as the 19th sport in Gamecock Athletics. That same year, I had the honor and privilege of being one of the nine girls to make up the first ever beach volleyball team at the University. With a brand new athletic program, there came a lot of responsibility and hard work in establishing a solid foundation for who we were as a founding team. It was up to my fellow teammates and I to establish that foundation and leave a lasting legacy for the future beach volleyball teams to follow. Now a senior and soon-to-be member of the first graduating class to participate in all four years of the USC beach volleyball program, I have learned the importance of leadership and the type of leader I prefer to be for a team. As a Gamecock athlete I have acquired a special skill set that has enhanced my leadership abilities and will be extremely valuable to take with me into the professional world. Among those skills, I have learned the importance of leadership, accountability, and selflessness through my position as team captain. Additionally, as a public relations student here at USC, the skills I have attained from my athletic experience will also directly transfer into a career in public relations. During my role as team captain, one of my duties is to serve as the liaison between the coaches and my 19 other team members. In doing this, effective communication is imperative so that all members are constantly on the same page. I am confident that the skills I have acquired during my time here at USC will prepare me for the challenges and opportunities awaiting me in the professional world.
Walden, Erin
Mentor(s): Ms. Theresa Harrison
Oh, The Places She’ll Go: Global Learning Experience from Greece to Austria

I often equate my study abroad experiences as a USC undergraduate student to the act of riding a bike. Phase-one of riding a bike involves parental guidance, training wheels, and several forms of documentation. My first trip to Greece and Italy through participation in “A History of Sports Culture” Maymester mirrored phase-one. After extensive preparation, my parents dropped me off at the airport and placed me in the care of USC faculty. I held true to the itinerary and remained within the confines of the group during the trip. Phase-two of riding a bike encompasses graduation from parental supervision. The training wheels remain as a safety net but the days of riding unhindered are on the horizon. My second trip to Nicaragua as a medical volunteer during an “Alternative Spring Break” with the Capstone Scholars Program parallels phase-two. I organized a caravan to the airport and ventured into the realms of a developing country with a league of language interpreters and medical personnel by my side. Phase-three of riding a bike encompasses a previously unobtainable level of freedom and “the world is my oyster” mentality. My third and final trip to Austria as an exchange-student at the University of Vienna reflects phase-three of riding a bike. I entered unexplored territory and moved 4,600 miles away from everything familiar, with one contact amongst the city’s 1.7 million inhabitants. Through the three study abroad experiences, I developed self-confidence and pride in my ability to form connections and navigate the world. The ride has only just begun, as I plan to continue traveling and incorporate international healthcare into my future career as a physician.

Walker, Sarah
Mentor(s): Dr. Nina Moreno
Leading with Intention & Inspired by a Purpose

The University of South Carolina has presented me with countless opportunities that have undoubtedly shaped the strong leader that I am today. Little did I know that attending a large university full of strangers would provide me with a concrete community and support system that pushed me to be the best version of myself every single day. I came to Columbia to earn a college degree, but I am leaving with much more than that. I am leaving with professional experience, proficient communication skills, and true confidence in myself. When I served as the president and philanthropy chair of Delta Delta Delta, I was faced with some extremely challenging obstacles, and I had to lead 400 women through both good and bad situations. These women were all my peers, and they depended on me to do great things. Not only did I have to communicate with the membership, but I also had to communicate consistently with the university and Tri Delta executive office. All of these external expectations taught me that in order to be an authentic leader, I always needed to have a specific purpose and goal in mind. The biggest take away from my various leadership roles is that I must have an intention behind everything that I do. This intention needs to be based on and stemmed from a greater purpose and goal. It was how I saw the bigger picture and the greater movement that made me become a successful leader in all aspects of my college career. Ultimately, being a leader set me apart and the decisions I made always impacted someone or something. What I learned from all of my commitments, internships, and peer leadership roles was echoed in my Hospitality Management courses. It was the University of South Carolina that provided me with the tools and resources that shaped me to be the leader I was destined to be.

Walters, Nicolette
Mentor(s): Mrs. Stuart Hunter
The Comfort Zone

I have learned that stepping outside of your comfort zone is an essential first step for any type of growth, and is the most positive choice you can make over and over for yourself in college. My presentation will focus on the Professional and Civic experiences I had during my undergraduate experience, and how they have changed who I am, the opportunities I will have in the future, and my opinion on how best to maximize your time and talents.
Wang, Ying  
Mentor(s): Prof. Jiajia Zhang, Prof. Xuemei Sui  
Non-Exercise Estimated Cardiorespiratory Fitness and All-cancer Mortality

Objective: To investigate associations of estimated CRF (eCRF) and all-cancer mortality among a United States representative population.

Participants and Methods: 4271 males and 4557 females derived from the NHANES III (1988 to 1994), aged ≈18 years at baseline who were followed for all-cancer death. CRF was estimated from a non-exercise algorithm and further grouped into tertiles. Cox proportional hazards models were used to calculate hazard ratios (HRs) and 95% confidence intervals (CIs).

Results: A total of 1796 deaths occurred during a median 19.5 years of follow-up. After adjusting for race/ethnicity, education, age, hypertension, diabetes, hypercholesterolemia, and baseline CVD status, in two-level PA model, HRs associated with each MET increase of eCRF were 0.71 (0.66-0.77) in men and 0.79 (0.68-0.91) in women for all-cancer mortality. Compared to the lower eCRF group, HRs (95% CIs) of middle and upper groups for all-cancer mortality (trend P<.001) were 0.73 (0.44-1.19), 0.95 (0.63-1.42) in men and 0.98 (0.59-1.64) and 0.87 (0.51-1.48) in women.

Conclusion: High eCRF was associated with lower risk of all-cancer mortality in a national representative population. The estimated method of CRF provides a great potential for initial clinical risk stratification and mortality prediction.

Key words: Non-exercise fitness, mortality, U.S. representative population

Wardlaw, Andreia  
Mentor(s): Dr. Deena Isom Scott  
Coloring the Ivory Tower: An Intersectional Assessment of the Academy

Female scholars of Color are underrepresented in academia, particularly in traditionally male-dominated fields. In an effort to identify the reasons for the racialized gendered divisions of labor that still persist in the academy, we are looking at tenure-tracked faculty from criminal justice departments at universities that are a part of the Association of Doctoral Programs in Criminology and Criminal Justice. Through a systematic assessment of departmental websites and publicly available curriculum vitae, we seek to answer several questions: What is the distribution of female faculty, faculty of Color, and female faculty of Color within criminology? What are their areas of specialization? Is their work mainly published in specialized journals? Answering such questions will lay the groundwork for a mixed methods assessment into the distinct challenges faced by female faculty of Color, above and beyond those of their white female colleagues. By assessing scholars’ perceptions of challenges faced in pursuit of a successful career, this work will highlight the unequal division of labor embedded in traditional academic structure.

Warner, Matthew  
Mentor(s): Dr. Aaron Vannucci  
The Development of Surface Modified Carbon Cathodes for Photoelectrochemical Fuels Production

Natural gas reformation is the most commonly used hydrogen production method today. It is desired to have a more sustainable method of hydrogen generation. Light driven hydrogen production is a sustainable method that had drawn much attention. One such method includes photoelectrochemical production of hydrogen fuel from weak acids. This next approach, however, involves chemically binding [Ru(bpy)2(4,4′-C2H4(PO3H2)(2bpy)][PF6]2, a chromophore, to the surface of a carbon electrode deposited with metallic oxide nanoparticles. The chromophore can be successfully deposited onto carbon electrodes with indium tin oxide and titanium dioxide nanoparticle layers. Indium tin oxide and chromophore deposited electrodes have been demonstrated to transfer electrons reductively in acetonitrile at a fixed potential above the hydrogen reduction potential with a bromonaphtalene photoacid present.
Warren, Daniel  
Mentor(s): Dr. John Grady  
Daniel Warren Abstract

My career at Carolina has been rewarding, challenging and the most enjoyable four-year experience I could have asked for. I have learned many valuable tools throughout class lectures and in my sport industry that will carry me a long way through my various career pursuits. However, it was what I learned as a University 101 peer leader that propelled my intellect and allowed me to improve every aspect of my professionalism. This experience enabled me to act as a liaison for freshman students and guide them through the trials and tribulations of their first semester in college. In addition, as a University 101 peer leader you are a co-instructor and you are responsible for presentations to the class and lectures on certain days throughout the semester. The main reason why I became a peer leader was to make an impact with the freshman class. When I was a freshman I learned a lot of valuable information throughout the duration of my University 101 class that helped me get comfortable with life away from home. I wanted to have the same impact my peer leader had on me with my own class and ensure I can do everything in my power to put them on the path to success here at Carolina. I learned that teaching is a very tough job and each student has specific strengths and weaknesses that are unique to him or her. The impact this experience had on me changed my mindset in regards to young collegiate students. For example, periodically throughout the semester I had students come up to me and express their gratitude for helping them find study resources, listening to their troubles with their roommates etc. These reactions not only made me feel respected but it also made me feel appreciated as well which is something that I will never forget from being a peer leader. I want others to learn that sometimes when you embark on an experience it may be different than you envision or you might have to venture out of your comfort zone but the reward for and pride you receive from helping others is worth the inconvenience and trouble. In the future I plan on using my experience as a peer leader to help me throughout law school and eventually as an attorney. In order to be a successful attorney you must express yourself clearly, dynamically and a level in which everyone understands. All of those skills I learned during my time as a Peer Leader at the University of South Carolina.

Washington, Kayla  
Mentor(s): Dr. Clayton Copeland  
Read-a-Rama

Literacy and literacy skill development remain critical concerns in the U.S. “Two of every three students in the U.S. do not have the necessary reading proficiencies to successfully complete grade-level work” (Allington, 2011, p. 40). Camp Read-a-Rama, a summer day camp in the southeastern U.S. for 4 to 11 year olds, creates innovative programming using children’s literature as the springboard for all camp activities. Activities reinforce concepts in children’s literature, thereby helping children “live books” and understand connections between their reading and their experiences. For 6 summers, Camp Read-a-Rama has provided fully-engaged, week-long themed literacy immersion experiences that seek to turn “summer slide” into “summer stride.” The longitudinal, mixed methods study found that the program positively impacted children’s attitudes toward reading and interactions with books, a critical step in literacy skill development/improvement. Implications suggest benefits of integrating best practices for children’s literacy skill development into LIS education/Youth Services curricula.

Waterman, Katherine  
Mentor(s): Mrs. Stuart Hunter  
The Benefits of Benefits

During the summer of 2016, I interned at Benefitfocus in Charleston, South Carolina. My job was in the Human Resources department specifically dealing with benefits offered at the company. I was able to learn detailed information, not only about benefits that the company offered to their associates, but also about how benefits work and who is able to qualify for what. I had to reconcile monthly bills and create a monthly benefits newsletter that informed employees on any updates regarding benefits. I was able to shadow exit interviews and eventually was able to conduct part of one myself. These tasks may seem minimal, but they were extremely significant to me. I was able to work as a real associate, not just an intern. I can use and apply the skills that I learned throughout the summer. This internship was so rewarding because it gave me hands on experience in a field that I eventually want to work in. Being in the HR department at Benefitfocus really opened my eyes to how many different and interesting areas that I could go into. I want to do more schooling after I graduate, but eventually I hope that I will be able to go back to Benefitfocus full time.
Watkins, Katherine  
Mentor(s): Dr. Myriam Torres  
Experiences of Latinos during the 2015 Flooding in South Carolina

Latinos tend to be particularly vulnerable to the dangers posed by natural disasters for reasons including cultural distrust of authority, language barriers, lack of access to relief services, and fear of seeking relief services for immigration-related issues. We conducted this observational study primarily to investigate the efficacy of South Carolina’s emergency services as they relate to serving Latinos in order to identify areas that need improvement. Secondarily, we sought to better understand the experiences of Latinos in emergency scenarios. We surveyed 100 members of the Latino population in Columbia, SC, the capital city devastated by an unprecedented flood in 2015. During in-person interviews, respondents answered questions about their experiences before, during, and after the flood. Most respondents, 64%, emigrated from Mexico and the average education level amongst them all was 9 total years of education. Three out of four respondents reported that they did not know what to do when the threat of flooding became evident. The same proportion of individuals reported not becoming aware of the possibility of a flood until less than 24 hours before the storm. We found that 57% of respondents felt that they were treated worse than others in their area. The services that participants cited as functioning best were relief offered by churches, the police/firefighters/military, water distribution, and volunteers/non-profits. FEMA and lack of communication available, both in general and in Spanish, were services cited as needing improvement. These successes and shortcomings should be taken into consideration in preparedness for future disaster relief efforts.

Watkins, Katherine  
Mentor(s): Dr. Joe Jones  
To Serve Well is to Learn Much: How Lessons in Teamwork, Cultural Humility, and Research Bolstered my Personal and Professional Capacities in Cross-Cultural Medical Service

A student maximizes the value of college only if what she learns in the classroom motivates and facilitates her beyond-the-classroom endeavors. Throughout my undergraduate education, the vessel that translated my within-the-classroom learning to the real world was community service. Principles of teamwork and collaboration gleaned from university coursework enabled my organization of effective, dignified patient care at the Good Samaritan Clinic, a local Latino free clinic where I am a volunteer Interpreter and Patient Intake Coordinator.

My study abroad programs in Madrid and Barcelona, Spain globalized and diversified my intellectual disposition in new and important ways. Extended time immersed in Spanish language and culture instilled in me a sense of cultural humility that I didn't know I lacked. I found that human differences, should we let them, beautify and richen our worldview; pursuing interaction with those differences has grown me to be a more capable and compassionate agent of service. My Honors College Senior Thesis research project investigated the experiences of Latinos during the 2015 floods that devastated the midlands of South Carolina. Encountering human suffering from within the scientific process, that is, entering numbers across the desk from bright screen, was an interesting and sobering experience. My classroom learning, research, and study abroad experiences added new, unique dimensions to my understanding of others and my appreciation for others’ cultures, experiences, and suffering, ultimately equipping me with skills and traits necessary to effectively serve the underserved both in my personal life and medical career.
Webley, Domonique  
Mentor(s): Dr. Shan Qiao  
Transportation for People living with HIV

The number of HIV cases each year is not decreasing even with necessary medication being available and more people are aware of the disease. Developing a project that would provide transportation for people living with HIV that cannot afford transportation. This well allows people living HIV the opportunity to receive care and improve their health. Women living with HIV, their providers, and literary view article states the effects of how the limited access to transport and its effect on their health. With the limited option of public transportation in Columbia, South Carolina and a growing number of people living with HIV this study will be of great value. If the needs of the people are met their status may improve, and the number of HIV cases that developed into AIDS will decrease. Also, there will be more cases of undetected HIV status. It will lower the number of HIV cases. People should be interested in my finding because of the effect it will have on the community. For future research, the study can be extended for to people with HIV that cannot afford transportation to seek medical care.

Wei, Judy  
Mentor(s): Dr. Stacey Mumbower  
Text Analytics Methods Using Job Ads Data

Use Job Ads data from Handshake to analyze any trends between type of job, employer preferences, location, major(s), and skills and qualifications.

Weisberg, Melissa  
Co-Presenter(s): Tina Monzavi  
Mentor(s): Dr. Kelly Lynn Mulvey, Dr. Bridget Miller  
The Impact of Gender Stereotypes on Children's Science Inquiry Processes and Attitudes towards STEM Toys

Stereotypes pertaining to gender can impact the interests and choices of children early in life. These stereotypes can be proliferated by something as straightforward as the toys that children play with, whether it is the type or color of the toy. To investigate the gender stereotypes, problem-solving ability and attitudes of children towards STEM toys, young participants (N = 105) solved an engineering problem using either pastel-colored or primary-colored materials. Participants were randomly assigned to stereotype-consistent or stereotype-inconsistent conditions (stereotype consistent example: boys assigned to primary colored building materials and girls assigned to pastel colored building materials) and were then asked to complete an engineering problem. Participants also evaluated, via survey, the acceptability of denial of access to engineering materials based on gender and counter-stereotypic preferences (i.e., a boy who prefers pastel colored materials). Results showed that even though female participants’ performance was not affected by the color of material used, younger males performance was. Younger boys demonstrated lower engineering aptitude while using pastel materials to complete the engineering task. Additionally, results documented age- and gender-related differences. Less flexibility was exhibited from younger participants when regarding gender stereotypes, as opposed to older participants who exhibited more flexibility. Similar differences appeared between male and female participants, with male participants exhibiting less flexibility with gender stereotypes than female participants. The findings suggest that attempts to enhance STEM engagement or performance through the color of STEM materials may have unintended consequences.
Influenza is one of the leading causes of mortality in the United States. Influenza vaccines are an effective strategy to prevent hospitalization, morbidity, and mortality associated with the influenza virus. In the United States, during the 2008 – 2010 influenza vaccine seasons, influenza vaccine coverage ranged between 38.7% to 42%. This level of coverage was well below the Healthy People goals of 80%. Factors that influence influenza vaccine coverage include: being allergic to the vaccine; concerns about side effects (i.e. getting the flu) from the vaccine; cost; consideration of being high-risk (i.e. greater than 65 years old, pregnant, high-risk chronic conditions); and perceived lower likelihood of getting sick. However, it is not clear whether a major influenza outbreak, such as 2009 H1N1 epidemic may influence vaccine coverage. Few studies have explored whether vaccine coverage changes before and after a major epidemic. The purpose of this study is to examine the distribution of influenza vaccine coverage by select sociodemographic characteristics before and after the 2009 H1N1 pandemic. To answer this question, we will use data from the 2008 – 2010 California Behavioral Risk Factor Surveillance System (BRFSS). We will calculate age-adjusted influence prevalence rates by race/ethnicity, education, income, and health insurance coverage in 2008 (before), 2009 (during), and 2010 (after) the H1N1 outbreak. We will assess whether influenza vaccine prevalence rates change between 2008 and 2010. It is hypothesized that higher influenza prevalence rates will be observed among those with higher educational attainment and socioeconomic status, whites, and those with health insurance coverage. The results from this analysis could potentially shed additional light on vulnerable populations and inform efforts to improve public health preparedness during an H1N1 pandemic.

Wharton-Bickley, Margaret  
Mentor(s): Mr. Alex Blauvelt  
Relationships, Business, and Communication on an International Level

My entire life I have had an International focus, and from my time here at USC it has streamlined into a fascination in relationships, business, and communication on an International level. During my time here, I have studied abroad in both Prague, Czech Republic, and Bilbao, Spain. My time abroad has affected who I am in the world and the student that I have become on USC’s campus. I’ve kept journals and photo blogs of what I’ve seen and where I’ve been but I’ve had a hard time bringing my experiences together into one thought process. From being abroad my interests have expanded into how we communicate across cultures, how we can connect better with people from different backgrounds and how adaptation can affect our appreciation of our surroundings. These experiences have helped contribute to my perspective on life, especially on a global scale, by encouraging others to go out of their comfort zones and study abroad as well. I consider myself a global citizen because I encourage others to push themselves places they have never been before and I encourage others to immerse themselves fully into other cultures to gain insight into other’s lives. Passing this knowledge on to other USC student is what I hope my legacy will be when I graduate in May.

Whetstone, Adam  
Mentor(s): Mrs. Laura Carnes  
Educational Access and Juvenile Delinquency:  A preventative program

As I experienced my Graduation with Leadership Distinction journey, it became apparent that I am passionate about serving underprivileged youth within my community. Throughout my coursework, at USC Lancaster, I have learned the correlation between access to adequate education and juvenile delinquency. I have merged my interest and my education to create a plan to address educational opportunities among underprivileged youth in an effort to lower rates of juvenile delinquencies in Lancaster, South Carolina. This plan is a collaboration between USC Lancaster and the Lancaster County School District. I will highlight the importance of this plan along with my recommend solutions, and a detailed plan for implementation.
White, Gabrielle  
Mentor(s): Prof. Asheley Schryer  
**Turning Theory into Practice: Applying My Philosophical Beliefs into the Classroom Setting**

Through my student teaching internship, I have been able to explore how the theories and concepts learned in my Early Childhood classes have guided my teaching philosophies and practices. My student teaching experience was one semester of full immersion in a diverse kindergarten classroom. I was able to learn new teaching methods through close observation and apply the skills and theories I have learned during my time here at the University of South Carolina. During my two weeks teaching alone, it was evident that every child has specific needs to be addressed and met through culturally relevant pedagogy, differentiated instruction and the use of balanced motivational strategies. By implementing these key insights into my teaching, I was able to see individual growth in every student. This experience challenged all pre-conceived notions I had about teaching and provided me with a change in perspective that led me to feel passionate about meeting every child where they are when they come into my classroom. My goal is to reach the students and families on a personal level beyond academics and to provide the basic needs for each child to be successful and secure.

White, Essence  
Mentor(s): Ms. Anna Oswald-Hensley  
**The Essence of...Success**

“No Need to Fear, Your Peer Coach is Here!”
During my freshman year at USC Sumter, I was assigned a peer coach by the Opportunity Scholars Program and it inspired me to become a peer coach this year. I was frightened beyond belief about college and had so many insecurities about whether I would be good enough to be successful in college. My peer coach eased most my fears and gave me the self-assurance I needed to have a successful freshman year with a 4.0 GPA. In becoming a peer coach this year, I wanted to ease some of those same fears in my mentees and inspire them as well. I am responsible for mentoring and assisting this year’s freshman students and new OSP members with any of their college fears and ensuring that they remain focused throughout the school year. There are so many misconceptions about college and horror stories to go along with it. However, my philosophy is that college is whatever you make it and now all the decisions you make, are yours. College is a new chapter in anyone’s life and I have instilled in my peer mentees that good decision-making, acceptance of different cultures, and developing personal brands are important keys to a prosperous college career.

Taco Bell Today- Disney Tomorrow  
I began working at Taco Bell a little over a year ago, and instantly higher management wanted me to be a shift lead manager. They saw the potential I had to be an effective leader. However, I turned down their initial offer because I did not believe I was fully ready to take on such a large responsibility. After being with the company for several months, I finally felt as though I was ready to balance school, work, and the responsibility of a Shift Lead Manager. My major is Hospitality Management and I wish to own my own business one day, so this management opportunity is a key stone experience as it directly relates to my intended profession and broadens my horizons. I am responsible for running an entire shift, ensuring top customer service and employee satisfaction, and monitoring and delegating responsibilities. I have found that as a manager, I want to treat my employees with respect and motivate them to do their best on ever shift. Although my job can be extremely stressful, and many unfortunate events occur, I still find the essential aspects of my job enjoyable and a reinforcement to continue pursuing a Bachelor's Degree of Science in Hospitality Management. I have been able to utilize the concepts I have learned at USC Sumter, such as decision-making, acceptance, and development of a personal brand, to hone my leadership skills and prepare me for a future internship at Disney.
White, Margaret Pate  
Mentor(s): Prof. Courtney Worsham  
Chapter Development; Leadership Development

Becoming a member of a Greek organization is one of the most rewarding experiences a college campus can offer. It opens the doors to leadership development, academic advancement, and lifelong friendships. All members find something different in their experiences from their sisters, but there is no other like the experiences of a sorority Chapter President. I had the privilege of serving the Zeta Sigma Chapter of Gamma Phi Beta as the 2016 Chapter President. As chapter president, I was tasked with working to improve chapter recruitment, public relations, member education, and overall sisterhood satisfaction. This role was particularly unique because I was the first president of my chapter to receive direct instruction and new requirements from our International Headquarters, instead of the regional system, for an entire term. This was accomplished by changing the chapter’s Standing Rules and developing a Membership Contract. The executive team changed the caliber of the judicial council hearings, piloted the new international philanthropy event, implemented a more structured new member education plan, and much more. Managing a chapter of this size certainly proved to be challenging, but I learned so much more about my leadership style. This chapter grew stronger and more stable and structured because of the programs and adjustments the 2016 team implemented. In addition, I developed as a leader and grew as an individual in this rewarding experience.

White, Courtney  
Mentor(s): Prof. Tricia Kennedy  
Congressional Internship: Office of U.S. Senator Tim Scott

During my final year at the University of South Carolina, I had the opportunity to work as a Congressional intern at the Office of U.S. Senator Tim Scott. The internship allowed me to handle community affairs and general administration for the Midlands regional office. As a public relations major, my internship led me to first-hand experience with communications projects in a government office. I had the opportunity to update county briefs for the regional director to gain knowledge of demographics and events, document new constituent casework and research solutions for constituents, and design and edit new regional maps and training materials. I also had the opportunity to follow the Senator and his communications team through various appearances, town halls and events statewide. While traveling around the state, I saw first-hand the diversity of the U.S. population and the need for open communication between government officials and their constituents. The open communication allows for people to discuss issues, concerns and express their opinions. The senator was voted to represent the people and to do that, I saw his constant need to communicate with his constituents to understand their needs. As an intern, I took every opportunity to find more tools to improve my overall success in the public affairs field. Participating in this Congressional internship reaffirmed my decision to pursue public relations and mass communications as a career, more specifically communications in government.
Whitely, Monique  
Mentor(s): Dr. Swati Debroy  
Associations between Body Mass Index, Gender, Grade and Food Choice among Middle Schoolers in Jasper County, SC  

Children with a high body mass index (BMI), an indicator of excess body weight, are more likely than their normal weight counterparts to have insulin resistance, high blood pressure, asthma, depression and poor self-esteem. In addition, obese children are more likely to become obese adults. The burden of obesity and related health conditions varies among different populations. It is more prevalent among minority groups, persons of lower socioeconomic status and residents of rural areas. For nearly a decade, BMI has been measured among elementary and middle school children in Jasper County, SC, and analyzed by race and gender. This effort has revealed an extremely high rate of obesity, prompting a research effort that resulted in a salad bar option being introduced to the existing lunch program at Hardeeville-Ridgeland Middle School for the 2016-17 academic year. Data are being collected on the frequency with which students opt for the salad bar option over traditional menu items. Additionally, students’ BMI, race, gender and socioeconomic status are recorded to enable the examination of associations of these personal attributes with salad bar usage. During the period of Sept 1, 2017 and Dec 9, 2017 the visits to the salad bar per day averaged 53.93 with a standard deviation of 18.9. A total of 333 unique students (out of 555) visited the salad-bar at least once during this period, with the number of visits by a single person ranging from 1 to 37 (salad-bar served for 44 days in total). The overall goal of the project is to inform school wellness policy within a racially and socio-economically disadvantaged school district as a means of addressing health disparities.

Wieczorek, Crystal  
Mentor(s): Dr. Daniel Freedman  
Providing services to at-risk youth: Westwood High School Social Work  

This presentation is an overview of my experiences in Richland 2 School District at Westwood High school interning under a school social worker. There are 1,315 students that attend Westwood High school with varying needs and resources. As such, a social worker will provide a variety of services including assistance through McKinney-Vento Act, Backpacks program, grant writing, and therapeutic groups. What this presentation will display are the positive impacts these services have on at-risk youth, as well as recommendations for improving service delivery and implementation.

Wiggin, Perri  
Mentor(s): Mr. Alex Blauvelt  
Professional and Civic Engagement: The Road to Veterinary School  

In my years at the University of South Carolina I undertook many new experiences with the hopes of becoming a veterinarian. As an applicant for Graduation with Leadership Distinction in Professional and Civic Engagement, I would like to share some of my beyond the classroom experiences that have helped me build my career in veterinary medicine. For the past two summers I have gone to South Africa on a hands-on pre-veterinary internship. While there I learned to test for pregnancies, determine the age, and inject nutrients into agricultural animals. I had the opportunity to participate in game captures and releases of wild African animals. In addition, I have logged over 2,000 hours as veterinary technician in a local small animal clinic. While there I have learned to properly restrain animals, draw blood, monitor anesthesia patients during surgery, perform urinalysis, x-rays, and prepare bacteria slides in lab. Also, I strengthened my interpersonal skills as a resident mentor in Patterson Hall. I learned about how to effectively communicate with others and guided residents with their personal and academic needs. Each experience has helped me develop the skills necessary be a veterinarian and have made me a well-rounded applicant to veterinary school.
Wiggins, Kali  
Mentor(s): Dr. April DeLaurier  
Determining the Role of ldlrap1a in Craniofacial Development in Zebrafish

A line of mutant zebrafish containing a jaw mutation named b1187 was discovered during a forward genetics screen. This mutation is characterized by fused joints and abnormal shaping in cartilage and bone in the craniofacial region of zebrafish. To find the gene behind the b1187 mutation multiple genes were sequenced, however there were no differences between mutant and wild-type sibling cDNA. This led to a reverse genetics approach using a CRISPR/Cas9 system to create a line of zebrafish with a mutated ldlrap1a gene. The ldlrap1a gene (low density lipoprotein receptor adaptor protein 1a) is known to be involved in cholesterol signaling, however we believe it could also have a role in craniofacial development of zebrafish. A F0 generation containing an ldlrap1a mutation was generated using the CRSIPR/Cas9 system and was then crossed with wild-type siblings to create three separate F1 generations. The F1 generations were screened using PCR and T7 endonuclease digest to identify approximately half of the offspring who were heterozygous mutants for the ldlrap1a gene. Fin clip samples were taken from all three pairs and a wild-type zebrafish and sent for sequencing. Of the three, pairs two appear to have favorable missense mutations. These fish were then crossed to their genotyped siblings to create an F2 generation. Histological stains will be performed on these zebrafish, which will allow us to observe any abnormal phenotypes which resemble those of the b1187 jaw mutation. If we do observe these abnormalities it could conclude that ldlrap1a is the gene underlying the mutation and that it is involved in craniofacial development.

Wiggins, Camden  
Mentor(s): Ms. Lisa Camp  
Graduation with Leadership Distinction in Professional and Civic Engagement: Identifying the Future

Through the Graduation with Leadership Distinction process, I have identified my strengths gained while learning and growing at the University of South Carolina. Due to my experiences both inside and beyond the classroom, I have gained key insights to prepare me for my professional career beyond the university. Serving in multiple internships with a variety of tasks, I had to quickly adapt to my environment and identify key issues that needed to be fixed in order to aid the office I was working with most. My experience within my student organizations challenged me to push organizations forward and understand the people around me. These experiences, teamed with what I learned in class, have equipped me for a successful future - always identifying what is ahead of me. In this presentation, I will share the insights I’ve gained as an executive board member of my fraternity and as an intern at the South Carolina Office of Regulatory Staff and how identifying issues will help me move into the future.

Wildman, Katelyn  
Mentor(s): Ms. Asheley Schryer  
A Comprehensive Look at Cultural Awareness Sparked by Global Learning

Travel. A six letter word that can have a thousand different meanings, depending on who you ask. The most influential travel of my life occurred when I studied abroad in Madrid, Spain in the Spring of 2016. Being a Spanish minor, I wanted to go to a Spanish speaking country where I could practice my skills that I had learned in the classroom. During my time abroad, I traveled to 12 countries, 22 cities, and had 1 trip of a lifetime. While I was in Spain, I became close friends with someone whose family lived in Mexico, which opened up an opportunity for me to live with her family over the summer and further immerse myself in the language. While my experiences in Mexico and Spain were very different, they opened my eyes to the concept of cultural awareness. After critically reflecting on embracing opportunities, cultural immersion and the inequalities in foreign aid access, it was apparent that lack of cultural awareness is a problem throughout the world. In this ever-changing diverse world, cultural awareness is an important concept to comprehend in order to have a greater understanding of how people from various backgrounds think and react in situations. My goal is to create a cultural awareness training program for international businesses to combat the lack of cultural awareness that plagues our society and ultimately avoid conflicts that stem from a cultural misunderstanding.
Wilkes, De’Aaricka  
**Mentor(s): Dr. Elizabeth Easley, Dr. Sarah Sellhorst**  
The effect of perceived adiposity level on BMI and body fat percentage

Purpose: The purpose of this study was to determine if differences existed in body mass index (BMI) and body fat percentage between women who perceive that they are overfat and women who perceive that they are within an acceptable body fat range. Methods: Forty-three traditional-age (18-25y), female college students participated in this study. Participants were asked to complete the PSDQ short form questionnaire. Height and weight were measured and BMI was calculated. Body fat percentage was measured using an iDXA (Lunar GE; Waukesha, Wisconsin). Participants were divided into two groups, those who perceived themselves to be over-fat (POF) and those who perceived themselves to be within an acceptable fat range (PAF) based on their response to the statement, “I have too much fat on my body.” Independent sample t-tests were used to determine if differences existed between the two groups. Results: There were no significant differences in BMI (PAF=22.69 ± 3.94 kg/m² vs POF=25.25 ± 5.64 kg/m², p = .094) or body fat percentage (PAF= 32.44 ± 5.51% vs POF= 34.77 ± 6.41%, p = .210) between groups. Discussion: Although no statistical significance was found in either variable, a practical significance exists in BMI between groups. Women who perceived themselves as over-fat were categorized as Overweight by BMI standards, but the women who perceived themselves within an acceptable fat range were categorized as Normal weight. However, according to body fat percentage both groups would be classified as “over-fat”.

Wilks, Jillian  
**Co-Presenter(s): Austin Sutherland**  
**Mentor(s): Ms. Laura Galloway, Ms. Hayley Efland**  
Sustainable Professional Development

The Professional Development Team within the Office of Sustainability challenges its student to develop their professional skill set through experiential learning and leadership opportunities. The Professional Development team organizes collaborative events like the Green Career Fair, Green Networking Breakfast, and Professional Development Workshops that are centered around the three pillars of sustainability. Through these events, our team helps create strong partnerships between Sustainable Carolina interns, campus constituents, and the Columbia community, allowing students to make valuable connections. Overall, the Professional Development Team provides opportunities for students to prepare for a sustainable future.

Williams, Savannah  
**Mentor(s): Mrs. Laura Carnes**  
Lactation Matters: Providing an inviting and safe environment for mothers to breastfeed and express milk.

My graduation with leadership distinction pathway is Diversity and Social Advocacy. My purpose, to promote breastfeeding, is to ensure that all mothers at USC Lancaster are provided with a private and comfortable place to breastfeed and express milk during work or school. The lactation room at USC Lancaster has been completely renovated in hopes to promote healthier lifestyles for mothers. The knowledge gained throughout my experience in both nursing classes and this project has allowed me to advocate to ensure that nursing mothers, not only at USC Lancaster, but worldwide are provided with the support they need to continue to thrive in parenthood while continuing their educational or occupational journeys. At USC Lancaster I strive to teach women how to take care of their babies and themselves while breastfeeding by using the lactation room.
Williamson, Sarah Marie  
Mentor(s): Dr. Julie Wise  
The Poetic Voice of Child Labor in Industrial Britain: Its Literary and Social Contexts

In her lifetime, Victorian poet Elizabeth Barrett Browning emerged as a significant literary figure in part for bringing her moral authority to bear on important political and social issues of her day. In particular, she confronted the problem of child labor, most famously in “The Cry of the Children.” In this poem, Barrett Browning provides a voice to the children who suffered during Britain’s shift from an agrarian to an industrial society. Barrett Browning realized that the many Victorian children who worked in dangerous environments desperately needed an advocate, not only to speak up to those who put them to work but also to enlighten those members of the reading public who simply failed to see the children’s suffering. Most poignantly, “The Cry of the Children” suggests that 19th-century child labor has stolen not simply the children’s innocence but also their voices and abilities to protest.

This project’s overall goal is to demonstrate how Barrett Browning’s “The Cry of the Children” epitomizes child labor poetry of 19th-century Britain through her combination of sentimental imagery and direct exchange between a maternal speaker and the suffering children. Additionally, this task compares Browning’s speaker in “The Cry of the Children” with the speakers in Norton’s “Voice from the Factories” and Landon’s “The Factory” to examine the impact of a female speaker. The essay also briefly analyzes Rosenfeld’s “In the Factory” and Blake’s two distinct “The Chimney Sweeper” poems to provide a male speaker’s contrast.

This project consists of the following two components: (1) a researched essay which demonstrates how Barrett Browning’s poem offers a distinct and valuable approach to child labor poetry in comparison to the other selected poets and (2) a blog in visual representation of not only the influential imagery in these poems but also the ways in which 19th-century female writers used the technology they had at hand, poetry, to address political and social issues from their domestic spheres.

Willis, Matthew  
Mentor(s): Dr. Gregorio Gomez  
Co-ligation of TLR4 and FcμRI on human skin mast cells enhances pro-inflammatory IL-6

Mast cells are part of our innate immune system. They are responsible for allergic reactions, and provide defense against bacterial and parasitic infections. Mast cells express receptors for IgE, FcμRI, that when cross-linked with an allergen causes mast cells to undergo degranulation – the release of pre-formed allergic mediators from cytoplasmic granules. This cross-linking also leads to the production of IL-6, a pro-inflammatory cytokine that plays a major role in allergic inflammation. Lipopolysaccharide (LPS), a key component in the cell walls of Gram-negative bacteria, can also trigger an immune response by binding to Toll-like receptor 4 (TLR4) on the surface of mast cells and other inflammatory cells types. My data shows that when skin mast cells are stimulated with allergen plus LPS, IL-6 is produced in greater amounts compared to stimulation with allergen or LPS alone. The goal of this research is to determine where the two pathways are connected in order to explain how signals from both receptors lead to enhancement in IL-6 production. This study analyzes the phosphorylation status of p38, ERKs1/2, JNK, and Akt, key intermediates in the TLR4 and FcμRI signaling pathways in order to identify key signaling proteins involved in the crosstalk between FcμRI and TLR4.
Willoner, Terence  
**Mentor(s):** Dr. April DeLaurier  
**Using CRISPR/Cas9 to study the role of zmym2 and zmym3 in zebrafish craniofacial development**

Potocki-Shaffer syndrome (PSS) is a rare contiguous gene-deletion caused by heterozygous interstitial microdeletions of chromosome region 11p11-p12 and is characterized by developmental defects that include intellectual disability and craniofacial anomalies. PSS is associated with mutations in genes encoding factors in the PHF21A protein complex, including KDMA1 (Lysine-specific histone demethylase 1A), ZMYM2 (Zinc finger protein 198), and ZMYM3 (Zinc finger protein 261) proteins. It is hypothesized that this protein complexes affects craniofacial development of zebrafish in a way that reflects their function in humans. At present, the individual actions between proteins in craniofacial development remain not fully understood. Previously, F0 founder fish carrying mutations in zmym2 and zmym3 were generated by microinjection of CRISPR constructs including a guide RNA (gRNA) and nCas9m mRNA at the 1-cell stage. Founders were screened by PCR and T7 endonuclease digest which identifies mutations in the DNA, and founders were used to generate F1 lines. The F1 generation was screened by using tail fin DNA for PCR and T7 endonuclease digest. F1 zebrafish were sequenced and frameshift mutations were identified. Zebrafish with confirmed frameshifts will be incrossed to produce an F2 generation. The F2 generation, of which 25% are expected to be homozygous mutants, will be studied for anatomical abnormalities in craniofacial development by using Alcian Blue and Alizarin Red histological stains for cartilage and bone. The work in this project will be used to identify the roles of zmym2 and zmym3 in zebrafish development, and how loss of function of these factors may underlie the defects seen in PSS.

Wineholt, Natalie  
**Mentor(s):** Ms. Theresa Harrison  
**Global Learning: Putting the “International” in International Studies**

In the Spring of 2016, I studied abroad at Mahidol University in Bangkok, Thailand with CISabroad. I chose to study abroad in Thailand because of the country’s rich cultural history and because I knew that I wanted to be in a completely foreign environment, both socially and politically. I also hope to pursue a career with the US State Department, and knew that if I studied abroad in a more unique destination, I would be a more competitive candidate. Through this study abroad experience, I learned the value of cultural awareness and the importance of international immersion experiences while also applying knowledge from my International Studies classes to moments outside of the classroom. Studying abroad in Thailand allowed me to pursue diverse interactions with peoples, places, and cultures that I would not otherwise have been exposed to, and I hope that by sharing my experience with others, I can inspire more people to take the leap and study abroad themselves.

Winkelmann, Jo Jo  
**Mentor(s):** Ms. Ashely Schryer  
**People and Places**

The practical and leadership skills I gained from my in-class and extracurricular activities at USC led me to go on the adventure of studying abroad in Brisbane, Australia in spring 2016. This May, I’ll be graduating with Leadership Distinction in Global Learning. Before I leave the university, I hope to provide other students with helpful resources and encouraging advice to prepare them for any study abroad and travel opportunities they may encounter. The process of choosing a study abroad program, preparing to go abroad, and actually getting to your destination and making the most of your time is a stressful process that I believe can become a much more positive experience with just a few extra resources and personal connections. With my Discover USC presentation, I use my key insights and core experiences from my time at USC and time abroad to encourage students not only to travel but also to form connections everywhere they go and to consciously reflect on their experiences afterward. I hope to highlight the benefits of interpersonal communication and strong, role model relationships throughout a student’s college career, especially in the stage of studying abroad.
Wisnewski, Carole
Mentor(s): Mr. Alex Blauvelt
Salt Marshes in South Dakota: Preparing Students for Global Engagement

As a proud product of the South Carolina public school system, I firmly believe in its power and influence in the community. However, as a South Carolinian, I have seen the harmful effects of keeping what I like to call a “local mindset” rather than a “global mindset.” In fact, I even kept that same mindset until my junior year of college, when a hot debate of the Common Core brought up the following question in one of my classes: should students be required to learn about salt marshes even though they live in South Dakota (where they will likely never see a salt marsh)? My response was an automatic “yes,” but my colleagues and professors pushed me to figure out why I felt that way. In an act of reflection, I worked to synthesize all of the information I had learned over my time at USC. What do I believe my students need to know? Should they have to learn about things that might not pertain to their lives? How far would I go to fight for my students, and why? What do I expect as a result? Lastly, as an educator, can I afford the comfort of a local mindset over a global mindset? What effect will that have on my students? As a candidate for Graduation with Leadership Distinction, I am trying to answer these questions and more by connecting my classroom experiences with the engagements I have participated in over these four years. By exploring and seeking out these relationships in pursuit of GLD, I intend to become a stronger and more introspective individual in preparation for my career as a middle school teacher.

Woods, Morgan
Mentor(s): Prof. Elise Lewis
Finding My Path Through Understanding and Teaching

My portfolio is on the professional and civic engagement pathway. Through several of my science classes I have gained valuable information and combined that with out of the classroom experiences helped me gather insights. Some of these activities include becoming a chemistry TA, an SI leader, and interning at a physical therapy clinic. I did these activities because of my love for the subject matter and to gain more experience. One insight I learned freshman year is that to truly understand something you must first find the real point of contention. Another insight is that learning to explain something is not only beneficial to others but to you as well. The last insight I learned is that things do not always go your way and you need to be flexible to accomplish your desired goal. These skills will have a direct impact on my future by giving me the skills I need to be successful in medical school. These are important because if it has opened by eyes to new ways of handling and processing information. All these insights combined I will use going forward in my path to becoming a doctor because I will need to be able to learn efficiently.
Feedback on three different mobile diet tracking methods during a behavioral weight loss intervention

Background: Traditional methods of dietary self-monitoring, such as food diaries and calorie counting, have shown to be very burdensome and tedious in achieving desired weight loss.

Objective: To find engaging, novel, and easy-to-use ways to track diet to enhance weight loss.

Method: Participants were randomized to one of three diet tracking conditions: wearable device that tracks bites per day (Bite; n=31), standard diet tracking mobile app (App, n=48), or photo-tracking mobile app (Photo; n=21). For six weeks, participants tracked their diet with their assigned device and received scheduled podcasts twice a week via email. These were meant to accompany dietary tracking with the participant’s assigned device. Participants were then asked questions on a Likert scale (1 completely disagree to 7 completely agree) assessing device likability, ease of use, novelty, device difficulty, and attribution of device to weight loss. Analysis of Variance was used to compare the mean scores for each question among the three groups.

Results: There were no significant differences among the 3 groups in device likeability (p=0.30), device engagement (p=0.35), or attribution of device to weight loss (p=0.11). Bite group found their device more novel (P<0.001), but also more difficult to use (P=0.03). Bite and Photo participants reported that they forgot to regularly use their device more than the App group (P<0.001). Photo participants reported having a more difficult time understanding the feedback from their assigned device (P=0.05).

Conclusion: To enhance dietary self-monitoring, devices should be novel, but also easy to use and understand.

Project FIT: Families Improving Together by Making Healthier Lifestyle Decisions

Obesity rates in adolescents have risen to epidemic proportions in the United States. Obesity can lead to other health problems later in life, including hypertension and diabetes. African American adolescents are affected by obesity more adversely and earlier on than Caucasian children. According to a special report done by the State of Obesity on Racial and Ethnic Disparities in Obesity, from 1999 to 2012 20.2 percent of African American children ages 2 to 19 were obese compared to 14.3 percent of Caucasian children. The purpose of Project FIT is to help obese African American adolescents and their families learn and implement healthier lifestyle choices to prevent risks associated with obesity later in life. This study implemented two different treatment groups. One group taught participants about exercise and dieting and the other taught participants a comprehensive lifestyle plan to lose weight. These two groups received 10 weekly face-to-face group sessions, a weekly online program for 8 weeks, a 6-month follow-up assessment and their activity levels and weight loss were tracked over the course of the program. Results of the success of each treatment group are still pending. A program similar to Project FIT could potentially be used in the future to teach healthier lifestyle choices to more diverse groups.
Children are often the victims of exclusion and witness this behavior in others (Killen & Rutland, 2011). This occurs for a variety of reasons such as group membership (Killen, Mulvey, & Hitti, 2013) or language (Kinzler, 2013). Peer influence is a powerful force in social exclusion. There are a few studies that explore the circumstances in which children might challenge the exclusion of a non-English-speaking peer. This study explored behavioral and evaluative challenges to language-based exclusion. A population of ethnically diverse children aged 8 to 11 (N=57, 49% female) participated in an online Cyberball game (Williams & Jarvis, 2006) and a series of hypothetical scenarios, addressing outgroup member exclusion. Results were evaluated using measures of behavioral inclusion, inclusion judgments, and individual and peer challenge. The younger children tossed the ball to the language outgroup participant less than the older children. Younger participants believed that their groups were less likely to include language outgroup members when compared to older children. Arabic and Chinese speakers were more likely to be included by the participants than were Spanish speakers. The children in the study saw that their peers may not support challenges to intergroup exclusion although the participants did support it. The results indicate that children are more likely to challenge exclusion as they age. The study also suggests that differences exist between individual and peer expectations as well as among language groups with higher negativity directed toward Spanish speakers. Further research can be done on intergroup dynamics, diversity, moral judgments, and exclusion.

Many Americans state that they “support the troops” and believe that veterans are deserving of certain benefits, including healthcare. Despite the public’s positive perceptions of veterans, healthcare provided by the Veterans Administration (VA) remains variable in quality and lacking in terms of access. The purpose of this study was to investigate the gap that exists between positive perceptions of veterans and the reality that these veterans encounter numerous problems when seeking healthcare. The study involved a qualitative research design involving two focus groups with nine participants (seven males and two females) and key informant interviews with three additional veterans (two males and one female). All participants were veterans who served in multiple service branches during Operations Iraqi and Enduring Freedom. The focus group sessions and key informant interviews were analyzed using NVivo 10 Software to identify themes related to this gap between positive perceptions of veterans and the poor healthcare they typically receive. Themes included the perception that Americans view male student veterans more positively than female student veterans. Participants confirmed past research findings and cited lengthy wait times and excessive administrative processes as well as variability of healthcare quality in the VA. Student veterans offered unique insights about the disparity that exists between positive perceptions of veterans and poor healthcare resources due to the public’s lack of awareness of veteran healthcare problems and lack of awareness of VA funding. Findings from the study are discussed in relation to public awareness and policy strategies to reduce the gap between positive perceptions of veterans and the generally poor quality of healthcare they receive.
Yaw, Haley  
Mentor(s): Ms. Jennifer Bess  
Connecting Passions with Opportunities

As a military brat, I have always been passionate about veterans and veteran issues. My career goals were to become a military physical therapist and eventually work in the Veterans Administration to craft policies for veteran healthcare. The Office of Fellowships and Scholar Programs (OFSP) connected my passions with the Truman scholarship, a financial grant that aids students' graduate studies in any area of public service. Although I was ultimately not named a Truman Scholar, I learned more about myself in the process of applying for the scholarship than I had in any of my other undergraduate experiences. Applying for the Truman Scholarship pushed me to investigate graduate school programs that met my career goal needs, allowed me to create connections with faculty and staff with similar interests, and helped me create my own independent research study with student veterans the spring of my senior year. Working with OFSP was one of the most valuable experiences of my college career. OFSP did not just help me discover what I was passionate about, they pushed me to apply myself and find a path to fix the problems in society that I cared about.

Yehl, Christopher  
Mentor(s): Dr. Ken Shimizu, Dr. Ping Li  
Attractive Interactions of Organofluorines

Organic molecules containing one or more C-F bonds (organofluorines) are widely used in many applications involving synthesis, materials, and medicine. The high electronegativity and small size of the fluorine atom endows organofluorines with unique properties. One well appreciated property of organofluorines is their “non-stickiness,” such as in the Teflon™ coating of a frying pan. However, little has been known whether organofluorines can form attractive interactions. In this study, we systematically examined the nature, magnitudes, and physical origins of the interactions between organofluorines and aromatic surfaces using a small molecule model system. The study found that organofluorines can form strong attractive interactions with electron-poor aromatic surfaces due to favorable electrostatic interactions. These results will contribute to the development of better organofluorine materials and medicines.

Yonge, Adam  
Mentor(s): Dr. Andreas Heyden  
Theoretical Investigation of the Decomposition of Glycerol over Pt(111)

Glycerol is a significant side product in biodiesel production and determining efficient ways for its conversion are would be economically worthwhile. Due to its high degree of functionality, glycerol has the potential to be converted to high valued chemicals and fuels in an energy efficient manner with the assistance of a solid catalyst. Gaining a firm understanding of the underlying mechanism involved with Glycerol's conversion is relatively complicated because of the hundreds of possible reaction paths. For this reason, research tends to favor the investigation of smaller molecules with lower functionality. A Microkinetic Model for glycerol over a Pt(111) surface has been developed in order to gain a deeper understanding of the dominant paths involved with deoxygenation and decarbonylation of the molecule. The theoretical approach to this system required the determination of optimized structures and transition states through the application of Density Functional Theory (DFT). The prominence of reactions involving C-O hydrogenolysis was also evaluated. The reaction networks toward desired products (1,2 and 1,3 propanediol), as well as undesired products (lactic acid), have been explored to determine how the favorability toward each changes with specific reaction conditions.
Young, Briana  
Supervisor(s): Lacey Barton, Greg Basnight, Helen Recaborde, Alec Terry - Mentor(s): Dr. Jack Jensen, Dr. Manoj Malhotra

Analyzing and Improving the Carrier Selection Process at Continental Tire

Process: Within Continental Tire's U.S. network, the company awards truckload and less than truckload contracts to various carriers through a bid selection process. All bids and transport lane assignments are managed within the Kewill transportation management system. A transportation planner organizes the shipments and tenders the carriers.

Project Description: Transportation is a significant cost factor in the production and sale of commercial tires. It is important to minimize bid leakage whenever possible while keeping in mind customer carrier preference and carrier reliability. Bid leakage is the present when the lowest cost carrier and/or rate is not used. Standardizing the carrier selection process and analyzing carrier rates is key to optimizing costs and adhering to contractual lane terms.

Objective: The objective of this project is to document, analyze and improve the carrier selection process in order to reduce bid leakage at Continental Tire North America. Any improvements must consider carrier availability, lane rates and shipment type. Our project will optimize the carrier selection process through standardizing the carrier selection process and eliminating bid leakage through accurate reporting. Overall, this will help to reduce the firm's transportation costs.

Recommendation: We recommend periodically running the carrier compliance report and improving updating methods to monitor bid leakage and ensure accurate reporting. This will help to eliminate invalid carriers and rates. Additionally, we recommend to establish an internal and external formalized feedback loop to more quickly capture improvement opportunities. The internal loop will ensure that the process remains capable with the Continental team while the external focuses on improving the performance of underperforming carriers. Finally, the creation of standard operating procedures was also a solution to reduce the variability in the carrier selection process.

Result: Through a stop light analysis, we found that helping Continental establish and update standard operating procedures was the most effective solution. Also, we documented and outlined the implementation plans and improvements thus far through a workflow diagram.

Zamiela, Sarah  
Mentor(s): Dr. C. Nathan Hancock

Analysis of the zebrafish transposable element, Harbinger3N_DR, in yeast

DNA transposable elements, or transposons, are sequences of DNA that jump from one site of the genome to another in a cut-and-paste manner. They are found in all kingdoms of life and are sorted by homology into groups called superfamilies. The transposable elements from the PIF/Harbinger superfamily are one of the more recently discovered superfamilies. We are interested in studying these elements in particular because some human genes were derived from Harbinger-like elements, providing evidence that Harbinger elements were active during human evolution. I am analyzing the Harbinger3N_DR transposable element from zebrafish, in order to learn more about its transposition characteristics. In order for Harbinger3N_DR to “jump” the proteins Harbinger ORF1 and Harbinger TPase must be present. Thus far, I have created the Harbinger ORF1, Harbinger TPase, and Harbinger3_DR constructs for expression in yeast. We will be transforming these constructs into yeast and determining the transposition rate using a yeast transposition assay. We expect to see Harbinger3_DR transpose successfully in yeast because it has previously been shown to transpose in human cells. We will determine the transposition rate and analyze the insertion and excision patterns. These results will be compared to the mPing transposable element from rice. Since these two elements both belong to the same superfamily, our comparison will show the similarities and differences in their transposition strategies.
Food4Thought is a student led initiative dedicated to empowering those in the Columbia community to make informed decisions about their food choices as it relates to their health and well-being. We plan and facilitate grocery store tours, cooking demonstrations, and other events focused on creating a dialogue about how we can overcome the barriers and challenges to eating a healthier diet. Our model of sustainability aims to provide the education and resources necessary for members of the community to promote their own health through dietary changes. We hope to reduce socioeconomic health disparities by addressing the social, economic, and ecological aspects of food and how they pertain to health.

Advancing Medicine: Video-Assisted Thoracoscopic Surgery (VATS)

With hopes of learning more about the surgical field, we took SCHC 392 (Perioperative Environment: Basic Survival Skills) and it was through this course that our career paths became more clear. As an assignment for the course, we were able to meet and interview a surgeon in Pediatric General Surgery and to explore the special qualifications and procedures that come along with caring for young children and infants. Reinforcing this support for our paths were the opportunities to scrub, gown, and glove in a surgical environment, as well as the opportunity to learn basics in surgical suturing. Dr. Stan Adkins, MD, a General Pediatric Surgeon at Palmetto Richland Hospital, provided us insight into the challenges and rewards of caring for children and families. In particular, we were fascinated by his description of Video-Assisted Thoracoscopic Surgery, or VATS, and the incredible ways that it is bettering medicine. VATS is essentially surgery using a few small incisions and a thoracoscope to operate inside a body cavity with the aid of specialized instruments, while viewing the interior through an inserted camera. It is especially useful for Pediatrics because the minimally-invasive technique reduces blood loss and recovery time, factors that have a greater impact on young children. The surgical field is constantly advancing and it was insightful to learn about this revolutionary advancement in medicine.

How Passion Can Change Your Path

When I think about my time at the University of South Carolina, I think mostly about what it has given me. A place to grow, friendships I could never have dreamed of and organizations that have changed my life. My time with Dance Marathon has made my college experience everything it has been and more by giving me the skills to strive to do good in my community, communicate my passions and to put a well thought-out plan into action. My freshman year I was simply a participant and then I rose through the organization and this year, as Hero Relations Director, I had a seat at the table for some of the organizations biggest decisions. The position allowed me to communicate with over 1,400 participants and taught me the importance of communication with diverse groups of people, deadlines and how to problem solve when your thought out plan does not go the way you had hoped. During this presentation, I will discuss my insights about how this organization, my classes and my professional experience has shaped me as a leader and as someone who will leave this university better than when I arrived.
We determined the abundance and size structure of mussel larval populations across ~30 km of coast-line in Southwest England. The spatial scale of the study approximates estimated larval dispersal in this region. We compared the growth and abundance of mussel larvae to the concentration of nanoplanckton that comprise potential food sources for larvae to test the hypothesis that larvae may starve during time they are transported. We specifically tested the hypothesis that larval populations are well mixed both with respect to distance from shore and cross-shore. Larvae abundance varied significantly over the course of the spring and summer but was generally well mixed at local spatial scales. There was, however, evidence that larval abundance very close to shore (<500m) is uncoupled from the abundance of larvae at sites 1-5 km from shore. Using samples collected at varying spatial scales we assessed the spatial scale of mussel larval patches and compared the local and regional availability of larvae to patterns of larval settlement that occurred on-shore.
Graduate Student presentations
Abdulla, Osama
Mentor(s): Prof. Mitzi Nagarkatti, Prof. Prakash Nagarkatti
Role of Ahr ligands in microRNA-mediated Th17/T regulatory cell differentiation in Delayed Type Hypersensitivity

The aryl hydrocarbon receptor (AHR) is known to have an impact on immunomodulation. Recent data showed that TCDD, an exogenous AhR ligand, tends to induce T regulatory cells (Tregs), while FICZ, an endogenous AhR ligand, induces Th17 cells. The aim of this present study is to investigate the effects of TCDD and FICZ on microRNA profile in delayed type hypersensitivity (DTH). Treatment of C57BL/6 mice with TCDD attenuated DTH responses to methylated bovine serum albumen and induced Tregs. Focusing on the Treg subsets, we found that there was a significant increase in inducible peripheral, natural thymic, and Th3 Tregs. In addition, there is increase in TGFβ levels in the draining lymph node, as well as increased expression of TGFβ and Treg transcription factor, Foxp3. In contrast, treating DTH mice with FICZ induced inflammatory Th17 cells and increased the expression of IL-17 and Th17 transcription factor, RORγ. Analysis of microRNA (miR) profiles from draining lymph nodes showed differential regulation between TCDD and FICZ groups. Specifically, miR-132, which was overexpressed in TCDD groups, leads to downregulation of gene targets HMGB1. Downregulation of these gene targets leads to an increase in Treg differentiation. In contrast, FICZ treatment caused a downregulation of miR-132, which leads to an upregulation of HMGB1. In summary, this study demonstrates that TCDD and FICZ have divergent effects on miRNA modulation in a DTH model, and both ligands differentially regulate miR-132, which targets key components involved in Th17 and Treg development.

Ach, Jada
Mentor(s): Dr. Cynthia Davis
Managing Land, Managing the Archive

In this presentation, I investigate the theme of land and water management in the writings of Jack London (1876-1916) and argue that despite London's interest in Progressive Era irrigation, ranching, and scientific farming practices, the lively environments that emerge in his fiction refuse to be wholly managed or reduced to mere resource. London's affective ecologies, as I call them, intimately engage with the characters in his work; as unruly environments, they frustrate, enter, fortify, and, quite often, weaken the bodies of humans and animals alike. While visiting the London archive at the Huntington Library, which houses over 60,000 items related to the author, I encountered materials that reveal London's own attempts to comprehend his environment, such as annotated irrigation pamphlets and landscape photography. Additionally, I began to notice that my own desires to manage (in) the library's vast holdings reflected the control-oriented motives of Progressive Era land management, and my presentation will conclude by considering the scholar's expectations and generative failures in the archive-ecology.

Afshinnia, Kamelia
Mentor(s): Dr. Mohammed Baalousha
Impact of organic ligands on the colloidal stability and dissolution behavior of silver nanoparticles

Engineered nanomaterials interact with natural organic matter (NOM) upon release to the environment which affects their fate, transport and environmental persistence. However the effect of chemical composition and concentration of NOM on aggregation kinetics and dissolution behavior of silver nanoparticles are still not clear. Here we investigate how functional groups in l-cysteine, N-acetylle-L-cysteine, and natural organic matter affect the colloidal stability; that is aggregation and dissolution kinetics, of citrate-coated silver nanoparticles (cit-Ag NPs). Both l-cysteine and N-acetylle-L-cysteine reduces the dissolution of Ag NPs, and this reduction in Ag NPs dissolution increases with the increase in cysteine concentration. L-cysteine reduces the stability of cit-Ag NPs, whereas N-acetylle-L-cysteine increases the stability of cit-Ag NPs. These differences are attributed to the differences in the structure of these two molecules. L-cysteine possesses both negative carboxylic and a positive amine group, while N-acetylle-L-cysteine possesses only a negative carboxylic group. Suwannee River fulvic acid (SRFA) enhances the colloidal stability of cit-Ag NPs; that is, SRFA increases the critical coagulation concentration (CCC) value to higher counter ion concentrations. Our results suggest that nature of organic ligands in the receiving water can differentially modify AgNPs surface and alter their environmental transformations and fate.
Prostate cancer (PCa) is a multi-focal slow-growing cancer of the prostatic glands that constitutes the second cause of death due to cancer among men in the USA. African Americans (AA) are about 1.6 times more likely to develop PCa, and more than twice as likely to die of PCa than Caucasians (Cauc). Mast cells (MC) are prostate-resident cells, with mediator-filled cytoplasmic granules, including tryptase and chymase proteases which expression defines MC subsets; Tryptase+ Chymase+-MC (MCTC), and Tryptase+MC (MCT). MC also produce sphingosine-1-phosphate (S1P), a potent modulator of tumor microenvironment that can activate MC and/or neighboring cells, also promoting proliferation, survival and motility. Interestingly, we have shown that S1P drives MC phenotypic conversion to chymase-expressing MC. Ceramide, a precursor molecule of S1P, triggers apoptosis in cancer. We hypothesized that the MC/S1P/ceramide axis may contribute to race disparity in PCa. Human prostate core biopsy samples from both ethnicities with varied histo-pathological Gleason Scores (GS) were sectioned and mounted on slides for analysis of MC using histochemistry. We found decreased numbers of total MC in cancer sections of AA compared to Cauc. Immunohistochemical labeling and mRNA expression for chymase revealed decreased MCTC numbers in cancer sections of AA compared to Cauc, suggesting a protective role for chymase+-MC in PCa. Lipidomics analysis revealed higher S1P, whereas total ceramide concentrations were reduced in AA cancer samples compared to Cauc in higher GS. In conclusion, decreased MCTC subset and proapoptotic ceramides with increased S1P among AA may provide an explanation pertaining to PCa race disparity.
Alattabi, Zaid
Mentor(s): Prof. George Voulgaris, Dr. Nirmimesh Kumar
**HF Radar Measurements of Waves: Sensitivity Analysis to Range and Boresight Angle**

Although HF Radar is routinely used to measure ocean surface currents, the return signal contains information about ocean wave conditions. A number of theoretical and empirical inversion methods have been suggested to estimate waves from the HF radar Doppler spectra with the latter one being in favor due to easier application. Although empirical inversion ocean wave spectrum has been reported by several literatures, variations and differences of estimated wave height are still obscure and are not well explained. Examination of the performance of HF radar-derived wave heights is still an active point of research.

The empirical method relies on calibration of the individual radar system using in situ wave data. In this study, we used wave spectra estimated from in situ data collected at 7 different locations within the area covered by a single Very High Frequency (VHF) radar site (48MHz). Single WEllen RAder (WERA) station was deployed in eastern site of Cape Hatteras (North Carolina) in 2010 as part of a project designed to study nearshore flow and sediment transport dynamics. These data were used to check the accuracy of the empirical method vs. radar range, and to the angle from the radar boresight.

The calibration process was carried out for in situ location using the recorded wave spectra. An ocean wave frequency dependent calibration parameter, relating the 2nd order part of the radar Doppler spectrum to the in situ recorded signal was estimated for each site. The analysis showed that the commonly accepted simplification of the process through the use of a frequency averaged value in the inversion leads to significant errors. The analysis also revealed that the frequency dependent calibration parameters depend on both range and angle from radar boresight.

The results of this study showed that calibration of HF radars from a single station might not be adequate for accurate wave inversion of the radar signal over the whole domain, and it requires accurate determination of both range and boresight dependence. In order to fully quantify this range and angle dependence, a high spatial resolution wave model (SWAN) verified using the in situ measurements is used over the entire HF radar coverage area.

Al-Ghezi, Zinah
Mentor(s): Prof. Mitzi Nagarkatti, Prof. Prakash Nagarkatti
**Combination of cannabinoids, Δ9- tetrahydrocannabinol (THC) and cannabidiol (CBD), ameliorate experimental autoimmune encephalomyelitis by promoting cell cycle arrest and apoptosis in activated T cells through miRNA signaling pathways**

Multiple sclerosis (MS) is a chronic and disabling disorder of the central nervous system (CNS) characterized by breakdown in the blood- brain barrier and demyelination. Finding a cure for MS remains challenging, and most treatments involve the use of immunosuppressive drugs that have toxicity. The marijuana plant, Cannabis sativa produces phytocannabinoids that relieve nausea, pain, and inflammation. In the current study, we investigated the effects of using a combination of the psychotropic Δ9-tetrahydrocannabinol (THC) and non-psychoactive cannabidiol (CBD) on the regulation of activated T-cells during the development of experimental autoimmune encephalomyelitis (EAE), a murine model of MS. We demonstrated that administration of THC+CBD ten days after EAE induction was effective at ameliorating the disease, including inflammation and CNS cellular infiltration. MicroRNA microarray analysis revealed altered miRNA profile in brain infiltrating CD4+ T cells following THC+CBD treatment of EAE mice. In addition, mice treated with THC+CBD showed decreased levels of brain- infiltrating CD4+ T cells, pro-inflammatory cytokines interleukin17( IL-17) and interferon-gamma (INF-Î²) and increase in the levels of brain -infiltrating Forkhead box protein P3(FoxP3)+ CD4+ T cells and anti-inflammatory cytokine interleukin 10(IL-10). Further evidence indicated that THC+CBD treatment significantly downregulated several miRNAs (miR-21a-5p,miR-155-5p, miR-146a-5p) in brain CD4+ T cells that target genes associated with cell cycle arrest (Cyclin-dependent kinase inhibitor 1B (CDKN1B) and Cyclin-dependent kinase inhibitor 1A (CDKN2A) and apoptosis Bcl-2-like protein (BCL2L11). Collectively, these studies demonstrate that THC+CBD treatment leads to the amelioration of EAE development by suppressing T cell responses through the induction of select miRNAs that control cell cycle progression and mediate apoptosis. (Supported in part by NIH grants P01AT003961, R01AT006888, R01ES019313, R01MH094755, R01AI123947, R01AI129788 and P20GM103641).
We examined the feasibility of using two types of fly ash (an industrial waste from thermal power plants) as a low-cost catalyst to enhance the ultrasonic (US) degradation of ibuprofen (IBP) and sulfamethoxazole (SMX). Two fly ashes, Belews Creek fly ash (BFA), from a power station in North Carolina, and Wateree Station fly ash (WFA), from a power station in South Carolina, were used. The results showed that >99% removal of IBP and SMX was achieved within 30 and 60 min of sonication, respectively, at 580 kHz and pH 3.5. Furthermore, the removal of IBP and SMX achieved, in terms of frequency, was in the order 580 kHz > 1000 kHz > 28 kHz, and in terms of pH, was in the order of pH 3.5 > pH 7 > pH 9.5. WFA showed significant enhancement in the removal of IBP and SMX, which reached >99% removal within 20 and 50 min, respectively, at 580 kHz and pH 3.5. This was presumably because WFA contains more silicon dioxide than BFA, which can enhance the formation of OH• radicals during sonication. Additionally, WFA has finer particles than BFA, which can increase the adsorption capacity in removing IBP and SMX. The sonocatalytic degradation of IBP and SMX fitted pseudo first-order rate kinetics and the synergistic indices of all the reactions were determined to compare the efficiency of the fly ashes. Overall, the findings have shown that WFA combined with US has the potential for treating organic pollutants, such as IBP and SMX, in water and wastewater.

Al designer, Abeer
Mentor(s): Prof. Mahmud Khan
Estimating the Impact of Affordable Care Act (ACA) on the Likelihood of Receiving Mammography and Pap Smear Screenings

Background: ACA removed cost sharing for preventive services including cancer screenings such as mammography and pap smear. In 2010, 66.5% of women >=40 years had a mammogram within 2 years, while 73.7% of women >=18 years had a pap test within 3 years.

Objective: 1) to predict the screening rates of mammography and pap smear among women >= 21 in absence of ACA and 2) to identify differential effects of ACA on screening rates by age, socioeconomics, insurance status and geographic factors.

Data source: The Medical Expenditure Panel Survey (MEPS) data for the years 2008, 2009 (pre ACA) and 2013, 2014 (post ACA) were used. Women >= 21 were selected for analysis. Sample sizes were 18,244 pre ACA and 19,736 post ACA.

Measures: The outcome of interest is the receipt of mammography and pap smear; the covariates are income, insurance type, age, education, and region.

Statistical analysis: Multivariate logistic model was run to explain the likelihood of mammography and pap smear screenings pre-ACA. The estimated model was used to predict utilization of screenings in post-ACA years in absence of ACA. Differences between predicted probabilities and actual use reflect ACA-effects.

Results: Mammography coverage would have been 52% in 2013-14 without ACA but the actual coverage was 57%. Mammography probabilities with and without ACA show no significant differences for high income group, uninsured, women with <= 8 years of education and women >=65 years. Pap smears coverage was found to be lower with ACA but the differences were not statistically significant for most population groups.

Conclusion: ACA improved coverage of mammography but did not improve coverage of pap smears. Financial barrier may not be the most important factor affecting utilization of screenings.
Activation of PTEN mediates the apoptotic effects of Cannabidiol, a non-psychoactive cannabinoid, in neuroblastoma

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Neuroblastoma (NBL) is one of the most common childhood cancers, which originates from the immature nerve cells of sympathetic system mostly in the adrenal gland, although it can arise in the neck, abdomen, chest, and spinal cord. Common treatment options for NBL patients include surgery, radiotherapy, and chemotherapy, which often lead to poor outcomes leading to relapsing tumors. Cannabinoids, which are ingredients found in marijuana, are often used to treat the side effects of chemotherapeutic agents, have shown great potential as therapeutic agents against a variety of cancers. We tested the effect of cannabidiol (CBD), a non-psychoactive cannabinoid, on NBL human cell lines, SHSY5Y and IMR-32. CBD was able to effectively induce apoptosis in neuroblastoma cells at a 5 μM/L dose, and its effect is augmented with increasing doses and exposure time. We found that CBD was acting through over-expression of PTEN (a tumor suppressor gene that is downregulated in most cancers) resulting in inhibition of Akt signaling necessary for cell survival and proliferation. The overexpression of PTEN is post-transcriptional, mediated by downregulation of miR-4529-3p, miR-26a-5p, miR-1269a, miR-130, miR-148a, miR-338-3p as well as miR-21 which was previously shown to enhance cancer cell proliferation and migration. NBL cell morphology changes within 6 hours of exposure to CBD, and significant apoptosis can be seen within 18 hours. Interestingly, the effect of CBD on the cancer cells cannot be blocked by CB1 or CB2 receptor antagonists, but can be effectively blocked using 5-hydroxytryptamine receptor-1 antagonist. Apoptosis induced by CBD cannot be reduced by caspases-2, -8, or -9 inhibitors, although we saw significant decrease with a caspase-3 inhibitor. Furthermore, CBD was able to significantly reduce the proliferative ability of NBL cells, as well as their ability to migrate. In addition, the mitochondrial basal oxygen consumption rate by NBL cells was significantly reduced within 6 hours of treatment with CBD, which was accompanied by compensatory increases in glycolysis. Thus, we concluded that CBD may be a promising drug in treatment of neuroblastoma tumors in children in the future. (Supported in part by MOHESR, NIH grants P01AT003961, R01AT006888, R01ES019313, R01MH094755, P20GM103641, and R01AI129788).

Alhasson, Firas
Mentor(s): Dr. Saurabh Chatterjee

High circulatory Leptin mediated NOX-2 promotes kidney inflammation in nonalcoholic fatty liver disease via miR21-dependent mesangial cell activation.

High insulin and leptin resistance followed by underlying inflammation is often ascribed to the ectopic manifestations in nonalcoholic fatty liver disease (NAFLD) but the exact molecular pathways remain unclear. We have shown previously that CYP2E1-mediated oxidative stress and circulating leptin in NAFLD is associated with renal disease severity. Extending the studies, we hypothesized that high circulatory leptin in NAFLD causes renal mesangial cell activation and tubular inflammation via a NOX2 dependent pathway that upregulates proinflammatorymiR21. High fat diet (60% kcal) was used to induce fatty liver phenotype with parallel insulin and leptin resistance in WT, Leptin knockout (ob/ob) and p47 phox knockout mice. Kidneys were collected after pathology showed NASH-like phenotype and accelerated oxidative stress in the liver. The kidneys were probed for mesangial cell activation and tubular inflammation. Results showed that NAFLD kidneys had significant increases in Ï‚-SMA, a marker of mesangial cell activation, miR21 levels, tyrosine nitration and renal inflammation while they were significantly decreased in leptin and p47 phox knockout mice. Micro RNA21 knockout mice showed decreased tubular immunotoxicity and proinflammatory mediator release. Mechanistically, use of apocynin or phenyl boronic acid (FBA) or DMPO or miR21 antagonir inhibited leptin primed-miR21-mediated mesangial cell activation in vitro suggesting a direct role of leptin-mediated NOX-2 in miR21-mediated mesangial cell activation. Finally JAK-STAT inhibitor completely abrogated the mesangial cell activation in leptin-primed cells suggesting that leptin signaling in the mesangial cells depended on the JAK-STAT pathway. Taken together the study reports a novel mechanistic pathway of leptin-mediated renal inflammation in NAFLD.
Allen, Joshua  
Mentor(s): Dr. Susan Richardson  
Is There a Disinfection By-Product Problem in Flint?

The issue of lead contamination in the city of Flint, MI has been well documented over the past year. The Flint, MI Water Crisis (April 2014 – present) resulted from an ill-fated decision to switch from Detroit water with corrosion control, to Flint River water without corrosion control. Although lead levels are closer to normal, recent reports of skin rashes have sparked questions surrounding tap water in some Flint homes. This study aims to investigate the presence of contaminants, including disinfection by-products (DBPs), in the hot water used for showering and bathing in the homes of residents in Flint. DBPs are formed when natural organic matter (NOM) reacts with disinfectants (e.g., chlorine) as well as bromide and iodide present in source water. Extensive quantitative and comprehensive, broadscreen qualitative analyses were performed in order to identify a possible source for the reported skin rashes. For comparison, waters from Detroit (using chlorine and Lake Huron as the same source) and two cities in Georgia (also using chlorine) were also analyzed. This work will shine light on possible harmful contaminants present in Flint tap water and give direction on what changes could be made for improved water quality.

Allen, Ashley  
Mentor(s): Dr. S. Michael Angel  
Alternative Optics for Standoff Spatial Heterodyne Raman Spectroscopy

The spatial heterodyne Raman spectrometer (SHRS) is a new type of Fourier transform (FT) Raman spectrometer that is based on a dispersive interferometer.¹ The SHRS has a wide input aperture and a wide field of view, which allows for very high light throughput for diffuse emission compared to conventional dispersive, slit-based Raman spectrometers. The spectral resolution of the SHRS is not highly dependent on the input aperture size, so the footprint can be small while still allowing high resolution. Recently we demonstrated a deep UV SHRS with <5 cm⁻¹ spectral resolution using 25-mm gratings.²

Our current research emphasizes miniaturizing the SHRS and making monolithic spectrometers for planetary applications. Recently we demonstrated an SHRS with 2.5 mm diffraction gratings that used a cell phone for the imaging optics and detector.³ We are also trying to make the SHRS small enough to use in a CubeSat or SmallSat spacecraft architecture. CubeSats are a class of spacecraft having a standard size and form factor; the smallest unit, 1U, measures 10x10x10 cm³ and weighs less than ten kilograms - these units can be combined up to 12U in size. For the SmallSat architecture we are exploring alternative optics that can be used to further reduce the size and weight of the SHRS.

Large diameter, short f/#, below f/1, Fresnel lenses are available that weigh a fraction as much as comparable conventional lenses, yet have sufficient imaging quality to be used for light collection with the SHRS. In preliminary studies we have compared an acrylic 100-mm diameter Fresnel collection lens to a high quality telescope for remote SHRS Raman measurements. The sensitivity of the Fresnel-based system was within a factor of 3 of the telescope based system, and the signal to noise (SNR) was within a factor of 2 for measurements made at 10 meters. In future work we will investigate higher quality glass, aspheric and achromatic Fresnel lenses for this application.

References:
Alrafas, Haider
Mentor(s): Prof. Mitzi Nagarkatti
Effect of resveratrol on gut microbiome in TNBS-induced colitis

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ABSTRACT
Colitis is an inflammatory bowel disease of unknown etiology characterized by acute or chronic inflammation of the large intestine. Currently there is no cure for patients suffering from colitis, and most treatments involve the use of immunosuppressive drugs that can have adverse side-effects or increased toxicity. In the current study, we investigated the effects of resveratrol, a natural component found in grapes, strawberries, and raspberries, on murine TNBS colitis model. Our data shows that administration of resveratrol alleviates symptoms associated with colitis in this model, which includes reversal of weight loss and colon shortening. In addition, mice treated with resveratrol showed decreased levels of circulating inflammatory biomarkers like serum amyloid A, myeloperoxidase and lipocalin 2. Flow cytometry data showed significant increase in mesenteric lymph node CD3+, CD4+ T cell population and INF gamma in TNBS group, while significant increase in Foxp3 T cells was seen in resveratrol treatment group. Endoscopy and histopathology also showed decreased tissue damage and cellular infiltration in the colon. In order to better understand the beneficial effects of resveratrol against colitis, we performed 16S rRNA metagenomic sequencing to investigate alterations in the gut microbiome after induction of colitis by TNBS and treatment with resveratrol. Analysis of cecal flushes revealed that TNBS administration leads to increase in Firmicutes, Tenericutes and Bacteroidetes. However, mice that were treated with resveratrol showed a remarkable reversal in these gut microbial alterations caused by TNBS colitis induction, with gut microbiome similar to that of vehicle-treated control mice. Collectively, these data suggest that resveratrol is able to ameliorate colitis by preventing pathogenic gut microbial dysbiosis and restoring gut microbiome composition to a more homeostatic state. (Supported in part by NIH grants P01AT003961, R01AT006888, R01ES019313, R01MH094755 and P20GM103641).

Al-Sammarraie, Nadia
Mentor(s): Dr. Mohamad Azhar
Role of Transforming Growth Factor Beta Ligands in Heart Development

Congenital heart disease (CHD) are the major class of birth defects in the US which affects 0.8% of babies born each year. Cardiac outflow (OFT) defects cause approximately 30% of all CHDs which occur in isolated cases or in association with genetic syndromes, such as Loeys-Dietz syndrome, caused by loss of function mutations of transforming growth factor beta2 (TGFβ2) ligand. Despite the loss of function nature of these mutations, cardiovascular tissues from these patients show evidence of increased (rather than decreased) TGFβ1 and SMAD2 signaling. Overall, the spatiotemporal and the yin-yang role of TGFβ2 and TGFβ1 ligands in the etiology of OFT malformations have not been investigated.

In this study, we used our novel Tgfb2flox mice to determine if loss of Tgfb2 in the endocardial lineage (via Tie2Cre+ mice) causes outflow tract (OFT) cushion remodeling and septation defects. The results indicate that TGFβ2 from the endocardial cell lineage is required for OFT development and its loss result in septation defects (such as Persistent truncus arteriosus). We also tested the hypothesis that the augmented TGFβ1 in vivo, through SMAD2 signaling, causes outflow tract defects. Our data show that overexpression of Tgb1 in the endocardial cell lineage leads also to cushion and septal remodeling defects (such as double outlet right ventricle). These exciting findings suggest the novel hypothesis that the OFT defects that occur as a result of disruption of TGFβ2 gene may be dependent on augmented endocardial TGFβ1 signaling. Future experiments will further allow us to determine which cardiac cell populations are responding to the autocrine/paracrine actions of TGFβ2 ligands. Collectively, the results will define the function of specific TGFβ ligands and the cell types that produce those TGFβ ligands and the lack of which contribute to the OFT defects seen in the CHD patients. Overall, our experiments will define underlying mechanisms that govern the OFT defects in the loss-of-function and gain-of-TGFβ function mice. This will provide a novel understanding of the etiology of the OFT defects in human CHD.
Apostolico, Taylor
Mentor(s): Dr. Crystal Hill-Chapman
Women's Attitudes and Perceptions of Utility Towards BRCA1/2 Genetic Testing

OBJECTIVES: Hereditary Breast and Ovarian Cancer (HBOC) is an autosomal dominant cancer predisposition syndrome with a 46-87% lifetime risk of developing breast cancer in mutation carriers. Women who are determined to have HBOC through genetic testing are eligible for more intensive screening procedures as well as prophylactic surgeries that may reduce the risk of developing breast cancer by up to 95%. Genetic testing services have historically been underutilized by minorities and individuals in lower socioeconomic classes. However, recent changes in the climate surrounding genetic testing have increased the general population’s awareness of and ability to access genetic services. The objectives of this study were to assess women's awareness of and interest in breast cancer genetic testing services, as well as women's attitudes and beliefs regarding the clinical and personal utilization of genetic testing for HBOC. METHODS: Two-hundred and sixty-eight women completed a 35-item survey on personal information regarding perceptions of HBOC and genetic testing, attitudes towards genetic testing for HBOC, as well as demographics. RESULTS: Two-hundred and eight women met participation criteria. One-hundred and forty-three (69%) indicated interest in genetic testing for HBOC. Women’s perceptions of their susceptibility to a genetic mutation and perceptions of the benefits of genetic testing showed statistically significant associations with expressed interest in genetic testing for HBOC. Black women expressed significantly less awareness of and more interest in genetic testing services. Race and income were influential factors on women's perceptions of barriers to genetic testing for HBOC. CONCLUSIONS: Women are interested in genetic testing for HBOC. Black women are simultaneously less aware of genetic testing services and more interested in pursuing these services once offered. Outreach and education in minority communities may increase utilization of genetic testing services for HBOC.

Assi, Lateef
Mentor(s): Dr. Paul Ziehl
Cost and fuel energy optimization of activating solution based silica fume geopolymer concrete

Development of sustainable construction materials has been the focus of research efforts worldwide in recent years. Concrete is a major construction material; hence, finding alternatives to ordinary Portland cement is of extreme importance due to high levels of carbon dioxide emissions associated with its manufacturing process. Geopolymer concrete is a potential solution; however, concerns about the high cost and the low real fuel energy efficiency are obstacles against its increase in the market share. In this paper, the current cost and fuel (thermal energy) usage are calculated. In addition, the cost and fuel usage were optimized based on previous experimental results. The results show that geopolymer concrete cost can be reduced using Portland cement in low percentage replacement (5-35%). The required fuel usage (thermal energy) for producing geopolymer concrete was lower than Portland cement. Using Portland cement and reducing sodium hydroxide concentration not only reduce the cost of geopolymer concrete, but also reduce the thermal energy. Based on the results of the study, the sodium hydroxide and silica fume have a significant role on the fuel usage and the cost. Three new mixtures were proposed to reduce the cost. Additionally, the fuel usage was 30% lower than Portland cement. Marketing and communication plans showed that geopolymer cement industries can be profitable because geopolymer concrete can be used for varied civil engineering applications including sidewalks, concrete panels, etc. The best locations to start the business were proposed, including some cites in the north east or east of the United States such as Chagrin Falls, Milwaukee, and Charlotte. Internationally, China was considered the best place to start the business due to the availability of raw materials and affordable prices.
Atiya, Huda  
Mentor(s): Dr. Ann Ramsdell  
The Laterality of Breast Cancer Metastasis and the Microenvironment  

In breast cancer patients, metastasis in distant organs is the main cause of death and therapeutic failure. However, there currently are no available therapies that can eradicate distant metastases. Toward this end, my research goal is to identify regulators of breast cancer metastasis.  

Studies have shown that the microenvironment plays a critical role in breast tumor progression, including development of metastases. Moreover, there is a recent study that showed that right side breast tumors have greater metastatic activity compared to left breast tumors. Thus, we hypothesize that there are left-right (L-R) differences in the mammary microenvironment that promote L-R differences in tumor progression and/or metastasis. To test this, we used a triple negative breast cancer (TNBC) mouse model in which a metastatic carcinoma cell line, 4T1, was injected into the left or right mammary glands of adult female mice. Our result showed that tumors formed on both sides with equivalent growth rates. However, left versus right tumors had significantly different metastatic behavior, with 83.3% of right tumors generating lung metastasis, compared to only 33.3% of left tumors generating lung metastasis. Moreover, among all mice bearing lung metastases, the size and number of lesions were higher in the right tumor group. To begin to determine the basis for L-R differences in tumor metastasis, we investigated if left versus right tumor cells disseminated to the lungs. Results indicated that tumors from either side had comparable dissemination. We next investigated histology of the primary tumors, which showed that right tumors have greater local invasion and collagen deposition, which are indicators of increased tumor aggression. We also are investigating tumor-associated macrophages, which are the most abundant leukocyte population in mammary tumors and which play a crucial role in breast tumor metastasis. Consistent with increased aggression of right side tumors, our results show that right tumors also had more tumor-associated macrophages compared to the left tumors. Collectively, our results demonstrate for the first time that the L-R mammary microenvironments are significantly different in supporting breast cancer metastasis. To determine basis for this L-R difference, future studies will include RNA-Seq analysis on the left versus right normal mammary microenvironments and left versus right tumors in order to identify genes and pathways that differentially regulate the breast cancer metastatic cascade.

B.H. Eliot, Lewis  
Mentor(s): Dr. Matt Childs  
Abolitionism, Enslavement, and the Stateless of the Nineteenth-Century Atlantic World  

This project explores the mid-nineteenth century black Atlantic World. This period was one of turbulence as European empires competed politically, ideologically, and morally over terrain, labor, and bodies during the Age of Emancipation. I examine the Atlantic Africans who experienced these clashes, demonstrating the stateless reality of black Atlantic life.
Baird, Jessica  
Mentor(s): Dr. Jill Stewart  
Development of a 3-Dimensional Motor Learning Task to Investigate Exercise-Enhanced Neuroplasticity

Brain plasticity is important for motor learning and re-learning. Exercise prior to motor training may facilitate plasticity due to an increase in brain derived neurotrophic factor. However, in most studies examining exercise-enhanced plasticity, changes in motor skill performance are examined on motor tasks involving single finger button presses or small movements of a joystick. Knowledge gained from these tasks may not translate to complex, 3-dimensional (3D) movements. The purpose of this study was to develop a motor learning task that involved 3D reach movements. Fifteen participants (23.5 ± 3.7 years) practiced a target task with the dominant, right arm over two days in a 3D virtual environment. Participants were instructed to reach to the target as quickly and accurately as possible. Once a target was “hit” it would disappear and the next target would appear. To examine sequence specific learning, target position alternated between random and repeated sequences. Each sequence consisted of 8 targets and was matched for difficulty. Time to complete both the random and repeated sequences improved significantly across practice (random: $t = 5.524$, $p < .01$; repeated $t = 5.918$, $p < .01$), and this improvement was maintained at retention (random: $t = 5.652$, $p < .01$; repeated $t = 5.347$, $p < .01$). Results indicate that a motor task requiring whole arm, 3D reach movements can demonstrate two important motor learning principles: motor skill acquisition and retention. This novel task can be used to assess exercise-enhanced neuroplasticity in a manner that more accurately represents real-world movement.

Baker, Kacie  
Mentor(s): Ms. Peggy Walker  
Exercise Recommendations for Active Adults at Risk for SCD. Can I continue to Exercise?

Sudden arrhythmic death syndrome (SADS), where death is secondary to cardiac arrhythmia, is associated with cardiac ion channelopathies and cardiomyopathies. Many of these conditions have exercise guidelines regarding eligibility and disqualification recommendations for competitive athletes through the American Heart Association and American College for Cardiology. This study investigates how medical professionals communicate these exercise recommendations to patients, and in turn, how well patients understand these recommendations. The study also explores motivations for either continuing or discontinuing an exercise practice after a diagnosis. A questionnaire was distributed through cardiac disease-focused support groups and organizations. Data from 67 individuals with a SADS condition were used for analysis. It was determined that both amount of time spent and intensity of exercise decreased significantly after a diagnosis. Patients were especially more likely to decrease activity intensity when they felt confident with the communication of their exercise recommendations and how well they understood them. Based on the responses, it was determined that individuals feel poorly informed regarding their exercise recommendations and often take on emotional burden with these guidelines. Importance of quality of life was widely expressed, and how exercise is a big component to a healthy lifestyle despite risks associated with SADS. Increased awareness on how exercise recommendations are being communicated to patients and how well patients understand their medical management will promote a safer and more personalized healthcare plan for patients, while improving the psychosocial outcomes of a recent diagnosis.
PURPOSE: To examine the relationship between changes in cardiorespiratory fitness and changes in ideal cardiovascular health (CVH) score over time. METHODS: The association between change in fitness and change in ideal CVH score was examined in 2,555 adults who had at least two clinic visits in the Aerobics Center Longitudinal Study. Fitness was measured as duration in minutes from a maximal treadmill test. Ideal CVH score was calculated on a 14 point scale using the AHA's simple 7 criteria of smoking status, BMI, physical activity (MET-min/wk), healthy diet, total cholesterol, blood pressure, and fasting plasma glucose. Participants were grouped into categories of loss, stable, or gain, by tertiles of change in cardiorespiratory fitness and also by tertiles of change in ideal CVH score between baseline and last follow-up visit. RESULTS: After a mean follow up of 3.3 ± 2.4 years, the average change in ideal CVH score was 0.14 ± 1.9 and the average change in treadmill time was -0.25± 2.7 minutes for the total sample. After controlling for age, sex, and time between exam dates, the gain in fitness group (n=851) significantly (p<0.0001) increased their ideal CVH score by an average of 0.71 ± 1.9, while the stable and loss of fitness groups (n= 830 and 873 respectively) significantly (p<0.0001) decreased their scores by -0.07 ± 1.9 and -0.55 ± 1.9, respectively (p<0.0001 for difference between groups). Change in treadmill time per year explained 9.0% of the change in ideal CVH score. For every minute increase in treadmill time per year, the ideal CVH score increased by 0.26 per year. CONCLUSIONS: Improving cardiorespiratory fitness during middle age is associated with higher scores and greater improvement in ideal cardiovascular health.

“Children with specific language impairment (SLI) and dyslexia often have difficulty with non-word repetition tasks. Previous research has rarely accounted for the co-occurrence of these two disorders and has further been limited by focusing on word and segmental level performance alone. In an effort to expand the research, this study investigated non-word repetition performance of children with SLI (with or without comorbid dyslexia) by evaluating elements of speech at three levels: word, phoneme, and suprasegmental. Eighty second and third grade students were randomly selected and evenly distributed into four groups. The first group included children with dyslexia, defined by low word reading ability. The second group included children with SLI, a disorder involving delays in language without the presence of other developmental abnormalities or delays. The third group consisted of children diagnosed with both dyslexia and SLI, while the fourth group represented typically developing children. Participants completed a battery of language and literacy assessments, including the Nonword Repetition subtest of the Comprehensive Test of Phonological Processing (CTOPP-2). In this assessment, participants were prompted to repeat nonsense words after listening to a voice recording of each word. Data was analyzed based on word accuracy, percent consonants correct, and suprasegmental properties such as number of syllables and stress patterns. The results of this study will improve our understanding of the similarities and differences between SLI and dyslexia. Further, the results may improve the identification of SLI and may increase effectiveness of treatment by providing specialized treatment options.”
Becker, William  
**Mentor(s):** Dr. Mitzi Nagarkatti, Dr. Prakash Nagarkatti  
**Marijuana Δ9-tetrahydrocannabinol induces unique changes in the murine gut microbiome through induction of myeloid-derived suppressor cells and T helper 17 cells.**

Δ9-tetrahydrocannabinol (THC) is the main psychoactive ingredient found in the Cannabis plant, one of the most widely used drugs on the planet. THC exerts its effects through binding to both cannabinoid CB1 and CB2 receptors as a partial agonist. Synthetic THC is currently being used to treat anorexia in people with HIV/AIDS, people undergoing chemotherapy, and has been approved for use in people with multiple sclerosis, neuropathic pain, and spasticity, among others. Thus, despite its illicit status in many countries, the therapeutic potential for THC is high. The mammalian intestine harbors a diverse array of bacteria that are constitutively referred to as the microbiome. As such, the gut microbiome has gained attention in recent years for its vast implications regarding human health and disease. Delineating the myriad reciprocal effects of our immune system and our microbiome is of great import. Here we use an acute and chronic model of murine THC administration to study the effects of THC on the naïve murine immune system, and to see how these immune changes relate to the flux of intestinal bacteria. Our lab has shown previously that a single dose of THC causes a migration of myeloid-derived suppressor cells (MDSCs) from the bone marrow to the peritoneal cavity. Recent work demonstrates that these MDSCs remain in the peritoneal cavity throughout chronic THC administration, where they proliferate and produce IL-6. The peritoneal IL-6 leads to an increase in T helper 17 (Th17) cells in the mesenteric lymph node (mLN). The alteration in the gut immune cells occurs in tandem with an increase in the number of Alphaproteobacteria in the cecum and feces of mice treated with THC compared to vehicle and naïve mice.

Beguelin, Paul  
**Mentor(s):** Prof. Michael Bizimis  
**Hf isotope systematics of rejuvenated Hawaiian magmas**

Rejuvenated stage lavas represent the final stage of Hawaiian volcanism, following the shield, and post-shield stages after a hiatus of 1-2 Ma. These alkalic lavas have more depleted isotopic compositions compared to previous stages [1] (87Sr/86Sr = 0.7032 instead of 0.7037) and plot outside of the mixing hyperbola described by the shield tholeites in Pb-Hf or Nd-Pb isotopic space [2], implying a change in the magma source between shield and rejuvenated stage, as the volcano moves away from the center of the plume.

We present new Hf isotope data on 34 previously characterized [3] submarine and subaerial lavas from the islands of Kauai and Niihau (all stages), and Hf-Nd-Sr-Pb measurements on twelve submarine rejuvenated lavas from the North Arch chain, NE of Kauai.

In δNd-δHf space, all rejuvenated lavas from Niihau, Kauai, Kaula, Oahu, Maui, Molokai, North Arch have more radiogenic composition than shield stage lavas and converge around δHf ~14 +/- 1 and δNd ~ 6 to 9, with North Arch showing the most radiogenic values at δNd ~9. Kauai lavas from the shield, post-shield and rejuvenated stages form a continuous array with a slope of ~1.3, between KEA type compositions and a depleted endmember similar to North Arch sources. Conversely, Niihau rejuvenated lavas have more radiogenic δHf (~14 vs. 11) for a given δNd (6-9) than the shield building stages (shield, late-shield, post-shield) which overlap KEA type shield lavas [2]. This offset points to a shift in the source composition late in the volcanism. This relatively radiogenic Hf composition has been recognized previously in pyroxenites from Oahu and Kaula, and peridotites xenoliths from Oahu, and has been attributed to a recycled lithosphere component integral to the Hawaiian hot spot [1]. There is no systematic shift in Hf isotopes of rejuvenated magmas across the Hawaiian swell from Kaula Island to the North Arch field for over 350 km, implying a relatively homogenous rejuvenated source over a large distance, and with distance from the plume center.

Belgrad, Benjamin  
Mentor(s): Dr. Blaine Griffen  
**Personality interacts with habitat quality to govern individual mortality and migration patterns**

Animal personalities are increasingly recognized as key drivers of ecological processes. However, studies examining the relative importance of personalities in comparison to other environmental factors remain lacking. We performed two field experiments to assess the concurrent roles of personality and habitat quality in mediating individual mortality and migration. We quantified the predator avoidance response of mud crabs, *Panopeus herbstii*, collected from low and high quality oyster reefs and measured crab loss in a caging experiment. We simultaneously measured the distance crabs traveled across reef quality in a separate reciprocal transplant experiment. Habitat quality was the primary determinant of crab loss, although the distance crabs traveled was governed by personality which interacted with habitat quality to control the fate of crabs. While crabs on low quality reefs rapidly emigrated, starting with the boldest individuals, both bold and shy crabs would remain on high quality reefs for months and experienced higher predation risk, particularly among bold individuals. These findings suggest that personalities could produce vastly different population dynamics across habitat quality and govern community responses to habitat degradation.

Bennett, Amanda  
Mentor(s): Dr. Karen McDonnell  
**Sleep Disturbances in Survivors of Early Stage Lung Cancer: A Review of the Literature**

Background: Early stage lung cancer (Stages I, II, IIIa) survivors experience persistent burdensome symptoms that affect quality of life (QOL). Sleep disturbances are a commonly occurring negative symptom of cancer survivors. While there is a high prevalence of research regarding sleep in patients diagnosed with cancer, there is minimal research regarding sleep disturbances in early stage survivors.

Purpose: The primary objectives of this literature review were to determine the prevalence of sleep disturbances, explore the impact of sleep disturbances, and to examine interventions used to improve sleep quality in survivors with early stage lung cancer.

Methods: An initial search utilizing CINAHL, PubMed-Medline, and Web of Science involved the MeSH terms lung neoplasm and sleep and the keyword survivors. The inclusion criteria included a publication date from 1995 to 2016, written in English, adult population, early stage lung cancer, and the use of an instrument to assess sleep. Excluded were studies involving patients without an identified stage of disease.

Results: The search yielded a total of 139 articles in CINAHL, 13 in PubMed-Medline, and one in Web of Science. After applying the inclusion/exclusion criteria, the number of articles meeting criteria for this review was five for CINAHL, three for PubMed-Medline, and zero for Web of Science. One article included was found both in CINAHL and PubMed-Medline. The overarching theme is that sleep disturbances are a common problem among survivors of early stage lung cancer. There is minimal research on interventions to alleviate sleep disturbances.

Conclusions: This review provides evidence that sleep disturbances are a common problem among survivors of early stage lung cancer. Sleep disturbances commonly lead to a decrease in QOL. Researchers need to develop and test interventions to alleviate sleep disturbances in this population.
Purpose: Churches have a unique opportunity to influence the health of underserved communities. Physical resources in the church environment may significantly impact health behaviors, but little research has examined socioeconomic disparities in the health of church environments. This study investigated the relationship between neighborhood income level and the physical activity (PA) and healthy eating (HE) environments of churches in a rural, southeastern US county.

Methods: As part of a larger study, early and delayed intervention churches (n=54) were audited independently by two trained data collectors to assess PA and HE opportunities. PA and HE scores were calculated where higher scores indicate healthier environments. Census block group data for median household income were compiled using 2014 American Community Survey 5-year estimates. Data were analyzed using SAS PROC MIXED. Three ANOVA models accounting for clustering of churches within census tracts compared scores for the combined church environment, PA opportunities, and HE opportunities across block group income levels (high/medium/low) while adjusting for church attendance, community education level, church address WalkScore rating, and intervention grouping (early vs. delayed).

Results: Scores for church environment PA opportunities and HE opportunities ranged from 5.0-42.0 (M=16.52, SD=6.92) and 10.0-24.5 (M=18.54, SD=2.80), respectively. Churches in low-income block groups scored 0.87 points higher (t=1.04, p=0.30) for HE opportunities and 2.40 points (t=-1.11, p=0.27) lower for PA opportunities compared to high- and medium-income block groups. Intervention status was not associated with scores for PA (p=0.09) or HE (p=0.41) opportunities.

Conclusions: Block group income level was not significantly associated with scores for PA or HE opportunities. However, limited environmental resources may constrain churches’ ability to make healthy living changes. Additional influences on enhancing the health of church environments, such as pastor and leadership support or implementing guidelines and policies, should be investigated further.
Publics make issues out of a problem that has not been resolved (Grunig, 1992, p. 146). According to Heath and Nelson (1986), an issue is contestable question of fact, value, or policy (p.37). Publics generally use mass media such as social networking sites to bring an organization's attention to an issue (Vanleuven & Slater, 1991). Grunig (2009) argued that if the power of social media is harnessed to its potential, social media inevitably can make public relations practice more global, strategic, two-way and interactive, symmetrical or dialogical, and socially responsible (p. 1) Bowen (2013) argued that public relations practitioners use social media as a tool to build an active relationship with their publics and the greater impact of social media suggests greater ethical responsibility (p. 119) , for use in issues management (Bowen, 2002) and for ethical resolution of problems (Bowen 2004). Social media changes the dynamics of communication between an organization and its publics to having multiple effects, which “means having the weight of ethical responsibility” (Bowen 2013, p. 121). Ethics can be assessed via Kantian philosophy, using autonomy, reason, and Good will for ethical decision making (Bowen, 2005; Bowen 2004). A two-way symmetrical (Grunig, 2001; Grunig & Hunt, 1984) approach is inherently ethical as it based on dialogue (Grunig, and Dozier, 2003).

This research uses a case study approach to the issue of suicide among Department of Veterans Affairs (VA) patients. Among estimated 21.6 million American veterans, almost 9 million are receiving health care services from the VA and nearly 900,000 veterans are detected with post-traumatic stress disorder (PTSD; Daly, 2016). Veterans suicide has become an issue of concern for the Department of Veterans Affairs (VA). According to the Suicide Data Report (2012) between 18 and 22 veterans die each day from suicide. The Department of VA has an official Twitter page, which can be used by the organization to conduct environmental scanning in its issues management program (Bowen, 2013, p. 129). There is a dearth of literature which has focused on how the VA is interacting with its publics and stakeholders on twitter to deal with this issue. The purpose of this study is to examine the view that issue management should be practiced in two-way symmetrical manner and also to conduct an ethical analysis of VAs tweets and responses to its publics on Twitter. Tweets with keywords suicide PTSD and mental for one year (from 04 November 2015 to 03 November 2016), was analyzed via content analysis. Tweets in English languages and originated from the United States were collected using Sysomos software. Total 350 tweets including 140 tweets posted by VA and 210 tweets posted by publics on VAs timeline were included in the sample after removing irrelevant and duplications. This paper examined if the VA’s tweets have used conversation to resolve the issue or indicate mutual benefit (symmetrical), the tone of the Publics tweets, the number of likes and retweets. Findings revealed that the VA is using Twitter primarily to promote itself, although persuasion of the public is not far behind.

The implication of this study is in understanding how government organizations such as the VA can ethically and effectively use social media to reduce the impact of an issue involving lives of its patients and potential patients.

Boesch, Brandon
Mentor(s): Dr. Tarja Knuuttila
Scientific Representation and Human Action

There are a large number of pragmatic accounts of scientific representation, which give an irreducible place to the intentions, actions, and activities of a scientist in explaining the nature of representation in science. While I think pragmatic accounts of scientific representation have much to recommend for themselves, very little has been said about what in particular is meant by the terms action, intention, or activity. The nature of agency which is an essential component of the pragmatic account of representation is, for the most part, unexplained. In my dissertation, I turn to the philosophy of action to better ground, explain, and expand upon the already existing pragmatic accounts of scientific representation.
Boling, Kelli  
Mentor(s): Dr. Kevin Hull  
**Understanding the True Crime Podcast Audience: An Exploration of Uses and Gratifications**

This study will examine the true crime podcast audience within the uses and gratifications theoretical frame. Combining an examination of true crime podcasts with audience assessment, this study seeks to explain why the genre has become so popular with podcast listeners, how the audience compares podcasts with other true crime media, and if the audience believes they are active participants in the investigation, harnessing the ability to impact the criminal justice system as well as the cases they follow. This study will explore the intersection of emerging media and audience engagement by surveying the online true crime podcast audience (n = 308). Results will compare motivations for listening to true crime podcasts to previous studies involving similar media as well as national podcast user data. Further, the impact of audience demographics including gender and education will be examined. Practical and theoretical implications for genre-specific media will be discussed.

Brazendale, Keith  
Mentor(s): Dr. Michael Beets  
**Children’s Obesogenic Behaviors During Summer versus School**

Background: Evidence consistently shows U.S. children gain 3-5 times more weight during summer vacation (~2.5 months) compared to the 9 month school year. Few studies have used a within-person design to examine children’s obesogenic behaviors during summer and how these compare to school. The purpose of this study is to examine within-child differences in 4 obesogenic behaviors (physical activity (PA), sedentary/screen-time, diet, and sleep) during school versus summer.

Methods: Using a repeated-measures within-subjects design, children (n=55 mean age=8.2 years; 57% female; 37% overweight/obese) wore accelerometers on the non-dominant wrist for 24hr/d over 9 consecutive days during school and summer of 2016 to capture PA, sedentary time, and sleep. Parents completed a daily diary to report bed/wake times, diet (food/beverage questionnaire), and screen-time of their child each day. Mixed effect models, conducted 2016, compared summer and school behaviors. All models included age, sex, and weight-status as covariates.

Results: Children spent more time sedentary (69 vs. 67% of time), less time in light PA (25 vs. 23% of time), had higher screen-time (242 vs. 123 min/day), slept longer (428 vs. 413 mins/day), and consumed more sugar-based foods (6 days vs. 2.5 days/week) and fruit (7 days vs. 4.7 days/week) during summer compared to school (p<0.05).

Conclusion: Initial evidence suggests children are displaying multiple unfavorable obesogenic behaviors during summer compared to school that may contribute to the accelerated weight gain observed during summer. Longitudinal evidence with larger, more diverse samples of children is necessary to identify specific behavioral targets for interventions during summer.
Brixius, William  
**Mentor(s): Dr. Jessica Green**  
**Modulation of Reading Speed**

Some behavioural directional preference effects arise based on the standard direction of reading, with left-to-right (e.g. English) readers responding faster to stimuli presented to their right, and right-to-left (e.g. Arabic) readers to their left. As the direction of bias shifts with reading direction, a causal influence of reading experience on spatial biases is indicated. Indeed, evidence also suggests that stronger readers may display stronger perceptual biases in the direction of reading. Further evidence suggests that those with higher dyslexia inventory scores display a reduced or slightly reversed directional bias. As said biases affect tasks with no direct linguistic/reading component, it is evident that the experience of reading is able to influence the general expectations of a spatial attention network shared by reading and other tasks. Since the brain adapts through general experience, with pattern recognition forming general sets of perceptual rules (e.g. sensory/Gestalt heuristics), it seems likely that the generalized directional bias effect should be affected by any consistent direction-biased task, whether or not reading is involved.

Through our current study, we further explored the relevant attentional network by investigating the influence of individual differences in reading ability on general task directional biases. We further set out to determine whether focused experience with directionally-biased non-reading tasks could reinforce said network and modulate reading speed. Our research questions were addressed using simple behavioural tasks (e.g. reading text and viewing and responding to simple moving game-like stimuli on a computer screen) and high-speed eye tracking.

Bunting, Leslie  
**Mentor(s): Dr. Kenn Apel**  
**The Development of Orthographic Knowledge and Its Relation to Reading and Spelling**

Co-authors on this presentation were Eve Falkiewicz and Caroline Harris

Orthographic pattern awareness and mental graphemic representations (MGRs) play a crucial role in the acquisition of reading and spelling. This study examined orthographic pattern awareness and MGRs in kindergarten through sixth grade students. The study aimed to a) describe orthographic pattern awareness and MGR development across the seven grades and b) examine the contributions of these two components of orthographic knowledge to reading and spelling performance above other known contributors (e.g., vocabulary, phonological awareness). The measures used to examine these two aims were the following: orthographic pattern measure, mental graphemic representation measure, word-level and connected reading tasks, spelling task, phonological awareness task, and a vocabulary task. The study revealed that the students’ orthographic pattern awareness and knowledge of MGRs both contributed to their word level reading and reading comprehension and that MGRs may impact reading comprehension more than orthographic pattern awareness. These findings are clinically important as we consider how to effectively teach children various spelling patterns and other literacy skills such as word reading and reading comprehension.
**Burns, Jessica**  
**Mentor(s): Dr. Subrahmanyam Bulusu**  
**Tropical cyclone activity over the Southwest Tropical Indian Ocean**  

The Southwest Tropical Indian Ocean (SWTIO) is a key region for air-sea interaction. Tropical cyclones (TCs) regularly form over the SWTIO and subsurface ocean variability influences the cyclogenesis of this region. Tropical cyclone days for this region span from November through April, and peak in January and February during austral summer. Past research provides evidence for more tropical cyclone days over the SWTIO during austral summer (December–June) with a deep thermocline ridge than in austral summer with a shallow thermocline ridge. We have analyzed the Argo temperature data and HYbrid Coordinate Ocean Model (HYCOM) outputs while focusing on the austral summer of 2012/2013 (a positive Indian Ocean Dipole (IOD) year and neutral El Niño Southern Oscillation (ENSO) year) when seven named tropical cyclones developed over the SWTIO region. This study reveals that the climatic events like the IOD and ENSO influence the cyclonic activity and number of TC days over the SWTIO. We ascertain that the IOD events have linkages with the Barrier Layer Thickness (BLT) in the SWTIO region through propagating Rossby waves, and further show that the BLT variability influences the cyclonic activity in this region.

**Butz, Shelby**  
**Mentor(s): Dr. Jamie Lead**  
**Relative importance of ions and particles in silver nanoparticle bio-uptake, accumulation, and depuration; Implications for trophic transfer**

Nanoparticles (NPs), are currently used in electronic, biomedical and pharmaceutical drug design, cosmetics, nutrition supplements, energy applications and clothing manufacturing (Nowack and Bucheli 2007, Piccinno et.al. 2012) that are known to be introduced into the environment through runoff and direct input. The U.S. National Nanotechnology Initiative (NNI), which includes several government agencies including the EPA, directed 5% of their yearly budget (over $800 million) to research processes on the nanoscale in the environment as well as the environmental and social implications of nanotechnologies (Wiesner et al. 2006, Lin et al. 2012). Due to an elevation in the amount of NPs in the environment, especially silver nanoparticles (AgNPs) from anti-bacterial sources, it is becoming increasingly important to identify the bioavailability of AgNPs in the aquatic environment and to determine the possible lethal or sub lethal effects associated with their unique size and characteristics.

AgNPs are partially soluble in complex medias and recent studies suggest an either, mainly ionic or mainly particulate behavior (Navarro et al. 2008; Fabrega et al. 2009; Xiu et al. 2012). Due to partial solubility, organisms are exposed to both ionic and particulate forms of silver (Ag) during exposures and current research suggests that a complex mix of processes influence bioavailability and toxicity from metal-based NPs (Fabrega et al 2009; Croteau et al, 2014). However, the role of ions and particles in AgNP bio-uptake and availability has not been fully clarified, with reported studies often not conducting crucial measurements and basic measurements not currently validated to make appropriate distinctions at the nanoscale.

In this study, we used the Eastern oyster, Crassostrea virginica and novel isotopically labeled, core-shell-shell NPs (Ag@Au@Ag) to determine the mechanism of bioavailability and bio-uptake of AgNPs and the consequent role this plays on trophic transfer and toxicity. We hypothesized that bio-uptake and bio-availability are mediated by the free ion, and that with the use of stable isotope tracers, the relative contributions can be differentiated. This study will greatly improve the understanding of how bio-uptake and -accumulation manifest under environmentally realistic conditions.
Cahl, Douglas  
*Mentor(s):* Dr. George Voulgaris  
**Creating a low cost surface ocean measurement system using autonomous unmanned aerial vehicles (drones)**

The ongoing process of the creation and theoretical validity of a rapidly deployable low-cost unmanned aerial system (UAS/drone) to remotely image the ocean for calculating surface ocean currents will be presented. Although still in development, this system will be capable of time critical surface current measurement applications such as search and rescue and pollution trajectory assessment. Additionally, this system will be used to assess the accuracy of already deployed surface current measurement systems (i.e. radar systems and buoys).

Although remote surface ocean current measurement systems have rapidly advanced over the recent decades, there are still many instances where no measurements are available or the costs are prohibitive. Surface current observations from HF radar deployments worldwide provide realtime measurements of the coastal ocean, however, most of the world’s coastlines have still have no HF radar deployments. Rapidly deployable HF radar systems are rare and require road access. Satellite Synthetic Aperture Radar (SAR) surface ocean current measurements can potentially cover the global ocean, but are limited in application as the measurement repeat time is on the order of a week. A more recent system, the Remote Ocean Current Imaging System (ROCIS), uses aerial photography to estimate the surface ocean current. Although accurate and rapidly deployable (it is mounted on a dual engine airplane), the costs of this system are prohibitively expensive for most academic research and many operational applications.

The creative aspect of this project is to use the ROCIS method with a drone, providing a low cost and rapidly deployable system for calculating surface ocean currents that does not require any additional infrastructure, such as roads, airports, or beach access. The creation of this measurement system will allow academic researchers and operational oceanographers to measure surface ocean currents at a much lower cost than has been possible previously.

Calva, Coleman  
*Mentor(s):* Dr. Jim Fadel  
**Neurochemical and neuroanatomical correlates of intranasal orexin-A (OxA) administration**

The orexin/hypocretin system modulates various aspects of cognition via widespread afferent and efferent projections between cortical and basal forebrain regions involved in arousal, attention, and learning, and homeostasis. A limited number of human and animal studies have suggested that intranasal orexin-A/hypocretin-1 (OxA) may enhance cognition and wakefulness, but the brain regions and neurotransmitter systems underlying these effects are unknown. Intranasal administration of OxA provides benefits over other treatment routes, namely, bypassing the blood-brain-barrier and eliminating peripheral side effects due to systemic exposure. Here, we used immunohistochemistry and in-vivo microdialysis to study the effects of intranasal orexin-A administration on brain c-fos expression, a marker for neuronal activation, and neurotransmitter efflux in the prefrontal cortex, respectively. Young (3-4 months) male Fisher344/Brown Norway rats received intranasal administration of either vehicle (0.9% saline) or orexin-A (OxA; 25 ul of a 100uM solution) into each naris. Animals were sacrificed and their brains processed for immunohistochemical detection of c-fos and phenotypic markers of specific neuronal populations. In cortical regions, intranasal OxA significantly increased c-fos expression in areas involved in attentional function. In the basal forebrain, intranasal OxA treated animals also showed greater activation of cholinergic neurons in the basal forebrain. Interestingly, c-Fos expression in GABAergic inhibitory neurons of the cortex was decreased in the prelimbic mPFC. Our live, in-vivo data showed that intranasal OxA increased acetylcholine efflux and glutamate efflux within the PFC. Collectively, these data demonstrate that intranasal OxA activates brain regions involved in attention and learning and memory. Importantly, these cognitive functions are known to decline with age. Ongoing immunohistochemical and microdialysis studies on aged animals treated with intranasal OxA will provide additional insight into the mechanisms underlying intranasal OxA as a putative treatment for age-related cognitive disorders.
Cannizzo, Zachary  
Mentor(s): Dr. Blaine Griffen  
Changes in spatial behavior patterns by mangrove tree crabs following climate-induced range shift into novel habitat

Climate-mediated range shifts into eco-evolutionary novel habitats have the potential to alter the ecology and behavior of shifting species. Of particular concern are behaviors which impact the ecology and life history of these species. Behaviors that control the spatial patterns of habitat use may be particularly important. We examined site fidelity and foraging foray behavior of the mangrove tree crab (Aratus pisonii) in its historic mangrove habitat and the recently colonized eco-evolutionary novel saltmarsh. Aratus pisonii exhibited both strong site fidelity to individual trees and a foraging pattern wherein the frequency of forays increased as their distances decreased in the mangrove but displayed neither behavior in the saltmarsh. Chemical cues from feces appear to be the mechanism behind site fidelity and may suggest the mechanism for the loss of this behavior in the saltmarsh where substrate is regularly submerged, potentially preventing establishment of such cues. The loss of site fidelity may affect the foraging and predation risk of A. pisonii in the saltmarsh leading to a shift in its ecology and bioenergetics. As more species shift into eco-evolutionary novel habitats, it is important to understand how this colonization may affect their life history, behavior, and ecology in indirect ways.

Chandrashekaran, Varun  
Mentor(s): Dr. Saurabh Chatterjee  
High mobility group box 1 (HMGB1)-RAGE interaction mediates ectopic Intestinal inflammation in NAFLD.

Recent clinical studies found a strong association of colonic inflammation with NAFLD yet the mechanisms remain unknown. The present study identifies HMGB1 as a key mediator of intestinal inflammation in NAFLD and outlines a detailed redox signaling mechanism for such a pathway. NAFLD mice showed liver damage and release of higher HMGB1 in systemic circulation, increased intestinal tyrosine nitrination that was dependent on NADPH oxidase. Intestines from NAFLD mice showed higher TLR4 activation and proinflammatory cytokine release, an outcome strongly dependent on the existence of NAFLD pathology and NADPH oxidase. In vitro experimentation using IE6 cells showed the HMGB1 activation of Toll like receptor (TLR-4) was both NADPH oxidase and peroxynitrite dependent with the latter being formed from the activation of NADPH oxidase. Proinflammatory cytokine production was significantly blocked by the specific peroxynitrite scavenger FBA, AKT inhibitor and NADPH oxidase inhibitor Apocynin suggesting NADPH oxidase-dependent peroxynitrite as a key mediator in TLR-4 activation and cytokine release via an AKT dependent pathway. Studies to ascertain the mechanism of HMGB1-mediated NADPH oxidase activation showed a distinct role of RAGE as the use of inhibitors targeted against RAGE prevented NADPH oxidase activation, peroxynitrite formation, TLR4 activation and finally cytokine release. Thus in conclusion, the present study identifies a novel HMGB1 mediated inflammatory pathway that is RAGE and redox signaling dependent and helps promote ectopic intestinal inflammation in NAFLD.
Chaparala, Anusha
Mentor(s): Prof. Lorne Hofseth
Mechanism of Action of American Ginseng and its Components in the Treatment of Ulcerative Colitis

Ulcerative colitis (UC) or colitis is a type of chronic inflammatory bowel disease (IBD) that has a significant impact on the quality of life for the patients and can substantially increase the risk of colon cancer in patients suffering long-term. Current conventional treatments provide only modest relief paired with a high risk of side effects and complementary and alternative medicines (CAMs) offer a safe and effective option for the treatment of UC. Over the past several years, we have shown that American Ginseng (AG), particularly the hexane fraction of AG (HAG), has anti-oxidant and anti-inflammatory properties that can suppress mouse colitis and prevent colon cancer associated with colitis. With a goal of isolating a single compound, we further fractionated HAG, and found the most abundant molecule in this fraction was the polycycolen, Panaxynol (PA). Recently, we demonstrated that PA effectively treats DSS-induced colitis in the mouse by specifically targeting macrophages for DNA damage and apoptosis. Currently, we are testing the ability of PA to prevent colitis-associated colon cancer in mice. To delineate the pathways involved in the mechanism of action of AG and its components (HAG and PA), we performed microarray analysis of mouse primary macrophage cells and found that AG prepares cells for cellular defense by initiating a stress response involving antioxidant pathways. Concurrently, we have seen that AG and its components activate Nrf2-induced antioxidant response in multiple cell lines. Furthermore, AG, HAG, and Panaxynol were inefficient in treating DSS-induced colitis in Nrf2 knockout mice, demonstrating that mechanism of action of AG and its derivatives depends on the activation of the Nrf2 pathway. Positive outcomes from this study will take AG one-step further towards being a conventional drug for the treatment of colitis, other autoimmune diseases and for the prevention of inflammation driven carcinogenesis.

Charping, Brooke
Mentor(s): Dr. Alison Hendricks, Dr. Suzanne Adlof
Language assessment with children who speak non-mainstream dialects: Comparing results of DELV-Screening Test and CELF-CLS

While it has been established that dialectal variation is not considered to be language impairment, researchers have found that language impairment is often misdiagnosed in children who speak non-mainstream American English dialects (NMAE). It can be difficult to identify language impairment in children who speak NMAE dialects because features which are often omitted by children with language impairment are similar to the features produced by typically developing children who speak NMAE dialects. Language impairment can be diagnosed using standardized language assessments. Some of these diagnostic tools have provided alternative scoring guidelines for children who speak NMAE dialects to avoid penalizing children for producing items differently than Mainstream American English (MAE). This study aimed to quantify diagnostic accuracy when using the modified and unmodified scoring guidelines. Participants included 299 second-grade students, who speak MAE and NMAE dialects. Participants completed two measures of language ability: the Clinical Evaluation of Language Fundamentals-4 Core Language Skills assessment (CELF-4 CLS), which was not designed specifically for NMAE speaking students, and the Diagnostic Evaluation of Language Variation-Screening Test (DELV-ST), which was designed specifically for NAME-speaking students. The CELF-4 CLS was scored with and without scoring modifications for students who speak NMAE dialects. Unmodified scored yielded a relatively low false positive rate for NMAE-speaking children. Modified scoring led to higher scores for NMAE-speaking children and increased the false negative rate, while decreasing the false positive rate. This poster discusses the implications of clinician decisions to apply or not to apply modified scoring guidelines.

Co-author and secondary presenter: Brooke Murdock
Chiang, Chia-Chun
Mentor(s): Prof. Greg Niehaus
How Statutory Reserve Regulation Influences Life insurers’ asset allocations in low-interest-rate environment?

Understanding how insurance companies manage their enormous assets in different economic environments is important to policyholders, regulatory authorities, and owners of insurance companies. From 2001 to 2011, the total assets of US life insurers increased from $3,181 billion to $5,493 billion. However, the 10-year constant maturity Treasury rate declined from about 6.5% in 2000 to 3.4% at the end of 2011. This low-interest-rate environment arouses concerns of the insurance companies and regulatory authorities because the low-interest rates could jeopardize insurers’ ability to fulfill their commitments to policyholders. Given over one-third of outstanding investment-grade bonds are estimated to belong to insurance companies (Schultz, 2001), the failure of insurance companies not only influences the policy holders, but also the other financial market participants. Inspired by the previous research, we study how the statutory reserve regulation influences the asset allocations of life insurance companies in a low-interest-rate environment.

Childers, Anna
Mentor(s): Ms. Whitney Dobek
Adoptees’ Experience With Direct-to-Consumer Genetic Testing: Emotions, Satisfaction, and Desired Outcomes After Receiving Test Results

Public awareness of the role of genetics in disease has grown in recent years. Subsequently, the use of direct-to-consumer genetic testing (DTC-GT) is increasingly common, offering the opportunity to order genetic tests without the involvement of a medical professional. One subset of customers taking advantage of DTC-GT is adoptees. Little research has been done exploring adoptees experience with DTC-GT, but research that has been completed shows that adoptees appear to be more motivated than non-adoptees to learn about their genetic disease risk. Fourteen adoptees that have used DTC-GT were interviewed. They were asked about their motivations for pursuing DTC-GT, their satisfaction with results, their emotions throughout the process, and their interest in meeting with a genetic counselor. Motivations for pursuing DTC-GT fell into three categories: 1) identity-seeking, 2) a desire for health information, and 3) curiosity for genetic and non-genetic information. The majority of adoptees (57.1%) were satisfied with their results, but those that were not desired more definitive medical information, more specific genetic risk information, and more information regarding biological family. Adoptees’ emotions were diverse and continually changing throughout the DTC-GT process. Emotions before testing included excitement, anxiety, fear of the unknown, and fear of rejection. After testing, adoptees experienced both positive and negative emotions. Adoptees described feelings of obsession, anger, disappointment, happiness and feelings as though they had a new direction. Finally, the majority of adoptees found value in meeting with a genetic counselor, either for themselves or for their family given certain circumstances. Overall, this exploratory study highlights adoptees’ experiences in their pursuit of genetic information. By understanding this population’s journey with genetic testing, genetic counselors and genetics professionals can be better equipped to address the concerns of this population.
Skeletal muscle atrophy is a critical condition associated with several diseases, including cancer cachexia and diabetes, and is induced by disrupted protein turnover. The IGF1/PI3K/Akt pathway has emerged as a major signaling cascade of protein turnover through mTOR and FOXOs. Recently, TRB3, a mammalian homologue of Drosophila Tribbles 3, has been found in multiple tissues, including liver, fat, and skeletal muscle, and negatively regulates Akt via direct binding to its phosphorylation sites. Although increased TRB3 expression has been associated with insulin resistance in in vitro and in vivo models, its role in the regulation of skeletal muscle mass is not known. Here, we tested the hypothesis that TRB3 negatively regulates skeletal muscle mass in denervation-induced atrophy. At 9 days post-denervation, there was a robust increased in TRB3 mRNA (120%) and protein expression (160%) compared to the control. Also, skeletal muscle weight was reduced by 20-30%, and insulin-stimulated IRS1 Y612 and Akt T308 phosphorylation was attenuated by 20-25%. Muscle-specific TRB3 transgenic mice (TRB3TG) exhibited reduced skeletal muscle mass compared to wild type with substantially elevated mRNA expression of skeletal muscle specific-ubiquitin ligases, Atrogin-1 (60%) and MURF-1 (70%). We then examined if skeletal muscle TRB3 overexpression would affect protein synthesis measured by assessing the incorporation of puromycin into nascent peptide chains. Muscle protein synthesis in TRB3TG mice was reduced by 60% compared to wild type. However, muscle-specific TRB3 overexpression did not accelerate or inhibit denervation-induced atrophy. In contrast, whole body TRB3 knockout mice (TRB3KO) displayed a 90% decrease in Atrogin-1 protein expression compared to wild type. Furthermore, TRB3KO mice that received denervation for 9 days tended to suppress Atrogin-1 and MURF-1 protein expression by 60-65% compared to wild type. These data suggest that TRB3 could be a critical regulator of skeletal muscle mass under atrophic conditions and could be a target for therapeutic treatment.

In the search for a coal combustion technology with near-zero emissions of CO2 (carbon dioxide), oxy-coal combustion can be a promising solution. Implementation of such technology requires the removal of N2 (nitrogen) from the combustion process to favor a CO2 (carbon dioxide)-rich environment in the power plant boiler. This reduces the flue gas volume and it is beneficial for CO2 storage and sequestration. But such volume reduction and the change in combustion medium will affect the reaction network. Before retrofitting the existing power plants with this alternative coal combustion technology, a detailed study is required to understand the behavior of SOx (sulfur oxides), NOx (nitrogen oxides) and Hg (mercury) pollutants. Such a study will be valuable for the power plants to implement necessary control measurements to reduce the emissions of sulfur, nitrogen and mercury pollutants.

This elaborate investigation intends to reveal the SOx, NOx and Hg emissions in an oxy-coal combustion system under variable operating conditions. To do so, an oxy-combustion environment has been created in a lab-scale reactor, and flue gas samples have been collected along the reactor from different temperature points. The samples have been analyzed using suitable detection techniques. Moreover, kinetic modeling has been conducted by using different combustion mechanisms to predict the amounts of the pollutants formed. Comparison between the experimental and kinetic modeling data helped to assess the performance of the existing mechanisms in predicting emissions and revealed the need for further improvements. Moreover, the data can be utilized to better understand the combustion reaction network and, to obtain more accurate prediction of the pollutant concentrations in coal power plants operating under oxy-combustion conditions.
TRBP phosphorylation regulates the activity of the eIF2\(\alpha\) kinase, PKR, during cell stress

The interferon-induced eIF2\(\alpha\) kinase PKR is activated in response to a diverse array of cellular stresses, ranging from viral infection to stress resulting from the accumulation of misfolded proteins in the endoplasmic reticulum. During these conditions, activated PKR phosphorylates the \(\alpha\)-subunit of the translation initiation factor eIF2 which in turn halts general protein synthesis. This pause allows the cell to attempt to recover from the stress or to induce its own death by apoptosis if the stress cannot be overcome. As such, PKR plays a centrally important role in several cell signaling pathways, and dysregulation of PKR’s activity has been implicated in various neurodegenerative and neuromuscular disorders.

PKR is activated during stress by its interaction with its cellular activator, the double-stranded RNA binding protein PACT. During these conditions, PACT is phosphorylated at Serines 246 and 287 and forms heterodimers with PKR, leading to PKR activation and subsequent eIF2\(\alpha\) phosphorylation. PKR is also regulated by inhibitory interactions with another double-stranded RNA binding protein, TRBP, which prevents PKR activation by precluding PKR-PACT interaction through the formation of TRBP-PKR and TRBP-PACT heterodimers. Recent studies have also shown that TRBP is also phosphorylated in other cellular contexts with direct effects on TRBP’s interactions with other known binding partners and their activities. The goal of this study then was to investigate how TRBP phosphorylation affects PKR’s activation and cell fate during cell stress. Various biochemical assays were performed to assess how stress-induced TRBP phosphorylation affects TRBP-PKR heterodimer interaction and consequently PKR activation, eIF2\(\alpha\) phosphorylation, and the induction of apoptosis during cell stress.

Our results strongly indicate that TRBP phosphorylation plays a significant role in regulating PKR activation in response to cell stress and could be an important but overlooked pathway needed to dampen the damaging effects of sustained stress and PKR activation in the cell.

Narcissistic CEO Selection

Despite a long history of the study of narcissism, a lack of evidence exists around what leads to the selection of a more narcissistic Chief Executive Officer (CEO). Narcissism is a multifaceted personality trait that combines grandiosity, attention seeking, an unrealistic inflated self-view, a need for that self-view to be continuously reinforced through self-regulation, and a general lack of regard for others. Narcissism is related to visionary, bold, and entrepreneurial behavior. As such, narcissists may have some appeal to boards. Nevertheless, narcissists can create performance volatility and damage personal relationships creating long-term performance uncertainty. Since business environmental characteristics constrain a board’s strategy and that strategy affects the ideal CEO candidate, some environmental circumstances may be more likely to result in the selection of a narcissistic CEO than others. From a sample of 76 fortune 1000 companies I test weather environmental dynamism, environmental munificence, and firm performance are associated with the selection of a more narcissistic CEO.
Cranston, Michael  
Mentor(s): Dr. Rosemarie Booze, Dr. Charles Mactutus, Dr. Steven Harrod  
A microstructure behavioral analysis of voluntary wheel running in HIV-1 Tg rats: evidence for dysregulation of motivation.

An estimated 30-50% of HIV-1+ individuals exhibit reductions in motivation (apathy). Given that rodent wheel running occurs in distinct, defined ‘bout’ of continuous running followed by inter-bout rest intervals (i.e.-disengagement of the running wheel or a cessation of running), we examined the microstructure of this behavior within the wheel running session. Adult, ovariectomized HIV-1 Tg (n=21) and F344N controls (n=24) rats were allowed nocturnal access to a voluntary running wheel (66min/day for 49 consecutive days). HIV-1 Tg animals were not significantly different from controls in the latency to initiate a wheel running session nor in maximal running speed. The number of running bouts, but not the inter-bout interval length, was significantly reduced (p≤.05) in the HIV-1 Tg rats, relative to controls. Further, the HIV-1 Tg animals were also more likely have run significantly further during their bouts (~ 3-fold higher, p≤.05) relative to controls. Overall, there was no evidence for motor impairments in the HIV-1 Tg rats (i.e., no difference in initiation of running, in maximum speed, or inter-bout interval length). However, the HIV-1 Tg rats had altered running profiles (significantly fewer running bouts but significantly greater distance during their bouts) which suggests dysregulation of motivational processes with preservation of motor function. Moreover, these findings indicate that analysis of the microstructure of voluntary wheel running behavior is valuable in studies of motivational dysfunction.

Da, Wendi  
Mentor(s): Dr. Xiaoming Li, Dr. Shan Qiao  
Evaluation of Self-report Measures of Antiretroviral Therapy (ART) Adherence among People Living With HIV/AIDS (PLWHA) in China

Self-report ART adherence measures significantly predict clinical outcomes, yet few studies have empirically compared the predictive validity of self-report measures with varying recall periods and item contents.

Data from a cross-sectional study among 2,987 PLWHA in Guangxi, China were used. One-month missed days (defined as “missed” if missing any dose or all doses), 3-day missed doses, and weekend missed days were measured. Poor adherence was dichotomized at the 90% mark. Sensitivity, specificity, and the area under the receiver-operating characteristic (AUROC) curve were calculated using inadequate viral response (viral load ≥400 copies/ml) as the “gold standard”. Multivariate logistic regression was conducted to assess the association between poor adherence and inadequate viral response.

All four measures had a sensitivity below 20.0% and a specificity above 90.0%, and the AUROC curves did not differ significantly. Overall, one-month missed days defined by any missing dose (OR = 2.12, 95% CI 1.08-4.17), but not all missing doses (OR = 1.63, 95% CI 0.80-3.31), was a significant predictor of inadequate viral response. The weekend missed days (OR = 2.51, 95% CI 1.15-5.55) was also a significant predictor, but the 3-day missed doses was not (OR = 1.81, 95% CI 0.73-4.48). Similar results were found for participants on a twice-daily regimen, but none of the four measures was a significant predictor among those on a once-daily regimen.

One-month measure with a strict definition of missed days have higher accuracy in predicting inadequate viral response compared with shorter periods, and separate items may be needed depending on dosing frequency.
Dattaroy, Diptadip  
**Mentor(s):** Dr. Saurabh Chatterjee  
**Administration of Sparstolonin B- a TLR4 antagonist attenuates hepatic fibrosis by inhibiting TGF\(\beta\) signaling in a disease model of NASH.**

Chronic hepatic inflammation potentiates hepatic fibrosis and anti-inflammatory therapies can improve outcomes. Previous studies from our laboratory and others have shown that TLR4 activation accentuates hepatic inflammation and fibrosis in Non-alcoholic steatohepatitis (NASH). However, there’s no current FDA approved drug available to treat NASH. Here we report the anti-fibrotic activity of Sparstolonin B (SsnB)-a TLR4 antagonist, derived from Chinese herb Sparganium stoloniferum. We hypothesize that, SsnB decreases TLR4 dependent TGF\(\beta\) signaling in liver and thus decreases fibroblast proliferation. Here, we used Bromodichloromethane (BDCM) induced model of liver fibrosis where diet induced obese (DIO) mice were administered with BDCM (a CYP2E1 activator) for 4 weeks. A similar group of mice were administered SsnB for 4 weeks along with BDCM (SSnB treated group). Images of picrosirius stain and immunohistochemistry of fibronectin showed a robust decrease of extracellular matrix deposition upon SsnB administration. Mechanistically, SsnB increases BAMBI (a TGF\(\beta\) pseudo-receptor) protein and mRNA expression by inhibiting TLR4 dependent MYD88-NfkB pathway and thus decreases TGF\(\beta\) signaling as shown by immunohistochemistry of TGF\(\beta\) and immunofluorescence images of SMAD2/3-SMAD4 co-localization in the nucleus. It also decreases stellate cell activation in vivo as indicated by decreased \(\alpha\)-SMA (a marker for activation of profibrogenic hepatic stellate cells activation) immunoreactivity. In vitro experiments on rat and human hepatic stellate cells shows that SsnB treatment increases gene and protein expression of BAMBI and decreases nuclear co-localization of phospho SMAD2/3 and SMAD4 protein. A decrease in phosphorylated SMAD2 protein upon SsnB administration in human stellate cells further confirms the antagonistic effect of SsnB on TGF\(\beta\) signaling. Thus, this research unravels a novel mechanistic approach to downregulate fibrogenesis in NASH through inhibiting a TLR4 dependent TGF\(\beta\) signaling pathway.

Dean, Charles  
**Mentor(s):** Dr. Milind Kunchur  
**Advances in Magnetism Applied in Audio Technologies**

Neodymium magnets (aka rare earth magnets) are one of the more recent developments in materials science and their importance for new tech, particularly in speaker drivers, is still being discovered. Their higher Remanence, Coercivity, and Energy Product are some of the qualities that make them so important. These lead vastly improved magnetic flux densities in both strength and longevity. Their use as driver motors has changed the way speakers are designed for home or professional uses.

DeHaven, Baillie  
**Mentor(s):** Dr. Linda Shimizu  
**Pesistent radicals of self-assembled benzophenone bis-urea macrocycles as a polarizing agent for solid-state DNP MAS NMR spectroscopy**

The assembly of molecules into well-defined architectures through sticky interactions brings about materials with distinct chemical and physical properties as a result of their organized nature. Here, we investigate UV-generated organic radicals that are persistent as a consequence of their self-assembled nature. The structure of the photogenerated radical, which is generated in \(-\frac{1}{4}\)M amounts, was investigated and its lifetime evaluated by EPR spectroscopy. High-Field EPR and variable temperature X-band EPR studies suggest the formation of a resonance stabilized radical pair. Our hypothesis is that the excited state of benzophenone abstracts a hydrogen from close-packed neighboring macrocycles to afford a ketyl radical. This proposed photochemistry suggests that the radicals are generated in positions that allow resonance stabilization into the neighboring benzene rings resulting in enhanced stabilization. The endogenous radicals were applied as a polarizing agent for magic angle spinning (MAS) dynamic nuclear polarization (DNP) NMR enhancement where a maximum enhancement factor, \(\epsilon_{on/off} = 4\) was observed for both the host and it’s encapsulated guest molecules. A preliminary field sweep demonstrated that the maximum enhancement was overlaid on a nearly constant DNP enhancement of \(\epsilon_{on/off} = 2\) over a broad field range. This maximum coincides with the high field EPR absorption spectrum, consistent with an Overhauser effect mechanism, which supports the hypothesis of a delocalized radical. DNP enhancement was observed for both the host and guest, suggesting that even low levels of endogenous radicals can facilitate the study of host-guest relationships in the solid-state.
Denton, Adam  
Mentor(s): Dr. Rosemarie Booze, Dr. Charles Mactutus, Dr. Steven Harrod  
Dopaminergic dysfunction in the nucleus accumbens core of HIV-1 transgenic rats

HIV-1 infection is a serious condition affecting approximately 47 million individuals as of 2014. Approximately 50% of infected individuals develop HIV-associated neurocognitive impairment (HAND) to some degree of severity. Two such conditions common in this trajectory are the development of depression and apathy. Previous research has also expanded on this notion of apathy to include neurocognitive symptoms such as psychomotor slowing and significant disturbances in mood. Dysfunction in the nucleus accumbens core (NAcc) region has been shown to be an underlying factor in both depression and in apathy. Moreover, studies in HIV-1 transgenic (Tg) rats have demonstrated dendritic/synaptic alterations in the NAcc region. Given these underlying neurological features, we analyzed dopamine release from the NAcc using fast-scan cyclic voltammetry. Subjects (HIV-1 Tg n=7 males/ 7 females; Fischer-344 n=8 males/ 8 females) were anesthetized and placed in a stereotaxic apparatus. Stimulating microelectrodes were implanted in the medial forebrain bundle while recording electrodes were placed in the NAcc. Biphasic pulse trains were applied through a linear constant current stimulus isolator to evaluate dopamine release. Results were analyzed with Demon voltammetry software and modeled with Michaelis-Menton kinetics. Dopamine release and reuptake was impaired in HIV-1 Tg animals relative to controls. Additionally, female rodents experienced slower reuptake rates. Collectively, these findings illustrate decreased Nacc function in HIV-1 Tg rodents and lend support to the idea that Nacc dysfunction is involved in the development of HAND.

Donevant, Sara  
Mentor(s): Dr. Joan Culley  
Developing an Evidence-Based Mobile Application for Chemical Triage

Background/Significance: Mobile health applications (mHealth apps) are one of the fastest expanding areas of healthcare with over 165,000 mHealth apps available. It is essential mHealth apps incorporate evidence-based practice to optimize patient outcomes. The team of Validating Triage for Chemical Mass Casualty Incidents – A First Step (R01LM011648-01A1) proposed to develop an evidence-based mobile triage app for chemical mass casualties.

Purpose: The purpose of the grant was to create a mobile triage app to: 1) quickly identify patients exposed to chlorine; and 2) accurately, precisely, and efficiently triage and process patients exposed to improve outcomes. The team used the medical data from the Graniteville, SC chlorine incident to isolate the signs and symptoms of a chlorine exposure, which served as the foundation of the mobile triage app.

Methods: The team used a methodical approach to develop an evidence-based mHealth app. The multi-faceted approach included: 1) abstracting the medical records from a local hospital who treated patients from the Graniteville incident; 2) analyzing the data to identify signs and symptoms of chlorine gas exposure; 3) developing an algorithm using the signs and symptoms; 4) testing the sensitivity and specificity of the algorithm; 5) revising the algorithm based upon the testing; 6) creating the triage mobile app in collaboration with computer engineers and human-computer experts; 7) allowing end-users to assess the mobile triage app; and 8) simulating a mass casualty incident to test the mobile triage app.

Results: This process ensured the evidence directed the development of the mobile triage app. The result was an evidence-based mobile triage app that accurately identified patients exposed to chlorine.

Conclusion/Implications: As mHealth continues to grow it is essential the evidence direct the development of the mobile apps to improve patient outcomes. This methodical approach demonstrates how the evidence may guide the development of evidence-based mHealth.
Douglas, Angela  
Mentor(s): Dr. Richard Ferrante  
**Pediatric Genetic Counselor Perspective on Serving the Foster Care Population and the Integration of Genetic Information within the Health Passport**

Many states, within the foster care system, have adopted a document referred to as the health passport, which provides a condensed summary of a child's health history. This passport is intended to remain with the child as he/she moves between placements to improve communication between foster parents, caseworkers, and medical professionals. This exploratory research study examines the foster care system's utility of a child’s health passport and opportunities for improvement. An online survey was distributed to the National Society of Genetic Counselors pediatric Special Interest Group and usable responses were reviewed. Results will reflect insight into enhancing genetic counselor effectiveness and advancing care for these children. First, counselor perspectives on serving foster children will be gathered and summarized into themes. Second, counselors will be asked for their input regarding the inclusion of genetic information within the passport. Specifically, topics such as the counselor's interaction with the passport document, prioritization of information to be included, and recommendations for utilization of the passport are addressed. As results are analyzed, the outcome of this study is to interpret genetic counselors' informational needs and create an example supplemental section to the foster care passport.

Dunn, Caroline  
Mentor(s): Dr. Andrew Kaczynski, Dr. Sara Wilcox  
**Reliability assessment of a novel tool to evaluate physical activity and healthy eating opportunities in faith-based settings: The Church Environment Audit Tool**

Background: Faith-based settings attract members of all sociodemographic backgrounds and are potential partners for health interventions. Audit tools to assess opportunities for physical activity (PA) and healthy eating (HE) in church environments are lacking. This study assessed the reliability of a novel tool to evaluate the physical environment of faith-based settings pertaining to opportunities for PA/HE. **Methods:** Using a standardized script and passively guided by church personnel, pairs of trained data collectors independently audited the available facilities and resources in 54 churches of various denominations in a rural South Carolina county. Tool sections included: indoor opportunities for PA, outdoor opportunities for PA, food preparation equipment, type of kitchen, food for purchase, beverages for purchase, and media (e.g. bulletin boards, flyers, or other displays about PA/HE). Kappa and percent agreement were used to determine interrater reliability. **Results:** Average audit completion took 19 minutes. Of 218 items, 104 were assessed for interrater reliability and 114 could not be assessed because they were not present at enough churches (largely pertaining to food and beverages for purchase). Percent agreement for all 104 items was over 80%. For 37 items, the sample was too homogeneous for Kappa to be assessed. Forty-four of the remaining 67 items had Kappas greater than 0.60 (21 items 0.80-1.00; 23 items 0.60-0.79), indicating substantial to almost perfect agreement. **Conclusion:** The new tool proved reliable and efficient for assessing church environments and identifying potential intervention points. Future use could include training stakeholders to conduct and use assessments.

Egab, Karim  
Mentor(s): Dr. Chen Li, Prof. Jamil Khan, Mr. Mohammad Alwazzan, Dr. Benli Peng  
**Influence of Patterned Hybrid geometry on Dropwise Condensation Heat Transfer and Droplet Dynamics**

The geometry of the pattern has a significant influence on droplets departure frequency and dropwise condensation performance, and it has not studied yet. Therefore, different patterns geometries (circle, ellipse, and diamond) have been designed, fabricated, and experimentally evaluated on horizontal copper tubes. All the patterns have the same surface areas size with a same identical gap as well between each adjacent patterns. The effect of geometry shape and the gap between them on dropwise condensation heat transfer as hybrid surfaces has been conducted. The hydrophobic region is modified using chemical treatment solution with SAM as a coating, and the hydrophilic region is fabricated using sandblasting of Silicon Carbide (SiC) with powder size 50 micron. Results show that the diamond hybrid surface has the best performance compared with ellipse and circles hybrid surface at the same size and the same neighbor gap between two patterns. However, the circle and ellipse hybrid surfaces outperform lower performance compared to diamond and complete hydrophobic. The heat transfer rate increases with gap scale increase.
Epperson, Tabitha  
Mentor(s): Dr. Shelley Smith  
Social Support in Post Natural Disaster Recovery

Natural disaster recovery takes many forms. Buildings and infrastructure need to be restored, but people affected by life-altering experiences, such as hurricanes and floods, need to heal as well. This presentation will explore how social support, including religion, aided in the restoration of lives following Hurricane Katrina and the 1,000 year flood in 2015. This presentation includes mixed methods data from two studies at different sites, but there are similarities across space and time in how people practice resilience with the help of those around them and move forward after devastating losses, such as home loss.

Fahey, Danielle  
Mentor(s): Dr. Dirk-Bart den Ouden  
Asymmetric Binarity as a Cognitive Universal: The Rhythm of Syntactic Structure

In all languages and all musical traditions, universal rules group elements hierarchically. Processing models from neuroimaging data have defined common brain areas that support linguistic and rhythmic domains, although it is unclear whether the same function for both domains is supported in these regions. Thus, this project investigated overlap in neural support for these domains based on similar structure.

In language, the theory Merge proposes that two elements in a phrasal structure are combined hierarchically, with one element governing the other, recursively, to form sentences (Chomsky, 1995). In rhythm, this same asymmetric hierarchy of beats is proposed in the Generative Theory of Tonal Music (Lerdahl & Jackendoff, 1983). Distinct brain regions, the left inferior frontal gyrus (IFG) and left posterior superior temporal gyrus (pSTG), have been separately shown to support either linguistic or rhythmic structural processing, although it is unclear whether these regions similarly process these domains. Linguistic models emphasize Broca’s Area (the left IFG opercularis and triangularis) in syntactic processing (Friederici, 2013). The IFG orbitalis, anterior to Broca’s area, has been advanced as primary in rhythmic assignment (Vuust et al., 2011), but involvement of Broca’s Area in rhythmic assignment has also been suggested (Danielsen et al., 2014). Additional research in syntactic processing and rhythmic processing supports the integration of the posterior superior temporal gyrus (pSTG) (Den Ouden et al., 2012).

19 right-handed adult native speakers of English underwent Magnetic Resonance Imaging (MRI) while auditory stimuli were presented. Neuroimaging data was analyzed using SPM12 software (http://www.fil.ion.ucl.ac.uk/spm), culminating in region-of-interest (ROI) analyses of the IFG opercularis, triangularis and orbitalis, and the pSTG. Participants were provided stimuli through E-Prime2.0 software (Psychology Software Tools, Pittsburgh, PA). Rhythmic stimuli provided participants with (1) regular, (2) rhythmically-patterned, and (3) arrhythmic beats. The regular beats sounded like a clock ticking. Rhythmically-patterned beats provided a rhythmic tune. Arrhythmic beats varied in tempo. Linguistic stimuli provided participants with (4) grammatical phrases, (5) semi-randomly sequenced words (random English), and two sets of jabberwocky stimuli. Random English contained words in an ungrammatical order (no hierarchical phrases). (6) Jabberwocky stimuli contained non-words with English phonological sequences. (7) Jabberwocky grammatical stimuli added inflectional morphemes to these non-words.

A RM ANOVA showed a 4-way interaction (p<.05) of hemisphere, ROI, domain, and grammaticality (rhythmic and linguistic stimuli sets matched on Merge level). Effects tests showed a difference approaching significance (p=.083) within left IFG operculum between grammaticality levels of linguistic stimuli: sets 4 and 7 (p=.072) and sets 4 and 5 (p=.025). Tests also showed a difference approaching significance (p=.064) within left IFG operculum between grammaticality levels of rhythmic stimuli: sets 1 and 2 (p=.035) and sets 2 and 3 (p=.021). Finally, tests revealed a significant difference (p<.001) within left pSTG between grammaticality levels of rhythmic stimuli: sets 1 and 2, and sets 2 and 3 (both, p<.001). These results support prior research suggesting overlap in brain regions responsible for both rhythmic and syntactic hierarchical assignment, specifically in the operculum of left IFG. However, the function of these regions for linguistic and rhythmic input is likely different, as linguistic and rhythmic grammaticality were not processed symmetrically within each region. This analysis suggests that the left IFG operculum and pSTG are domain general in their overall cortical roles, yet domain-specific in the type of processes they support within the domains of language and rhythm processing.
Background: Reducing the likelihood of receiving an abnormal mammogram which is confirmed as benign through follow-up testing (a false-positive mammography result) is one several rationales offered for the recent changes in mammography screening recommendations. Extensive research indicates that false-positive mammograms (FPM) have been associated with negative psychosocial, and cancer-related beliefs, but only a handful of studies examine Black women's reactions to this experience. Additionally, these studies do not investigate how organizational and provider-level factors in concert with individual patient characteristics shape Black women's experiences and reactions to FPM. This study addresses three specific aims:

1) To describe the organizational and provider-level characteristics of mammography facilities and their impact on Black women's FPM mammography experiences and outcomes;
2) To determine the relationship between receiving a FPM result and future mammography intention in Black women, and
3) To explore the healthcare interactions involved in the FPM from the perspectives of Black women and their healthcare providers;

Methods: Three phases of data collection, which correspond to each specific aim were planned for this study. Phase I began in March 2016 and concluded October 2016. Observations, key informant interviews, provider surveys, and analyses of screening and diagnostic data from were used to describe the facility and provider-level characteristics of five mammography screening centers in the Columbia area. These data were linked to Phase II data to describe influences on cancer-related beliefs and attitudes in Black women with FPM results. Phase II consisted of the administration of surveys to Black women aged 40+, breast cancer free, who completed screening mammograms from January to August 2016 at one of the previously mention screening centers. Women receiving a FPM result were selected as cases, and women screened on the same day and site with normal screening results were matched as controls. Patient surveys were administered from July 2016-January 2017. Qualitative interviews of providers and Black women with FPM are currently in progress as part of Phase III. Regression analyses are being conducted with Phase I and II data. Interpretive phenomenology will be used to analyze the Phase III interview data. Results: Facility characteristics such as physical space, patient volume, and demographics were collected for each site and analyzed to identify site level differences. Twenty-four provider surveys were collected from facility employees. Facility and provider data were merged with the patient survey data to determine what factors impact satisfaction among Black women, specifically those with FPM results. Preliminary analyses were limited to 115 surveys with complete responses. Models describing satisfaction with convenience and the physical environment were statistically significant. Receiving a FPM result was negatively associated with satisfaction in both models. Analyses for Phase II incorporate demographic information, mammography screening history, breast cancer beliefs, social support, the State-Trait Anxiety Inventory (STAI), the Psychological Consequences Questionnaire DK-33: Anxiety Subscale, and the CES-D Short Form as collected via patient survey. The distribution of age and screening sites were examined by group to ensure a balanced sample. Regression models were created to examine the influences breast cancer beliefs including mammography intention, perceived susceptibility, benefits, and barriers to mammography screening. Of the 132 patient surveys returned, 126 meet the criteria for study inclusion. Preliminary analyses indicate that having a FPM was a significant predictor of the perceived barriers to mammography and approached significance for perceived susceptibility and perceived benefits of mammography. Depression did not impact screening beliefs, and the effects of anxiety varied across the different measures used, with breast cancer-specific anxiety having a more consistent negative effect than general anxiety. Perceived barriers were negatively associated with screening intentions.

Discussion A variety of organization, provider, and individual characteristics have been demonstrated to influence mammography satisfaction, breast cancer beliefs, and by proxy mammography screening intentions in Black women. More work is needed to determine how to enhance mammography satisfaction and reduce negative emotions associated with receiving a FPM result in this population.
Ferster, Brady  
**Mentor(s): Prof. Subra Bulusu**  
**Estimation of Salt Flux and Transport in the Southern Ocean**

Sea surface salinity (SSS) derived from the multi-satellite missions, NASA's Aquarius/SAC-D, ESA's Soil Moisture and Ocean Salinity (SMOS), and NASA's Soil Moisture Active and Passive (SMAP), are used to estimate surface salt fluxes in the Southern Ocean (SO). To examine the satellites accuracy, we validate these products against Argo salinity. Correlation coefficients as high as 0.94 and Root Mean Square Difference (RMSD) and standard deviation of 0.23 psu (Aquarius) suggest that the satellite derived salinity can be used within the SO at higher spatial resolution. Surface salt flux calculations produce statistically similar estimations between the satellites, with anomalies resulting in changing the surface dynamics (buoyancy frequency). Depth-integrated salt and volume transports using Simple Ocean Data Assimilation (SODA) reanalysis are used to investigate the role of salt flux variation. The mean Drake Passage volume transport was calculated to be $143.3 \pm 0.2$ Sv. Average inter-basin zonal salt transport is found to be $>5000 \ 106$ kg s$^{-1}$ eastward, where mean Indian ($566 \ 106$ kg s$^{-1}$) and Atlantic ($106 \ 106$ kg s$^{-1}$) basins transport salt southward and the Pacific basin ($589 \ 106$ kg s$^{-1}$) transports salt northward. Seasonal variations in salt and volume transports suggest a net sink and source seasonally. Our results suggest that changes in salinity and salt transports are a major component of the SO warming. Based on these results, the use of satellite-derived salinity may prove to be a useful resource for observing salinity and surface salt fluxes within the SO.

Feys, Roel  
**Mentor(s): Prof. George Khushf**  
**The Tragedy of the Health Care Commons**

Health care expenditures are on the rise across the Western world. The increase in costs, which is bound to exacerbate over the next decades as populations age, leads to worries about the efficient, equitable, and sustainable management of health care resources. Many of these concerns center upon the most suitable governance model for health care, often depicted as a choice between the institutions of state and market. But what if there was an institutional “third way?” In my research, I look at commons institutions as an alternative approach to governing scarce health care resources.
Finnell, Julie  
Mentor(s): Dr. Susan Wood  
The role of estradiol on social stress induced depressive-like behavior and neuroinflammation in females

It has long been established that repeated exposure to social stress can lead to the development of psychosocial disorders, such as depression. Strikingly, women are more sensitive to stress-related disorders, such as depression compared to men. This enhanced stress sensitivity in females begins at the onset of puberty and ends during menopause, suggesting that ovarian hormones could be a large contributing factor to this phenomenon. However, the mechanism by which ovarian hormones could be driving this enhanced stress sensitivity is unknown. Using a modified social defeat paradigm which consists of a rat bearing witness to an aggressive social defeat encounter, we have previously shown that witness stress produces depressive-like anhedonia and enhanced pressor and tachycardic responses selectively in intact cycling females while females that are ovariectomized (OVX) are resistant, making this an ideal model to study mechanisms of stress susceptibility in females. We recently demonstrated that neuroinflammation is crucial in the development of depressive-like anhedonia in socially stressed males. The purpose of this study was to determine the effects of estradiol on social stress-induced neuroinflammation within the central amygdala (CeA) witness stressed females. Study 1 determined the differential neuroinflammatory consequences of witness stress in intact cycling vs. OVX females. Much like our behavioral data suggests, intact cycling females show enhanced neuroinflammation in the CeA compared to OVX females. In order to determine the discrete role of estradiol in these neuroinflammatory responses to stress, study 2 determined cytokine levels in OVX females that received estradiol or placebo replacement. While estradiol replacement did not result in the emergence of stress-induced depressive-like anhedonia, it did promote anxiety-like behavior as evidenced by increased burying during witness stress exposure. Based on this enhanced anxiety-like response, we predict concomitant increases in neuroinflammation within the CeA, a brain region known to contribute to behavioral stress responses. Therefore, the current study suggests that ovarian hormones, potentially estradiol, may mediate enhanced stress sensitivity in females by promoting stress-induced inflammation in critical brain regions involved in the behavioral stress response, providing novel therapeutic targets to study female stress resiliency and susceptibility.

Flynn, Patrick  
Mentor(s): Dr. Paul Bliese, Dr. M. Audrey Korsgaard  
The Dynamics of Job Attitudes in Response to Unexpected Events

Job attitudes are predictors of important outcomes such as performance and turnover. Recent research of job attitudes has begun to explore their dynamic nature, yet has not examined how employee experiences in the organization shape changes in job attitudes. This paper integrates affective events theory and event system theory as a framework to explore the dynamics of job attitudes in response to unexpected positive events by proposing both immediate and long-term changes. Discontinuous growth model analysis finds that job attitudes negatively vary over time and then change signs to experience positive post-event growth. Further, this paper builds on the honeymoon effect for newcomer job attitudes by proposing and testing how job attitudes differ for organizational newcomers and returning members. Theoretical and practical implications are discussed.
While a large body of research discusses internalizing and externalizing problems for youth with autism spectrum disorder, there is less research on positive indicators of functioning. According to the Emerging Disability Paradigm, psychological research and practice should emphasize positive subjective experiences, positive personality traits, and positive social interactions for individuals with disabilities, in addition to deficits (Schalock, 2004). The purpose of the present study was to provide preliminary support for the validity and reliability of measures of life satisfaction (LS) and psychosocial assets (e.g., optimism, gratitude, self-efficacy, social support) in adolescents with high-functioning autism spectrum disorder (HFA), as well as to assess levels of LS and examine the relations between assets and LS within this population. Psychosocial assets are strong predictors of LS in typically developing adolescents (Furlong et al., 2014). Further, assets may respond to interventions and contribute to improved LS as a result. However, research has not adequately examined LS and its predictors with adolescents with HFA. Given differences in cognitive styles and social communication in youth with HFA, systematic investigation of the reliability and validity of positive measures, as well as the predictors of LS, is important. The results of the present study indicate that youth with HFA provided reliable reports of their LS and psychosocial assets. Further, adolescents’ self-reported LS converged with parent reports. Finally, psychosocial assets were significant predictors of LS; adolescents’ self-efficacy, self-awareness, persistence, and social support had the strongest relations with LS. These results yield implications for both research and clinical practice with adolescents with HFA.
Apraxia of speech (AOS) after stroke in adults is typically challenging to differentiate from aphasic phonological planning deficits and from dysarthria. Comorbidity of AOS with aphasia means that most speakers with AOS produce a mix of errors generated at different functional levels of production planning (Code, 1998; Den Ouden, 2011). This impedes the objective assessment of the relative severity of the impairments. Articulatory and acoustic studies have revealed high correlations between the presence or severity of AOS and consonant production accuracy, but not for vowel production (Jacks, Mathes, & Marquardt, 2010).

The present study focused on the extent to which vowel formant dispersion can be used as a predictor variable for the presence and severity of AOS, as distinguished from aphasia and dysarthria. We hypothesized that if AOS is an articulatory (motor) planning deficit, this should also be reflected systematically in increased variance in vowel formants, which rely on subtle temporal and positional interactions between articulators, and a stable vowel space. With respect to the latter, we also hypothesized that the size of an individual’s vowel space might be affected by AOS and/or dysarthria, in that the deficit might cause all articulations to be generally more centered and less enunciated. We measured formants in vowels produced during spontaneous speech by stroke survivors with and without AOS, and assessed to what extent formant characteristics, were predictive of aphasia, AOS and dysarthria, as well as AOS severity, based on the Apraxia of Speech Rating Scale (ASRS; Strand, Duffy, Clark, & Josephs, 2014).

Picture-description speech samples from the participants (n=53) were used to measure speech production deficits during connected speech. Vowel boundaries were identified manually in Praat (Boersma, 2001), based on the visible formant structure (Thomas, 2011), and labeled using the SAMPA transcription convention (Wells, 1997). First (F1), second (F2), and third (F3) formants from the midpoint of stressed monophthongs /ɑ, æ, ɛ, i, ɪ, ɒ, ɔ, ʊ, ʌ, u, ɜ/ in content words were extracted (Lennes, 2003). As a measure of individual vowel formant dispersion, standard deviations around the means were computed for normalized F1, F2 and F3 for all vowels separately, and then averaged for each individual.

We investigated the extent to which articulatory problems with vowels are associated with the presence and severity of AOS, relative to problems with consonant articulation. The most consistent predictors of both the presence and severity of AOS, turn out to be F2 dispersion and (voiced) VOT dispersion. The apraxic deficit, therefore, does appear to be across-the-board, affecting vowel articulation as much as consonant articulation. The deficit is primarily characterized by articulatory instability, so a lack of consistency between subsequent articulations, within speakers. We also speculate that articulatory searching may lead to generally more open vowel articulations, reflected in a raising of the first formant. Vowel space itself, however, is not consistently affected in AOS, dysarthria or aphasia. Acoustic measures of both consonants and vowels may improve classification of motor speech impairments after stroke, and differentiation from aphasic output problems.
Dopamine, a major neuromodulator, is critical for processing of reward and addictive behaviors brought about by drugs of abuse. Investigation into drugs of abuse has traditionally been directed at understanding the role of neurons. The effect of dopamine on astrocytes has been historically understudied, yet research indicates that astrocytes express dopamine receptors and are sensitive to dopaminergic activity. Astrocytes comprise a morphologically heterogeneous population of cells with a region specific distinction between polygonal protoplasmic and stellated fibrous. However, the molecular and functional implications of this heterogeneity are largely unknown. Using an in vitro model of elevated extracellular dopamine exposure, our evidence reveals a rapid dopamine-induced switch from a protoplasmic morphology to a fibrous-like morphology in cultures of rat hippocampal astrocytes. A one hour exposure to dopamine (75µM) produced an average of 4.5 more primary processes per astrocyte accompanied by a significant decrease in GFAP-positive area. Exposure to antioxidants N-acetylcysteine (NAC) or sodium metabisulfite (SMBS) in the presence of extracellular dopamine did not blunt dopamine-induced stellation; yet, treatment with dopamine receptor antagonists prior to dopamine exposure significantly blunted dopamine effects on astrocyte primary process production. Quantitative RT-PCR (qRT-PCR) analysis revealed a significant dopamine-induced upregulation of dopamine receptor D1 (DRD1) mRNA following 60 minutes of dopamine treatment while treatment with DRD1 antagonist SCH23390 resulted in significant downregulation of DRD1 mRNA. Additionally, RNA-sequencing and qRT-PCR results demonstrate that exposure to dopamine (75µM) for 20 and/or 60 minutes leads to upregulation of immediate early genes (IEGs) ARC, FosB, JunB, and ATF3 implicated in drug-induced structural and synaptic adaptations. Initial investigation of dopamine's effects on astrocytic intracellular signaling messenger, Ca2+, illustrates increases in Ca2+ wave duration. Together these findings support the hypothesis that excess extracellular dopamine, through potential action on an astrocytic dopamine receptor, induces phenotypic changes in cultured astrocytes. Physiological implications for astrocyte-mediated effects of dopamine on neurons in drug abuse, a condition associated with elevated dopamine signaling, remain to be examined.

Ganewatta, Mitra
Mentor(s): Prof. Chuanbing Tang
Antimicrobial Biomaterials and Sustainable Polymers from Renewable Biomass

Development of biomaterials and renewable polymers from natural biomass is widely anticipated as fossil oil reserves dwindle and the environmental problems keep rising. Novel compounds and polymers were synthesized using pine tree resin acids that demonstrated to be effective antimicrobial agents that can kill bacteria including Methicillin-resistant Staphylococcus aureus. Interestingly, these chemicals had very low toxicity to mammalian cells proving the effectiveness of them. The mechanism of action was found to be the cell membrane disruption. More recently, ring-opening metathesis polymerization was utilized to synthesize high molecular weight polymers from resin acids. Molecular weights as high as half a million Daltons were prepared. Flexible and mechanically robust films from these resin acid polymers were developed.
Gao, Chuanji  
Mentor(s): Dr. Svetlana Shinkareva  
Negative valence facilitates conceptual processing

Recent research has suggested that affect influences the way people think. Some researchers argued that positive affect facilitates the spread of activation in semantic memory while negative affect inhibits the spread of semantic associations. In contrast, some other researchers posited facilitation effects for negative affect. Most studies used words or pictures as stimuli, thus introducing potential semantic or lexical confounds. To resolve this controversy, two experiments were conducted to investigate the influence of affective information on conceptual processing. In experiment 1, participants (n=33) were presented with positive, neutral or negative instrumental music followed by a subsequent novel shape. They were instructed to do a meaningfulness ratings on a 1 (meaningless) to 4 (meaningful) scale. The shapes were low in inherent meaning and varied widely and idiosyncratically in perceived meaningfulness. We reasoned that evaluation of subjective meaningfulness could be obtained to provide an index for pure conceptual processing. In experiment 2, the procedure was similar to experiment 1. Participants (n=20) were instructed to indicate the presence or absence of a loop in the stimulus. The results showed that negative valence facilitated response times for meaningful ratings compared to meaningless ratings. However, there was no effect for positive or neutral valence. In addition, affective manipulation did not influence perceptual processing. The effects of valence could not be explained by simple motivational changes because no significant differences were found for proportions of meaningfulness ratings. Our findings suggest that negative valence can facilitate conceptual processing due to its relevance for survival.

Gee, Megan  
Mentor(s): Dr. Andrew Greytak  
Solvent Effect on Ligand Dynamics in Colloidal Quantum Dot Systems

For a number of decades, the study and development of colloidal semiconductor quantum dot (QD) chemistry has proven to be a rich field toward ultimate application goals ranging from photovoltaics and photocatalysis to bio-imaging and drug delivery. Although each synthetic batch of these particles contains some inherent variability; high quality QD syntheses have been routinely achieved in the presence of high boiling point, non-coordinating solvents, along with bulky organic molecules ligated via dynamic adsorption/desorption interactions to the QD surfaces. The synthetic ligand surfactant layer is necessary for high quality products and stability, but is also electronically insulating and bio-incompatible. Therefore, surface modification in the form of sample purification, ligand exchange, solvent change or extraction, etc. is universally required for any rational QD application. Whereas the solvent environment is a crucial component of the QD surface chemistry, the solvent effect on QD-ligand dynamics is barely mentioned and even ignored in most investigations. I will discuss a combined nuclear magnetic resonance (NMR) spectroscopy and isothermal titration calorimetry (ITC) project to investigate the effect of the solvent environment on the ligand dynamics with the QD surfaces. This project has been posed to address the following research questions: 1) whether a systematic approach to designing QD surface treatment is feasible; and 2) whether QD investigations should more intentionally consider solvent effects from the purification stage and on through surface modification reactions.
At the end of January, 2016 the homeless count for South Carolina was 5,050. Of those 5,050 individuals, 34% were unsheltered, while 66% were staying in emergency shelters or transitional housing. 20% were counted as experiencing chronic homelessness (Kahle, 2016). Of all the counties in South Carolina, Richland County has the highest homeless population per capita (Kahle, 2016). Homelessness is a traumatic experience for any individual. Social bonds become disrupted, leading to a sense of isolation. In addition to internal challenges, public perceptions and stereotypes about homelessness is a significant issue (Shier and Jones, 2010). Both the people experiencing homelessness and the programs that serve them suffer from a negative image, complicating advocacy, fundraising, and service provision. Visible markers of homelessness can exacerbate these stereotypes. Creating difficulties for individuals experiencing homelessness to obtain employment, secure housing, and other services. The researchers examined how a storage program that benefits homeless individuals in the Columbia, South Carolina community, impacts the lives of those individuals. In addition, the research make recommendations for the creation and implementation of storage program for the Columbia community. The researchers envision the implementation of the storage program happening in two phases. Phase one will be focused on fact finding and information gathering to ensure successful implementation in the community. Phase two of the program will be focused on implementation of the program developed in partnership with the community advisory board in phase one, the researchers designed surveys to be collected with the target population. The surveys will be conducted at feeding sites for the homeless. Researchers will collect surveys until the point of saturation. Researchers will also review similar programs across the country to garner best practices and insights. Recommendations for implementing a storage program will be presented to a group of key stakeholders in the Columbia, South Carolina community.

The bioactive secondary metabolites, Folipastatin and Unguinol have been reported mostly from the genus Aspergillus and Penicillium. In this study we report a novel strain, Talaromyces virginiae sp. nov., discovered from sediment samples from a salt pond on San Salvador, The Bahamas (24°01′N, 74°27′W). The strain produced a red colored metabolite fraction that primarily consisted of the secondary metabolites folipastatin and unguinol when grown in oatmeal agar and potato dextrose agar but not in yeast extract agar. Scanning electron micrographs of T. virginiae colonies grown on potato dextrose agar revealed its morphological characteristics that are typical of the red pigment producing species within the genus Talaromyces. Multigene phylogenic analysis (ITS and β-tubulin) confirmed its unique nature. Finally, we show that this novel Talaromyces strain has the ability to inhibit growth and synthesis of the hepatocarcinogen, aflatoxin of Aspergillus parasiticus, a popular plant pathogen, which correlates with its ability to synthesize these secondary metabolites. This is the first evidence of biosynthesis of folipastatin and unguinol by the genus Talaromyces and highlights the ecological and public health significance of the genus Talaromyces.
Background: Mother’s risky behavior during pregnancy leads to subsequent adverse birth outcomes. The purpose of this study is to assess the association of mother’s personal and health seeking behavior during pregnancy with giving birth before 37 weeks of gestation (premature birth). Methods: We used 12 years’ (2004-2013) South Carolina Pregnancy Risk Assessment and Monitoring System (PRAMS) data. Results: Total 550,292 live births were documented, including 55,871 (10.15%) babies born premature. Most mothers were White (59%), Medicaid insured (52%) and WIC enrolled (55%). Quarter (26%) of the mothers’ prenatal care (PNC) visit was not adequate, and 13.5% smoked and 7.42% drank just 3 months before delivery. Chance of having preterm birth (PB) was decreased with adequacy of PNC; mothers who had intermediate and adequate visit according to Kotelchuck index had lower odds of PB (OR 0.54 95%CI 0.31-0.93 and OR 0.35, 95%CI 0.22-0.56, respectively) than who had inadequate visit; however, who visited more than adequate have higher likelihood of PB (OR 1.98, 95%CI 1.45-2.72). Mothers experiencing PB in earlier birth had higher chance to have PB again (OR 3.72, 95%CI 2.77-4.98), but previous poor pregnancy had no significant association with PB. While mothers with Medicaid and hypertension have higher odds, mother’s enrollment in WIC can reduce the likelihood of having PB.

Study found no significant association of household income, maternal race, and smoking with birth outcome. Conclusion: While mother’s socioeconomic factors, smoking, and drinking have no adverse effect on birth outcome, mother’s adequate prenatal visit can prevent premature births.

Systematic Review of the Effectiveness of Family Literacy Interventions for Children from Cultural and Linguistic Minority Backgrounds

Gina Crosby-Quinatoa
Angela McLeod
Suzanne Adlof

National testing data indicates that African American and Hispanic/Latino children represent a considerable percentage of children who are below proficient in reading in fourth grade (NAEP, 2014). Some evidence suggests that differences in the frequency and quality of literacy experiences prior to school entry may explain some of the differences in school literacy outcomes. Family literacy interventions are aimed at helping parents build upon home literacy practices to prepare their children to meet school literacy standards. Two meta-analyses have provided evidence that family literacy interventions have small to moderate effects on children’s literacy skills (Manz et al., 2010; van Steensel et al., 2011). However, important limitations of this research include underrepresentation of minority populations and limited attention paid to cultural and linguistic factors in the design of the interventions. The purpose of this study was to re-evaluate the evidence base for the effectiveness of family literacy interventions with cultural and linguistic minorities since the previously cited meta-analyses. Specifically, we examined the extent to which cultural and linguistic minorities are represented in family literacy intervention studies as well as the effects of family literacy interventions on the literacy skills of children in these populations. We are conducting a systematic review and meta-analysis of peer-reviewed family literacy intervention studies that were published between March 2008 and April 2015. Fifty-two articles met the inclusion criteria for the meta-analysis and an additional twenty-five articles were included in the systematic review. This poster will describe the representation of cultural and linguistic minorities in recent studies of family literacy interventions and report average effect sizes on language and literacy outcome variables observed across studies. Implications for educational practice will be discussed.
Eccentric muscle contractions (ECC) induce growth that is associated with increased protein synthesis regulated by mTORC1. While disrupted muscle protein turnover occurs during cancer cachexia, cachectic muscle's capacity to respond to ECC is not well understood. Repeated ECC bouts during the progression of cachexia can attenuate muscle mass loss, reduce muscle inflammatory signaling, and decrease AMPK activation. However, cachectic muscle's ability to induce protein synthesis through mTORC1 has not examined. Therefore, we examined if cancer-induced muscle inflammatory signaling involving STAT3 and NFkB could disrupt ECC-induced protein synthesis. Either pharmacological (PDTC, a STAT3/NFkB inhibitor) or non-pharmacological (ECC training) treatments were used to alter muscle inflammatory signaling. mTORC1 signaling and protein synthesis was examined 3h after a single bout of ECC in C57BL/6 (B6; N=9) and cachectic ApcMin/+ (MIN; N=9; 16% BW loss) mice. A subset of MIN mice (N=6; 17% BW loss) also received a single PDTC injection 24h prior to acute muscle contraction. The acute response after ECC training (8 bouts over 2 weeks) in C57BL/6 (N=8) and MIN mice (N=9; 15% BW loss) was also examined. In all experiments the left tibialis anterior (TA) performed ECC while the right TA served as intra-animal control. Cachexia decreased TA muscle mass, mTORC1 signaling, and protein synthesis when compared to B6 controls. While the ECC induction of p70S6K(T389) phosphorylation was not attenuated by cachexia, the protein synthesis induction by ECC remained suppressed compared to B6 controls. Inhibition of STAT3/NFkB signaling increased basal muscle protein synthesis in MIN mice, which was further enhanced by ECC. The acute ECC induction of muscle protein synthesis was not altered by training. These data demonstrate that basal muscle protein synthesis in cachectic muscle is regulated by muscle inflammatory signaling. However, cachectic muscle inflammatory signaling does not alter the ECC induction of mTORC1 signaling and muscle protein synthesis.
Harris, Eboni  
Mentor(s): Dr. DeAnne Hilfinger Messias  
Examining Rest Practices among African American Women in South Carolina  

BACKGROUND:  
Social, cultural, and environmental factors contribute to obesity and obesity-related disease among African American women. There is evidence that African American women's value of and perceived need for rest impacts their level of participation in physical activity, yet little is known about actual perceptions and practices of rest. Understanding African American woman’s perceptions and daily patterns of rest is important for designing culturally appropriate interventions that increase physical activity and decrease health disparities.  

METHOD:  
The aim of this research was to uncover practices and perceptions of rest among African American women in an urban setting in South Carolina, employing the Photovoice method. The eight participants ranged in age from 30 to 59. At Session 1, each participant received a digital camera and instructions on taking photos that represented what rest meant to her and how, where she rested. In subsequent group meetings, each participant shared her photos of personal rest practices, settings, and meanings, using the PHOTO discussion method. A modified ethnonursing framework guided analysis of data from images, transcripts, and field notes.  

RESULTS:  
Participants’ representations of rest focused on spirituality, relaxation, and seeking stress-free environments. Photos depicted devotional text, restful environments, and activities (e.g., taking a bubble bath, having a massage). Participants depicted rest both as associated with engaging in physical activity (i.e., taking a walk) and conversely, with not being physically active (i.e., having a meal; reading). Personal stress, environmental conditions, and making a conscious effort to rest were among the factors participants identified as influencing their ability to obtain needed rest.  

DISCUSSION:  
Engaging these urban, southern African American women through Photovoice methodology resulted in the elicitation of rich descriptions of their perceptions and practices of rest. Interventions with this population often focus on physical activity and exercise rather than personal self-care. These results suggest that a focus on self-care activities, which include both rest and exercise, may be a promising approach to developing new strategies and refining existing interventions aimed at enhancing personal health and quality of life through physical activity promotion among this population.  

Harty, Hailey  
Mentor(s): Dr. Suzanne Adlof  
Inter-Rater Reliability: A Tutorial for Researchers and Practitioners  

Inter-rater reliability is a measure of the extent to which different individuals are consistent in their measurements or decisions. For example, in the college admissions process, inter-rater reliability would measure the extent to which different application reviewers agreed in their acceptance, waitlist, and rejection decisions. Many clinical professions rely on standardized assessment tools to make diagnosis and treatment decisions. For example, in the communication sciences, standardized tests are used to measure articulation skills, oral language ability, and social skills and to diagnose impairments such as apraxia, aphasia, specific language impairment, and autism spectrum disorder. Inter-rater reliability is important in standardized testing because it ensures that the test can produce consistent and accurate results, no matter the administrator. Similarly, inter-rater reliability is important for researchers because disagreements between raters are a source of measurement error that can reduce statistical power for finding significant effects. There are different ways to measure inter-rater reliability, depending on how different raters are assigned to rate individual cases as well as the psychometric properties of the rating systems (e.g., categorical vs. continuous variables). Using examples from a study of children’s language and reading abilities, this poster will provide a tutorial that describes methods of assessing inter-rater reliability. We will discuss the important considerations for the calculation and interpretation of each reliability statistic from both research and practice perspectives.
Haselden, Jacy  
Mentor(s): Dr. Krystal Werfel  
Oral-reading Fluency in School-Age Children with and without Language Impairment

Language impairment affects approximately 7% of children (Tomblin et al., 1997). Specific language impairment is largely unidentified, with roughly 30% of parents of preschool children with SLI aware that their child has a language impairment. Identification of SLI is even more difficult in school-age children, as school-age children with SLI do not commit overt errors in their conversational speech. At the same time, children with SLI struggle with more complex tasks, such as reading and writing. Currently, there is a need for measures that identify specific language impairment in school-age children. The purpose of this study is to develop an experimental oral-reading task and collect preliminary data using the task to determine whether it can be used to improve the identification of school-age children with and without specific language impairment.

Haun, Daniel  
Mentor(s): Dr. Kevin Hull  
No Country For Selfies: Analyzing Facebook and Instagram’s User Agreements

This paper describes a study of Facebook and Instagram users’ knowledge of the Terms of Service and Terms of Service on the use of these social networking sites (SNS). It begins with a summary of relevant research related to trust in Social Networking Services, the legal implications of user generated content, terms of use and Social Identity Theory. The online survey methodology is described and the results presented, followed by limitations and conclusions. By conducting a survey of University of South Carolina Facebook and Instagram users, we investigated student awareness of these issues. In a survey of college students, 91.64% of those who responded to the survey said they did not read Facebook’s Terms of Service when they signed up for an account. 93.25% said they did not read Instagram’s Terms of Use when they signed up. Implications regarding trust in social networking services are discussed.

Havighorst, Amanda  
Mentor(s): Dr. Hippokratis Kiaris, Dr. Ioulia Chatzistamou  
Individual Variations in Unfolded Protein Response are Correlated with Glycemic Variation in Peromyscus maniculatus bairdii

Research has shown that there is a clear, causative relationship between endoplasmic reticulum stress and the death of insulin-secreting pancreatic Î² cells, which leads to diabetes. Thus, it stands to reason that individual differences in the Unfolded Protein Response (UPR), which occurs in response to ER stress, would affect one’s susceptibility to diabetes. Testing such hypotheses in the inbred Mus musculus bears certain limitations, since the extent of the UPR does not vary between individual animals. Thus, we utilized outbred Peromyscus animals to explore potential variation in the UPR and its consequences. We have found that individual Peromyscus maniculatus bairdii animals exhibit variation in their ability to induce chaperone expression during ER stress, though animals of another subspecies, P. maniculatus sonoriensis, do not show such variation. To see how this might affect diabetes susceptibility, animals classified as high- or low-responders were placed on a high-fat, high-sucrose diet. After one week on this diet, both groups showed a significant increase in fasting blood glucose, though this increase was greater in low-responding animals. A negative correlation was observed, in particular, between blood glucose and GRP94 expression. However, by day 35, this correlation had reversed, and become positive. This was reflected in the loss of high and low response in animals after 8 weeks on a high-fat diet. Animals exhibiting an overall high response also display lower glycemic variance as compared to low-responding animals. Interestingly, there also appears to be a correlation between sex and response, as most high-responders were male, and low-responders female. Despite these differences, none of the animals have yet become diabetic and the study is ongoing. However, the differences in glycemic variation between high- and low-responders indicate that the differences in UPR may affect the Î² cells’ ability to respond to changes in insulin demand, and thus susceptibility to developing diabetes in the future.
Hayes, Megan
Mentor(s): Dr. Daniel Fogerty
Rhythmic Processing in Speech Perception

Previous research proposes that rhythm is what simplifies complex processes involving coordination of separate components to complete a task. This concept of rhythm helping link separate components together has been studied with limb coordination tasks as well as speech production tasks. This study examines the effects of rhythm in speech perception. Because listening requires tracking various properties of a speech signal over time, speech perception is also a complex task. We examined how temporal properties of the speech signal influence perception, specifically with timing constraints based on rhythm. Subjects were presented with rhythmic speech stimuli recorded by a male and female speaker. The stimuli were four-word phrases with nearly identical prosodic structure and low predictability. Each followed the form X for a Y, with consonant-vowel-consonant words as X and Y in each phrase. Subjects listened during the first presentation of each phrase, and were instructed to speak along with the recording as the phrase was repeated five times at the same rate. Alignment was measured by comparing the subject’s phase alignment to syllabic beats in the stimuli, with values closest to 0 milliseconds indicating better alignment. This presentation reports on current work in progress regarding the development of a speech entrainment test battery that will further delineate the role of rhythmic processing in speech perception. The results of this project will help to explain how listeners track rhythmic constraints in the speech signal. Furthermore, it investigates if alignment during speech entrainment tasks is correlated to performance in speech-in-noise tasks.

Henbest, Victoria
Mentor(s): Dr. Kenn Apel
Is a Systematic Analysis of Spelling a Valid Measure of Orthographic and Phonological Awareness Skills in First Grade Students?

The relation between students’ scores from a spelling error analysis and their performance on measures of phonological and orthographic pattern awareness were examined. Data were analyzed from 37 first grade students with typical expressive language skills who completed a spelling task, a phonological awareness task, and an orthographic pattern awareness task. The students’ spelling skills were measured using the Spelling Sensitivity System (SSS; Masterson & Apel, 2010). The SSS parses words into elements based on their sounds and then assigns a score to each of the elements based on the linguistic skills represented in the spelling. Elements that were not represented with a letter or letter combination received a score of zero. Elements that were represented by a letter or letter combinations, but that were orthographically illegal received a score of one. Elements represented with a legal, but incorrect spelling earned a score of two, and correctly spelled elements received a score of three. Results indicated that there was a negative correlation between scores of zero on the SSS and performance on the phonological awareness task \( (r = -.57) \). There also was a moderate negative correlation \( (r = -.41) \) between scores of one and two on the SSS and performance on the measure of orthographic pattern awareness as well as a weak negative correlation between scores of one and two and the measure of phonological awareness \( (r = -.39) \). These findings offer initial evidence for support of the SSS as a valid measure of phonological awareness and orthographic knowledge and provide initial educational implications for the use of these measures in the classroom setting.
Hendley, Michael  
Mentor(s): Dr. Michael Gower, Dr. Prakasam Annamalai  
Adipose Tissue Engineering: A Therapeutic Strategy for Metabolic Diseases.

Despite the availability of existing treatment options, the number of people diagnosed with type 2 diabetes is on the rise, suggesting a need for the development of alternative therapeutic strategies. While various pharmacological agents have shown promise, they also have drawbacks including patient compliance and off target tissue effects. The adipose tissue has come into the spotlight in recent years as a target for pharmacological agents for type 2 diabetes therapy after its functions as an endocrine organ playing a key role in maintaining glucose homeostasis was discovered. Unfortunately, traditional routes of drug administration require large and frequent doses to have effects on this tissue. To address this, scaffolds made of poly(lactide-co-glycolide) or PLG, an FDA approved biomaterial, have been developed for adipose tissue engineering. These scaffolds have the ability to integrate with the adipose tissue and slowly degrade over time allowing for extended release of drugs directly into the tissue. Before these scaffolds can be used to treat metabolic disorders, the effect of the polymer itself on whole body metabolism must be characterized. To address this, c57bl/6 mice were placed on a diet containing 60% calories by fat, a mouse model for pre-diabetes. After one week, scaffolds were implanted into the epididymal fat pads. Duel-energy x-ray absorptiometry and inter-peritoneal glucose tolerance tests were then performed to assess body fat composition and glucose tolerance respectively. At the end of the study, skeletal muscle tissue was collected and analyzed for proteins involved in glucose metabolism. Results indicate that mice receiving PLG scaffolds show improved glucose tolerance which correlates with increased levels of GLUT4 and pAMPK found in skeletal muscle tissue extracts showing promise for these scaffolds to be used as therapeutic drug delivery devices for type 2 diabetes.

Hendricks, Jonathan  
Mentor(s): Prof. Robert Ployhart  
Exploring the Effect of Employee Contact on Job Applicant Perceptions of Organizational Image

Research on recruitment has highlighted how an individual’s perception of an organization’s image—the combination of mental representations of specific aspects of a company (Slaughter, Zickar, Highhouse, & Mohr, 2004) impacts organizational attractiveness and the willingness to apply for jobs. However, despite the influence organizational image exerts in the recruiting process, we currently do not know how this process takes place during recruitment or the extent to which social interactions with employees might influence an applicants perspective of the organization. We integrate research on organizational image, recruiting, and social-cognitive processing (Salancik & Pfeffer, 1978) which suggests interactions with others impact impression formation, to generate hypotheses about the influence employee contact has on applicant perceptions of organizational image. We propose that applicant experiences with employees influence the extent to which the applicant identifies with the organization, and that organizational identification subsequently impacts applicant’s perception of an organizations image as well as the intentions to apply to the organization. We test these hypothesis using field data from a career fair and discuss theoretical and practical implications.

Keywords:
Organizational image, recruiting, organizational identification, social-cognitive processing
Hickey, Rachel  
Mentor(s): Mrs. Emily Jordon  
Assessment of Patient Satisfaction with the Provision of Fertility Information in Women with Lynch Syndrome

Lynch Syndrome (LS), one of the most common hereditary cancer syndromes, is primarily known for its substantially increased risks for colorectal cancer. The incidence of gynecologic cancers (endometrial and ovarian cancers) equals or exceeds the incidence of colorectal cancers in female patients with LS. The prevention and treatment methods for these cancers can drastically affect fertility and reproduction. Previous studies with cancer patients have revealed challenges in acquiring information related to these topics; thus far, no research has assessed whether there is an informational gap regarding fertility information for women in the LS population. The purpose of this study was to identify the amount of information received related to fertility and reproduction, assess patient satisfaction, and characterize current practices of this information delivery within our target patient population. Data was collected from 154 women with LS. Likert scales were used to quantify the amount of information provided about major themes pertaining to fertility in LS: effects of cancer treatment, risk-reducing surgeries, fertility preservation and family planning. Overall, participants were more satisfied when they received more information about specific topics within these themes. There was a difference observed in the amount of information provided to presymptomatic carriers of LS and individuals with LS who are affected with cancer. Participant opinions indicate that genetic counselors may be an untapped resource in the provision of fertility and reproduction information to this patient population.

Hirschhorn, Rebecca  
Mentor(s): Dr. Susan Yeargin  
Epidemiology of injuries requiring emergency transport among college and high school student-athletes

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Context: There is a lack of research regarding the epidemiology of emergency transport incidents (ETI) of sports-related injuries in high school and collegiate settings. Objective: To determine frequency and type of ETI as a result of athletic participation. Design: Descriptive epidemiological study. Setting: National Athletic Treatment, Injury and Outcomes Network (2011/12-2013/14) and National Collegiate Athletic Association Injury Surveillance Program (2009/10-2014/15) in 25 male and female sports. Patients or Other Participants: High school and collegiate student-athletes. Interventions: ETI data were collected by athletic trainers (AT) who attended each practice and game. ATs also collected data on athlete-exposures (AEs) as defined by one athlete participating in one practice or game. Main Outcome Measures: Injury frequencies, injury proportion ratios (IPR), and injury rates per 10,000 AEs with 95% confidence intervals (CIs) were reported. For each ETI, the body part, final diagnosis and injury mechanism were reported by the documenting AT. Results: A total of 339 ETIs were reported over 2,105 college team-seasons and 146 over 1,845 high school team-seasons. ETIs represented 1.02% and 0.31% of all injuries, respectively. Women's ice hockey had the highest ETI rate at 1.28/10,000 AE (95% CI: 0.71-1.86) of all collegiate sports; however, football had the highest number of ETI (n=121). In high school, football had the highest rate at 0.80/10,000 AE (95% CI: 0.64-0.97) and the highest number (n=89). Head/face injuries were the most frequently transported injuries in college (n=71, 20.9%) and high school (n=33, 22.6%) across all sports. This differs from collegiate football which most frequently transported neck injuries (n=26, 21.5%). The proportion of trunk injuries requiring emergency transportation was higher in college than high school (IPR = 9.56; 95% CI: 1.27-71.76). Heat-related events accounted for 5.6% (n=19) and 4.1% (n=6) of ETIs in college and high school, respectively. Strain was the leading diagnosis in college (n=23, 14.7%). Fractures were the leading diagnosis in high school, accounting for 24% (n=35) of emergency transports. Player contact was the leading mechanism of injury in all collegiate (41.6%) and high school (54.8%) sports. Conclusions: Women's ice hockey had the highest rate, whereas football had the highest number of ETI in college. Football had the highest rate and number of ETI in high school. ATs should maintain a high level of emergency preparedness when working with these sports. Injuries to the head, neck and face, including concussions, are the most frequently transported across competition levels. ATs need to have the appropriate equipment and protocols in place to handle the most common injuries. Strains were the leading diagnosis in college, which are not considered an emergent condition. Future research should examine differences between field and hospital diagnosis to help improve prehospital care and decrease the likelihood of unnecessary emergency transports.
Holmes, Jordan  
Mentor(s): Dr. Parastoo Hashemi  
**Electrochemical Strategies for On-site Speciation Sensing using Ionophore-Grafted Carbon Fiber Microelectrodes**

Trace metals are highly regulated in the environment; however, in dynamic events, both anthropogenic and naturally occurring, this homeostasis that the ecosystem depends on becomes disturbed. The resulting toxicity and mobility of rapidly fluctuating trace metals is controlled by speciation. Copper, specifically, is an important environmental and biological nutrient that can also act as a contaminant; thus, development of a portable analytical tool able to distinguish copper speciation in real-time is desirable. Electrochemistry is a promising technique for such analysis as electrodes are inherently portable and can be directly immersed in a sample of interest; however, they suffer from selectivity issues when analytes and interferences are of similar charge and size. We approach this challenge using fast-scan cyclic voltammetry (FSCV) at ionophore-grafted carbon fiber microelectrodes, able to detect Cu(II) in the presence of interfering divalent metals with ultra-selectivity on a time scale of milliseconds. Here, the electrode response is characterized with respect to ionic strength, interferences and recovery, which in the future will allow for the behavior of ambient Cu(II) in complex systems to be modeled. Finally, we introduce our design for an on-site speciation sensor: the first Hg-free voltammetric tool capable of selective trace metal monitoring with excellent temporal and spatial resolution.

Holt, Hope  
Mentor(s): Dr. Melissa Moss  
**Regulation of P-glycoprotein Expression for Treatment of Alzheimer’s Disease**

Alzheimer’s disease (AD), the most common form of neurodegenerative disorder, affects over 5 million people and is the 6th leading cause of death in the United States. AD is characterized by an accumulation of amyloid-Î² protein (AÎ²) in the brain. Currently under study as a therapeutic approach is the transport of excess AÎ² out of the brain through the single endothelial cell thickness of the blood-brain barrier. P-glycoprotein (P-gp), an ATP binding cassette transporter located on the apical side of the blood-brain barrier, has been shown to transport AÎ². However, the form of AÎ² transported has not yet been explored. While monomeric AÎ² is inert, oligomeric AÎ² exhibits neurotoxicity and leads to the formation of AÎ² fibrils that deposit as amyloid plaques in the brain, a pathological hallmark of AD. However, formation of oligomeric AÎ² may be important to its clearance from the brain. To explore this hypothesis, this study begins by determining the AÎ² assembly state (monomer, oligomer, fibril) that most effectively interacts with P-gp. Using an ATPase activity assay, this study has demonstrated that P-gp selectively transports oligomeric AÎ², but not monomer or fibrillar aggregates. Low levels of P-gp expression at the blood-brain barrier correlate with high levels of AÎ² aggregate deposits around the cerebrovascular. Also, it has been recently discovered that the presence of certain forms of AÎ² in the cells of the blood-brain barrier can reduce P-gp levels through the ubiquitin-proteasome degradation pathway. These findings identify P-gp as a novel therapeutic target for AD. Thus, this study further seeks to identify therapeutic compounds that will increase the expression levels of P-gp at the blood-brain barrier in order to mitigate the accumulation of AÎ² by allowing for increased clearance of AÎ² from the brain. Madin-Darby Canine Kidney (MDCK) epithelial cells continuously express the multidrug resistance 1 (MDR1) gene responsible for the presence of P-gp. Cells were treated with the prospective therapeutic compound, verapamil, which has shown neuroprotective effects in AD rats. Following treatment, alteration of P-gp expression was determined using fluorescent microscopy to visualize cell membrane location of P-gp and SDS PAGE with Western blotting to quantify P-gp expression. Results indicate increased expression of P-gp following verapamil treatment, highlighting the prospective therapeutic potential of this compound.
Satellite to ground links are extremely vulnerable to any type of terrestrial interference due to the relatively weak satellite signal at the ground stations [1]. This can cause connection failures or degradation in performance at the ground station, which could in some cases be significant or even catastrophic. The great flexibility of software defined radio (SDR) systems facilitates the implementation of cognitive relays as a complementary entity that can help reduce the effects of interference. In this paper, we describe a cognitive SDR testbed that has been developed based on the Universal Software Radio Peripheral (USRP) and the GNU radio software platform. One of our testbed’s aims is to evaluate error performance improvements of satellite signal relays in the presence of both narrow and wideband interference. We report on performance evaluation in terms of bit error ratio (BER) as a function of signal-to-noise ratio (SNR) and other metrics, for our detect and relay algorithms in several example frequency bands, using both narrowband and wideband desired (satellite-relay-ground station) signals. Our testbed contains four separate segments: satellite (emulated), relay, interferer, and ground receiver. At each segment, we transmit and/or receive signals via the SDRs or standard communication laboratory equipment [2]. We consider two relaying protocols in our work, amplify-and-forward (AF), and decode-and-forward (DF) [3]. A comparison between the AF and DF relaying techniques is important because each technique requires different hardware and software implementation, yet the flexibility of SDRs essentially enables design of either type of these relays in a logical step by step fashion. Initial experiments will be indoors, although outdoor testing with small unmanned aircraft systems is also planned. Our experiments explore the effects of different modulations and interfering signal types, and provide some quantitative results on performance improvements via our relay approach.
Youth obesity is a major public health concern due to an array of physical, social, and psychological health consequences. Place has continued to emerge as a key health determinant with studies showing that where a child lives impacts their health, including obesity. Environments where it is easy for individuals to have low levels of physical activity – either by discouraging active behavior or promoting sedentary behavior – and easy for individuals to consume unhealthful foods – either by the limited availability of healthful foods or increased availability of unhealthy foods – have been coined ‘obesogenic’. Additional research is needed to improve measurement of obesogenic built environments and test associations with childhood obesity. This study occurred in a southeastern US county (pop:474,266) in 2013 and combined four unique datasets: 1) demographic, weight status, and addresses from all 3rd through 5th grade youth enrolled in a large southeastern school district (n=13,469), 2) detailed audit data on all public park facilities, 3) location of all food stores and restaurants, and 4) sociodemographic Census data. Global Moran’s Index and Anselin’s Local Moran’s I (LISA) were used to detect global and local spatial clustering while residuals from a series of linear regression models were subsequently spatially analyzed, mapped, and compared to examine correlates of spatial clustering. Significant, positive global clustering (Index=0.04, p<0.001) was detected. In addition, LISA results showed that about 4.7% (n=635) and 7.9% (n=1,058) of the sample were identified as high and low obesity localized spatial clusters (p<0.01). Individual and neighborhood sociodemographic characteristics accounted for the majority of spatial clustering and differential patterns were observed by level of urbanicity (e.g., urban, suburban, rural). The second part of this project developed and tested an obesogenic built environment measure. Public parks (n=103) were identified and then scored using detailed audit data, while two commercial databases of food stores (n=395) and restaurants (n=717) were collected, categorized, and geocoded. Grocery stores that offered access to fresh produce were classified as ‘healthy’, while convenience stores, discount/drug stores, fast food restaurants, and fast casual restaurants with less access to fresh produce were classified as ‘less healthy’. In ArcGIS, kernel density estimation procedures were used to create, normalize, and summarize separate raster (pixel) surfaces representing the nutrition and park environments. Using multilevel linear analyses, results showed that availability of parks and healthy food outlets were related to lower weight status in youth (b=-0.25, p<0.05). Associations were stronger for youth living in non-urban areas. Identifying geographic areas that contain spatial clusters is a powerful tool for understanding the location of and contributing factors to patterns of childhood obesity. Environments that were classified as health-promoting by providing greater access to public spaces to be active and places to consume healthier food options were related to lower youth obesity. This dissertation project integrated innovative methodology to analyze spatial patterns of youth obesity and develop and test a unique characterization of obesogenic built environments.
Hundal, Tanya
Mentor(s): Dr. John Lavigne
Investigating metastatic potential in colon and prostate cancers using synthetic lectins

Cancers of the colon and prostate, though both treatable, early detection is necessary to improve patient outcomes. Current diagnostic methods, e.g., visual inspection and biopsies besides being invasive, are somewhat subjective also, thus decreasing accuracy. Alternatively, blood-based tests measuring specific biomarkers (like CEA and PSA for colon and prostate cancers, respectively) are associated with high false-positive rates and are more useful for monitoring post-treatment patient health, thus driving efforts to identify better screening and diagnostic techniques. Abnormal glycosylation of integral membrane and secreted glycoproteins is known to take place at the onset of many diseases, including cancer, and presents as the over, under or new occurrence of certain glycans. The aim of this study is to design synthetic lectins (SLs) that could discriminate cancer associated glycans (CAGs) and also to investigate global glycosylation changes associated with colon and prostate cancers. Further, the ability of an array of SLs to discriminate cell lines based upon their difference in metastatic potential, demonstrates an alternative approach to detect colon and prostate cancers by looking at aberrant glycosylation changes rather than hunting for a specific biomarker.

Each CAG produced a unique response pattern with an array of cross-reactive SLs, capable of classifying these targets with >99% accuracy. The positively-charged amino acids (e.g., Arg) and those containing phenyl ring residues (e.g., Tyr, Phe) appear to be the principal factors involved in discriminating these CAGs. The utility of these SLs, was first demonstrated using purified glycoproteins, since the glycans displayed are also present in CAGs. Subsequently, an array of 5 SLs could distinguish between 4 human colon cell lines based on their metastatic potential with 89% accuracy. Further SL design modifications have been carried out and correlations between structural modifications and activity have been established. Based on these preliminary examinations, several new SLs are identified targeting human colon and prostate cell lines. These new SLs were combined with existing SLs to make an extended array, which can discriminate normal, non-metastatic and metastatic states from secreted glycoproteins of different tissue types with >99% accuracy. Metastatic potential of colon and prostate correlate with variation in 1. amount of Arg and 2. number of phenyl rings in SL peptide sequences. Ongoing work is focused on investigating correlations between SL-glycoprotein binding and the amount of sialic acid present in colon and prostate cancer samples.

Hung, Chen-Ling
Mentor(s): Prof. Allan James
Storm Hydrographs in Two Subwatersheds of Rocky Branch Watershed

Many urbanized areas in South Carolina experienced severe flooding in October 2015 and October 2016. Urbanization greatly increases runoff generation by decreasing infiltration capacities and encouraging Hortonian flow. Knowing the timing of storm hydrographs in small urban catchments and constructing model hydrographs enables prediction of peak discharge and calibration of rainfall-runoff models. This project examined flood flows on Rocky Branch Creek (RBC) at two existing stream-flow gauge sites. RBC is a small, very heavily urbanized stream that flows through Five Points and the USC campus. The project measured and gathered continuous stage data, compared flow stages with rainfall data to build stage hydrographs and examine lag times for selected storms, developed stage-discharge rating curves for low to moderate flows, and built stormflow and model hydrographs. High flows could not be calibrated due to backwater effects, which are common in urban environments. The timing of stage hydrographs was analyzed by regressing the lag-to-peak discharge on various rainfall parameters. Rainfall duration was significantly correlated with lag-to-peak and gives an objective method for predicting the timing of flood-wave arrivals from storm duration. Lag times were compared with empirical equations to examine the effects of urbanization on flood arrivals. Dimensionless unit hydrographs (DUHs) were constructed and averaged for low-to-moderate flows. Average values of the DUHs provide a robust model of storm-flow response within the range of flows examined. This study found that model hydrographs for moderate-magnitude floods in RBC can now be constructed from available data. Enhanced runoff data will soon be available that will allow expansion of the range of flows to larger floods. These models will be of great importance to calibrating the next round of rainfall-runoff models.
Illenberger, Jessica  
Mentor(s): Dr. Steven Harrod, Dr. Charles Mactutus, Dr. Rosemarie Booze  
Behavior and dendritic spine alterations reflect the potential for methylphenidate abuse in HIV-1+ youths.

HIV-1+ adolescents have twice the odds of receiving psychostimulant medications such as methylphenidate (MPH, Ritalin") to treat mental health disorders, including ADHD. To evaluate the potential for MPH abuse in HIV-1+ adolescents, we compared oral self-administration behavior in female OVX HIV-1 Transgenic (Tg) rats (n=19) and female OVX F344 (n=20) rats. Animals were given access to MPH/sucrose (max dose 4 mg/kg/day) on a FR1 schedule of reinforcement for 14 days. Following MPH exposure, we employed DiOlistic labeling/confocal microscopy to examine dendritic spine alterations on medium-spiny neurons (MSN) in the nucleus accumbens core (NAcc) using Neurolucida 360. We also evaluated dopamine release from the NAcc region using an electroanalytical technique, fast-scan cyclic voltammetry. We hypothesized that MPH would resolve genotype differences in sucrose-maintained responding, and MSN spines. A significant increase in MPH self-administration was found during the first week for HIV-1 Tg animals, relative to F344 controls (p<0.05), indicating escalation in MPH dosing during drug initiation in HIV-1 Tg animals. HIV-1 Tg rats of both sexes exhibited a significant decrease in dopamine release in the NAcc, (p<0.05), relative to controls. Further, MPH had differential effects on dendritic spine distribution in the NAcc of control and HIV-1 Tg animals. Together, these experiments indicate a role of the dopamine system in contributing to, if not mediating, potential abuse liability of MPH in the treatment of ADHD in HIV-1+ youths.

Jackson, Erika  
Mentor(s): Prof. Janice Edwards  
Recipients’ Perspectives Regarding Expanded Carrier Screening of Gamete Donors

Couples and individuals utilizing donor gametes consider many factors when deciding on a donor. Aside from physical characteristics, recipients have stated that the health of the donor and donor’s family is among the most important attributes; however, screening for physical health relies largely on donors to be truthful about their personal and family health histories. Genetic carrier screening, however, can help ameliorate some of this uncertainty by identifying donors who are at risk of passing down mutations for potentially detrimental genetic conditions to their offspring. Donor genetic carrier screening practices differ widely throughout the United States, creating variation in the number of conditions donors are screened for. Furthermore, an increasingly multi-ethnic population makes determining who should be screened difficult and unclear. Thus, consideration of a pan-ethnic expanded carrier screen for all potential gamete donors is warranted. An online questionnaire was developed to assess intended parents’ preferences regarding expanded carrier screening of their donors. Participants were recruited from various online support groups if they had ever or were currently utilizing donor gametes (sperm and/or egg). A total of 58 usable responses will be presented and reflect insight into the perspectives of intended parents regarding which factors regarding genetic carrier screening influence their choice of donor. These perspectives may identify potential areas of improvement in educating patients about carrier screening. Additionally, understanding the genetic screening preferences of parents utilizing donor gametes may lead to increased uniformity of genetic screening practices in gamete donation programs. Consistent and increased genetic screening practices will increase identification of at-risk individuals and subsequent prevention of heritable conditions.
Jahan, Merina  
**Mentor(s): Dr. Mark Uline**  
**Molecular modeling in drug delivery for cardiovascular repair: a physical insight towards solving experimental problems with theoretical approach**

Overexpression of matrix metalloproteinases (MMPs) following myocardial infarction (MI) is linked to deleterious left ventricle remodeling and heart failure. Current research has focused on introducing a therapeutically relevant concentration of effective MMP inhibitor to the MI site to mitigate the harmful tissue remodeling. Theoretical molecular level studies provide an effective platform for designing novel delivery systems for MMP inhibition that can provide valuable insights for experimental researchers. This drug delivery system consists of a broad spectrum MMP inhibitor drug PD-166793 that is bound to a polymer in a nanoparticle-polymer vehicle. A molecular model using single chain mean field theory (SCMFT) is used to scan the wide range of possible design parameters. The molecular theory properly accounts for the highly non-additive coupling of molecular interactions among all the species. The size, shape, electrical properties and physical conformations of the polymer, drug and solvent are taken into account. The model is used to study the variation of this binding with changing pH, salt concentration, grafting density and length of the polymer. Experimental studies have shown that this system is capable of retaining PD-166793 at more than 100 times the inhibitory concentration against MMP-2 with a particle concentration of 2.5mg/mL. The model is used as a tool for continual improvements in binding of PD-166793 by providing valuable feedback on how the variations of system parameters affect the binding efficiency.

Jayne, Julianna  
**Mentor(s): Dr. Christine Blake**  
**Role of Drill Sergeants in Basic Training Soldiers’ Nutrition Behaviors**

Introduction: In the Army, Soldiers’ nutrition habits have a direct impact on their performance. The emphasis in basic combat training is on “Soldierization” (transforming a civilian into a Soldier), and Drill Sergeants are instrumental in this process. This study aimed to understand nutrition attitudes, beliefs, and knowledge of Drill Sergeants, as well as the ways Drill Sergeants instill new Soldiers with an Army identity (e.g., warrior athlete, Army strong), and how healthy eating is perceived to fit with this new identity.

Methods: In-depth interviews were conducted with Army Drill Sergeants at Fort Jackson, SC and Fort Benning, GA between July-August 2011 (n=31). Interviews emphasized Drill Sergeants’ perceptions of the basic training eating environment, Drill Sergeant role, and Soldier attributes. A grounded theory approach to coding was employed using NVivo 11.

Results: Drill Sergeants described the ideal Soldier as healthy and physically fit but did not include being a healthy eater as an aspect of Soldier identity. Confusion about nutrition concepts was common. Overall, Drill Sergeants recognized that what Soldiers eat affects their physical performance, but they did not see helping Soldiers establish healthy eating behaviors as one of their duties or responsibilities during basic training.

Discussion: Drill Sergeants are key individuals in the process by which new recruits develop a Soldier identity. The development of new Drill Sergeant training approaches and nutrition modules emphasizing nutrition and health may help Drill Sergeants guide Soldiers in adopting healthy eating as part of their Soldier identity to improve weight control, health, and performance.
Jenkins, Laura - Supervisor(s): , , , - Mentor(s): Dr. Mythreye Karthikeyan, , , , -- Betaglycan Regulation of Wnt/\nβ-catenin Signaling in Ovarian Cancer -- Due to the significant gaps in our understanding of mechanisms controlling tu-
mor-promoting signaling pathways, ovarian cancer remains the most lethal of all female reproductive system cancers and the
fifth leading cause of death among US women. Over the past few decades, overactive Wnt signaling has been linked to the
formation of multiple cancers, including ovarian cancer, making identification of molecules regulating Wnt signaling crucial
to the development of cancer treatment strategies. Betaglycan, a widely expressed cell surface receptor, can exist with or with-
out its glycosaminoglycan (GAG) sugar chain attachments (heparan sulfate and chondroitin sulfate) and has demonstrated
roles in regulating cancer biology. The goal of my thesis project is to define the specific role of betaglycan and its GAG chains
on Wnt signaling in ovarian cancer. Recently, I have shown that betaglycan regulates Wnt signaling by controlling Wnt avail-
ability through its GAG chains. My findings also reveal opposing functions for the heparan sulfate and chondroitin sulfate
chains of betaglycan and suggest that Wnt interactions with betaglycan's heparan chains result in inhibition of Wnt signaling,
while betaglycan's chondroitin chains promote Wnt signaling. These studies identify a novel, dual role for betaglycan and
define a key requirement for the balance between chondroitin sulfate and heparan sulfate chains in dictating cell signals. The
next steps of my project include stably expressing betaglycan lacking either its heparan, chondroitin or both GAG chains in
ovarian cancer cells and then delineating the effects of modified betaglycan on ovarian cancer progression. I will test the hy-
pothesis that heparan-betaglycan suppresses tumor progression while chondroitin-betaglycan enhances tumor progression, in
part, through changes in Wnt signaling. Upon completion of my project, I expect to define the specific roles of heparan and
chondroitin modified Betaglycan in regulating Wnt activity and ovarian cancer, which will be relevant to human health as it
will broaden our current knowledge of ovarian cancer development.

Jiang, Yanping
Mentor(s): Dr. Xiaoming Li, Dr. Shan Qiao
The Impact of Bullying Victimization on the Cortisol Circadian Rhythm among Children Affected by Parental HIV/AIDS

Bullying victimization is associated with a range of poor developmental outcomes among children. One of the promising
mechanisms underlying these effects is stress physiology. In the current study, we investigated the relationship between bul-
llying victimization and activity of the hypothalamic-pituitary-adrenal (HPA) axis as assessed through repeatedly measuring
salivary cortisol in a sample of 645 children affected by parental HIV/AIDS. Results from the three-level multilevel model
indicated that bullying victimization was related to lower cortisol levels at awakening and blunted cortisol slopes. The magni-
tude of this relationship, however, varied by genders. For girls, bullying victimization was related to lower cortisol at awaken-
ing and blunted cortisol slopes, whereas for boys, bullying victimization was not significantly related to activity of HPA axis.
These findings highlight the importance of considering the effect of bullying victimization on child development, especially
for some vulnerable populations. Bullying victimization may act as a significant source of chronic stress in children’s daily
life, which contributes to the alternations in the HPA axis, resulting children at high risk of developing psychopathology and
disease.
Johari, Karim  
Mentor(s): Dr. Roozbeh Behroozmand, Dr. Priyantha Herath, Dr. Roozbeh Behroozmand  
Neural correlates of impaired motor timing during speech production and hand movement in Parkinson’s disease

Patients with Parkinson’s disease (PD) demonstrate impairments in temporal processing aspects of motor function, which can affect their speech and hand movement reaction time. However, the underlying neural bases of such motor timing impairment in PD has remained unclear. This study investigated how temporal processing of visually-presented sensory cues modulates speech and hand movement reaction time and neural activities in PD. Event-related potentials (ERPs) were recorded in 8 PD patients and 8 control subjects while they were visually-cued to prepare to produce a steady vocalization of a vowel sound or press a button in a randomized order, and to initiate the cued movement following the onset of a go signal on the screen as well as stop ongoing movement after stop signal. The time interval between visual cue and go signal as well as between go and stop signal was temporally-predictable. PD patients were significantly slower, relative to control subjects, in initiation and inhibition of the speech production and hand movements. ERP results showed attenuation of ERP activities at the time window from -100 to 0 ms before movement initiation over frontal and parietal electrodes for speech production and hand movements. For movement initiation, patients showed significant attenuation of ERP activities over frontal electrodes for speech production and hand movement at the time window from -100 to 0 ms. These findings suggest that the PD patients cannot use external temporal information to facilitate movement initiation and inhibition and implicate the role of basal ganglia in temporal processing before movement initiation and inhibition.

Josey, Michele  
Mentor(s): Dr. Jan Eberth  
Exploring the Predictive Ability of Physician Density Measures for Endoscopy

Objective: Physician density is traditionally calculated as the number of physicians divided by the target population, and is used for intervention planning, resource allocation, and health disparities research. However, this calculation can give an unrealistic picture of the supply of available physician. The purpose of this study is to offer an alternative, more realistic measure of physician density, which weights physicians by their actual procedure volume.

Methods: We used the South Carolina ambulatory surgery database to extract claims made for all colonoscopy services and the U.S. Decennial Census for population count of adults aged ≥50 in 2010. Each physician was assigned a weight between 0 and 1, which was then summed to create the weighted density for each county in SC. The weighted and traditional densities were then compared.

Results: Per 100,000 adults aged ≥50, Edgefield and Marion County had the lowest (0.32) and highest (73.22) weighted density, while Clarendon and Greenwood County had the lowest (7.33) and highest (338.80) traditional density. There was a significant difference between the weighted and traditional scores, with the largest difference in Greenwood County (i.e., traditional density inflated true capacity). The correlation between physician density and colorectal cancer incidence and mortality increased by 5.7% and 30.4%, respectively when transitioning from the traditional to weighted method.

Conclusion: The predictive ability of physician density on clinical outcomes can be improved by considering the volume of procedures they perform. While this illustration focuses on endoscopic providers, this tool can be used for various specialties and professions.
Kannaley, Kristie  
Mentor(s): Dr. Daniela Friedman  
Unspoken Interviews: Gaining Insight Through the Analysis of Dementia Caregiver and Care Recipient Blogs

Background: Individuals affected by Alzheimer’s disease (AD) and other dementias may utilize blogging as a means of self-expression and an opportunity for communication of personal experiences with others. Given the intimate nature of blog writing, researchers can gain valuable insight into the perspectives of individuals affected by dementia that may not have be revealed in a face-to-face interview. The current study analyzes blogs written by AD/dementia caregivers and blogs written by individuals with dementia. Thematic analysis of these narratives provides information related to the needs, experiences, and perspectives of individuals who are directly affected by the disease.

Methods: A search was performed using Google, a blog search engine, and lists of award-winning blogs related to AD/dementia. 48 caregiver and 24 care recipient blogs were selected for this study. Blogs written by organizations or healthcare professionals who specialize in aging and/or dementia were excluded. The 5 most recent blog posts (as of October 22, 2016) containing 10+ lines of original content were selected for analysis from each blog. Initially, subsets of 5 blogs from the caregiver group and 5 from the care recipient group were selected for line-by-line open coding and for development of the codebook. Open codes were examined to determine overarching themes in the data using grounded theory. The remaining blogs were coded and organized using NVivo software. Sub-categories were established based on thematic overlap among coded material.

Results: Overarching themes included: 1) recognition of the toll of the disease on the caregiver and/or care recipient; 2) seeing the positives of the situation; 3) feeling out of control; 4) desire to do something to gain control; and 5) candid descriptions of AD/dementia. Both group included candid descriptions of their struggles, such as the effects of the care recipient losing independence and the impact of inappropriate social behaviors. Additionally, both caregivers and care recipients reported on compensatory strategies and coping mechanisms that have benefitted them throughout the progression of the disease.

Conclusions: This study provided information about the experiences of AD/dementia caregivers and care recipients. Our findings revealed both caregivers and care recipients can offer insight pertaining to the physical, emotional, and psychological effects of dementia as well as strategies for coping with the changes that occur as the disease progresses. Health professionals could incorporate this information into future interventions to better support both AD/dementia caregivers and care recipients.

Kennedy, Mary Lee  
Mentor(s): Dr. Bobby Gibbs II, Dr. Dan Fogerty  
Amplitude modulation detection for speech

This investigation examined the basic auditory ability to track amplitude modulation (AM) important for speech processing. The research also seeks to explore how cognitive attentional abilities affect AM detection. In contrast to previous investigations using sinusoidal AM signals to assess low-level auditory processing, this study derives the AM signal from speech. Normal-hearing listeners (18-30 years old) completed two-interval forced-choice AM detection tasks, listening to AM noise presented via headphones within a sound booth. Adaptive tracking methods were used to derive thresholds for detecting AM in low frequency and high frequency narrow bands of noise embedding in a low-level broadband noise background. These thresholds were then used in a selective attention AM detection task where participants attended to either the high or low frequency band while ignoring competing AM in the alternate frequency band. Finally, participants completed a divided attention task. Two AM bands of noise were again presented. Following presentation of the sounds, the participant was cued to respond based on one of the AM noise bands. Data collection is ongoing; however, results of this study of will be used with a test battery to predict speech understanding in noise based on temporal speech cues.
Histone deacetylase (HDAC) plays a major role in suppression of transcription of the tumor suppressor genes leading to development of glioblastoma, which is the most malignant brain tumor. Activity of HDAC removes acetyl groups from histone tail causing condensation of chromatin and suppression of transcription of the tumor suppressor genes in glioblastoma. Suberoylanilide hydroxamic acid (SAHA), which is an important HDAC inhibitor (HDACi), has been used in various cancers for induction of cell cycle arrest, differentiation, and apoptosis. The inhibition of HDAC causes accumulation of acyl groups in histones and thereby activation of transcription of the tumor suppressor genes. But SAHA has modest effects as a single anticancer agent in many types of cancer cells. So, there still is an urgent need for enhancing anticancer effect of SAHA by combination of it with another anti-cancer drug. In this study, we used combination of two drugs, SAHA and N-(4-hydroxyphenyl) retinamide (4HPR), in the treatment of glioblastoma cells. 4HPR is a synthetic retinoid derivative and related to Vitamin A and it is a potent suppressor of growth of solid tumors such as breast and prostate cancers. We found significant cytotoxic effects on growth of glioblastoma cells when treated with the synergistic combination of 4.0 µM SAHA and 1 µM 4HPR. Our results showed that combination of SAHA and 4HPR not only reduced cell proliferation but also significantly induced astrocytic differentiation in glioblastoma cells. The characteristic morphological features of differentiation were observed by methylene blue staining. We found that levels of differentiation were significantly increased in glioblastoma cells in media containing synergistic combination of both drugs. Further, induction of apoptosis was evaluated morphologically by in situ Wright staining and light microscopy and also biochemically by Annexin V staining and flow cytometry. Our results showed that inhibition cell proliferation and induction of apoptotic death in glioblastoma cells were significantly increased due to treatment with combination of SAHA and 4HPR, when compared with either drug alone. In conclusion, synergism of SAHA and 4HPR seems to be promising therapeutic strategy for improving therapeutic effects in glioblastoma.

Historically, sport migration literature had presented athlete migrants as elite and skilled transnationals who freely migrate abroad to further their playing careers and earn significant incomes (Carter, 2011). However, former US college basketball players who play “overseas” must also accept the prospect of long-distance job relocation and possible cultural alienation (Maguire & Pearton, 2000). For many migrating US players their short-term work sites (e.g., college and professional locations) are geographically distant from their primary residence or home site. Consequently, it is theorized oscillating migrants experiences are organized around two – often distinct – cultures: “a home-site, which includes family and friends of similar social and cultural origins, and…work-site[s] that [involve] different and unfamiliar social and cultural expressions” (Southall & Weiler, 2014, p. 169).

Within this research setting, using International Basketball Federation (FIBA) Europe team rosters, researchers developed a database of current U.S.-born, former National Collegiate Athletic Association (NCAA) male professional basketball players (N = 1239) who have migrated to FIBA Europe to play in the zone’s 20 leagues in 42 countries (www.fibaeurope.com). Informed by Carter’s (2011), Hawkins’ (1999), and Southall and Weiler’s (2014) oscillating migrant-labor theoretical frameworks, this presentation, utilizes a variety of formats (e.g., tables, charts and Geographic Information System (GIS) maps) to: (a) identify players’ home sites (i.e. high schools), highlighting the top-five U.S. basketball-talent enclaves; (b) summarize home-site socioeconomic demographics (e.g., median family income, Title I status, and racial/ethnic composition); (c) aggregate players’ NCAA classification, ethnicity, and education status; (d) analyze collegiate work-site data, and (e) encapsulate players’ 2016-2017 FIBA Europe employment locations (e.g., countries, leagues), professional experience.

Data confirm a two-stage oscillating migration pattern: (a) an initial interstate migration from high school to Predominately White Institutions (PWIs) throughout the United States, and (b) an international migration of various time-spans to FIBA Europe. Given that this presentation reports the results of the first phase of a three-phase longitudinal study, a call for future research is also included.
King, Sarah B.  
Mentor(s): Dr. Andrew T. Kaczynski, Ms. Jackie Knight, Mrs. Ellen W. Stowe  
Walkability 101: Using multiple methods to assess the walkability of a large university campus in the southeastern United States

Background/ Purpose: University campuses serve as ideal settings for physical activity due to their expansive landscape and pedestrian infrastructure. However, only half of U.S. college students, faculty, and staff meet physical activity recommendations. This study employed multiple methods to evaluate the walkability of a large, urban university campus, campus members’ perceptions of walkability, and campus environment impact on their physical activity.  
Methods: Campus walkability was assessed using environmental scans and campus member surveys. Evaluators objectively audited ten highly-used campus walking routes for key walkability characteristics, including safety, pavement markings, paved routes, and overall walking experience. University faculty, staff, and students (n=78) completed surveys that investigated perceptions and attitudes about the campus’ walkability and whether it promoted or hindered physical activity. Data were analyzed using descriptive and inferential statistics in SPSS 22.0.

Results: Over 85% of survey participants agreed that the campus sidewalks, walking routes, and layout encouraged physical activity. Environmental audits and surveys noted sidewalks were continuous, shaded, and free from obstructions. Survey participants, however, rated sidewalks as uneven and motor vehicle traffic a potential risk to pedestrians. The route audits also indicated a need for improvements in lighting, pedestrian visibility, crosswalks, and safety enforcements in key areas throughout campus.

Conclusion: Campus walkability is impacted by both the physical environment and university members’ perceptions of the environment. This study is one of the first to combine both perceived and objective walkability assessments, and provides substantial data to support interventions to improve walkability and promote physical activity within the university setting.

King, Samuel  
Mentor(s): Dr. Lauren Sklaroff  
High-Class Chop Suey: The Making of Chinese Fine Dining in Chicago, 1893-1917

My research interrogates how changes undertaken in Chinese American foodways by restaurateurs living in Chicago in the early twentieth century, such as the transformation of “chop suey restaurants” from low class to high-class establishments, impacted the sociopolitical status of Chinese American immigrants living under a regime of anti-Chinese legislation. In the first decade of the twentieth century, certain members of the city’s Chinese elite invested large amounts of capital in creating palatial dining establishments that served, among other dishes, chop suey, and that catered specifically to an elite white clientele. The men who owned and operated these restaurants were not merely ambitious businessmen, but were immigrants who in all other respects were actively engaged in efforts to make themselves more Americanized and acceptable to their white neighbors. Lacking access to formal institutions of political mobility, these immigrants utilized restaurant spaces to positively render and commoditize Chinese culture, thereby altering their alien status in the eyes of their white neighbors. In creating simultaneously luxurious and “Oriental” restaurant spaces, Chinese immigrant restaurateurs created sites for inter-racial exchange and challenged existing stereotypes about Chinese immigrants, facilitating a shift in public perception of China and Chinese Americans by the end of the 1930s.
Kingkiner, Megan
Mentor(s): Dr. Julius Fridriksson
Analyzing Fluency and Language Abilities in Left Hemisphere Stroke Survivors

There is currently not enough evidence to determine what mechanisms are related to impaired speech fluency in people with left hemisphere stroke, and this study aims to help develop an understanding what those mechanisms may be. In order to do that, this study determined language measures that are predictive of nonfluent speech in people who survived left hemisphere stroke. Eighty-eight individuals with and without aphasia were included in the study. Both fluent and nonfluent aphasias were included in the participant population. Each individual was administered a battery of speech and language assessments, including a two minute picture description task. The picture description task was audio/video recorded and objectively analyzed by graduate students for fluency using PRAAT software. These analyses provided multiple objective measures of fluency. Principal component analysis was done to determine which component best represented variance in fluency. Multiple stepwise linear regression was then used to compare language measures against those measures of fluency to determine their ability to predict speech fluency. The principal component analysis determined that a combination of speech measures including speech rate, the number of different words, and the number of syllables best represented nonfluent speech. The multiple stepwise linear regression revealed that performance on speech entrainment task was the best predictor for nonfluent speech and explained 68% of the variance in speech performance. The results of this study supports the treatment of individuals with nonfluent aphasia via techniques that focus on speech initiation and maintenance.

Kiprotich, Joseph
Mentor(s): Prof. Richard Adams
Cage opening of closo-carborane ligands: The reaction of closo-o-C2B10H10 and closo-o-(1-SCH3) C2B10H11 with triosmium carbonyl cluster complexes

Carboranes typically react by substitutions at either the cage boron, carbon atoms or substituent groups attached to the carborane with the cage remaining intact. The extraordinary stability of the carborane cage is as a consequence of electron delocalization within the framework. It has been shown that the most electron deficient borons on the cage can undergo attack by bases leading to cage rupture and in most cases complete removal of a BH group. There are very few examples of cage opening transformations without the loss of boron. Transition metal B-H bond activation offers a new route for the selective functionalization of carboranes that may not be achievable by other means. We have recently found that closo-o-C2B10H12 and its thiolate substituted derivative, closo-o-(1-SCH3)C2B10H11 reacts with Os3(CO)10(NCMe)2 leading to the opening of the cage without deboronation upon addition of two Os3 clusters on the cage surface. Interestingly in the latter case cage opening occurs in a stepwise process providing new insights into the mechanism. Os3(CO)10(NCMe)2 reacts with closo-o-(1-SCH3)C2B10H11 to yield the complex Os3(CO)9(\{1/4\}3-\{3-4,5-9\}C2B10H8(SCH3))(\{1/4\}H)2, which can further react with a second Os3 cluster leading to cage opening and the formation of Os3(CO)9(\{1/4\}H)(\{1/4\}3-\{3-4,5-9\}C2B10H7(SCH3))Os3(CO)9(\{1/4\}H). The reaction of Os3(CO)10(NCMe)2 with closo-o-C2B10H12 leads to the formation of Os3(CO)9(\{1/4\}3-\{3-4,5-9\}C2B10H8)(\{1/4\}H)2 which reacts further with a second equivalent of Os3 cluster to form Os3(CO)9(\{1/4\}H)2(\{1/4\}3-\{3-4,5-9\}C2B10H7)Os3(CO)9(\{1/4\}H)3 which undergoes cage opening without deboronation when heated to form Os3(CO)9(\{1/4\}H)(\{1/4\}3-\{3-4,8\}C2B10H8)Os3(CO)9(\{1/4\}H).
Levkoff, Phillip  
**Mentor(s): Mrs. Rachel Miller, Dr. Dan Fogerty**  
**Segregation: Effects of Attention, Pitch, and Auditory Expertise**  
Musicians have been shown to exhibit increased sound segregation and enhanced pitch perception abilities when compared with non-musicians. Prior research has shown attention interacts with informational and energetic masking properties contributing to individual differences in speech segregation. Pitch perception involves auditory processing at the global and local structural levels; however, it is unclear how these different levels independently contribute to talker segregation. This study aimed to systematically examine multiple factors that influence a listener’s ability to segregate auditory signals, including the effects of attention and masking factors co-occurring with global and local pitch cues. Thirty-two participants completed an eight-part test battery during one session. Data was compiled into three categories: correct identification of the target words, incorrect selection of competing words, and errors. We found no significant differences in ability to segment based on musical experience. We did observe a benefit of temporal “dips” in the masker, consistent with prior research. Individual performance improved with pitch differences between talkers, and during sustained attention vs. divided attention tasks. Additionally, correlations were found between both a listener’s ability to detect modulation and masking release, as well as with stroop-interference scores and results on speech tasks involving attention. These results add to current research on the most favorable conditions for accurate identification of a target speech signal with a competing speech signal. Further research into understanding how listeners process speech is necessary to identify components contributing to talker segregation.

Lewis, Tyler  
**Mentor(s): Prof. Jesse Kass**  
**A Family of Singularities with Infinite Cohen-Macaulay Representation Type**  
A celebrated theorem of Buchweitz, Greuel, Knörrer, and Schreyer is that the hypersurface singularities of finite representation type, i.e. the hypersurface singularities admitting only finitely many indecomposable maximal Cohen-Macaulay modules, are exactly the ADE singularities. The codimension 2 singularities that are the analogues of the ADE singularities have been classified by Frühbis-Krüger and Neumer, and it is natural to expect an analogous result holds for these singularities. I will present a proof that, in contrast to hypersurfaces, Frühbis-Krüger and Neumer’s singularities include infinitely many singularities of infinite representation type.

Lewis, Kaleea  
**Mentor(s): Dr. Allison Marsh**  
**Decolonizing the Hidden Curriculum: The Quest for Social Justice and Anti-Racist Public Health Education**  
Racism is a pervasive and significant social determinant of health that operates through multiple pathways to sustain, perpetuate, and exacerbate the very trends the field of public health is working to ameliorate (Braveman, Egerter, &Williams, 2011; Jee-García & Sharif, 2015; Williams & Mohammed, 2013). At its core, public health is anti-racist work, yet discussions on labeling the social structures and systems that perpetuate the social determinants which in turn feed the health disparities are often discussed without explicit acknowledgment of their connection to racism The goal of this project is to examine how the concepts of race and racism are discursively framed within health disparities focused public health syllabi. The end goal of this project is to aid in the development of recommendations for more equitable anti-racist public health and social justice oriented course.
Li, Min  
Mentor(s): Dr. Zhengqing Fu  

**NPR1 interacts with TCP15 to regulate the transcription of PR5 in plant defense**

Plant defense hormone, salicylic acid (SA), regulates 2280 genes’ expression, while 2248 of these genes’ expression is dependent on NPR1 (NON-EXPRESSER OF PR GENES 1), which is a master protein in systemic acquired resistance (SAR). NPR1 contains two conserved protein–protein interaction domains: BTB (Bric-a-brac, Tramtrack, Broad-complex) domain and ankyrin repeat domain. It is well known that NPR1 functions as a transcription co-factor, recruits TGA transcription factors to the promoter of PR1 (Pathogenesis-Related 1) and activates the transcription of PR1. The expression of PR1, PR2, and PR5 are usually used as hallmarks for SAR. As a transcription co-factor, NPR1 may interact with novel transcription factors to regulate the expression of downstream genes. Using full-length NPR1 as bait and a comprehensive Arabidopsis transcription factor library as prey, we identified 8 TCP transcription factors that interacted with NPR1 in Yeast-Two Hybrid (Y2H) assay. Loss of TCP function resulted in decreased PR genes transcription and compromised plant immunity. So, TCP proteins may directly regulate PR genes expression. Interestingly, a consensus TCP class I motif (GTGGGAC) is present in the promoter of PR5 at -788 bp. We found TCP15 showed the binding ability to the promoter of PR5 in Yeast-One Hybrid assay. The interaction between NPR1 and TCP15 was confirmed again by Co-immunoprecipitation assay. We also found the expression of PR1 and PR5 decreased in tcp8tcp15 double mutant after SA application. Now, we are testing whether tcp8tcp15 mutants compromise to SAR. We will use ChIP assay to further confirm the binding ability of TCP15 to the promoter of PR5. Our research will elucidate how NPR1 regulate the expression of PR5.
Li, Minghui  
Mentor(s): Dr. Kevin Lu, Dr. Richard Schulz  
The Impact of Medicare Reimbursement Policy Change on the Risks Associated with Erythropoiesis-Stimulating Agents

Background:  
Erythropoiesis-stimulating agents (ESAs) are commonly prescribed for chemotherapy-induced anemia in cancer patients. Due to emerging findings from clinical trials, Centers for Medicare and Medicaid Services (CMS) issued a national coverage determination which changed Medicare reimbursement policy in cancer patients to reduce potential risks associated with ESAs. The objectives of this study were to 1) compare characteristics of new users of ESAs before and after the policy change, 2) examine the impact of the policy change on the risks of myocardial infarction (MI), stroke, and venous thromboembolism (VTE) associated with ESAs, and 3) examine whether the impact differed among patients with different types of cancer (breast, colorectal, lung, lymphomas, ovarian, and prostate).

Methods:  
This study used the Surveillance, Epidemiology, and End Results (SEER)-Medicare linked database. A retrospective new-user cohort design was implemented. New users of ESAs before and after the policy change were followed by one year for the diagnosis of MI, stroke, or VTE. Basic statistical tests (Chi-square or Fisher’s exact test for categorical variables and independent sample t-test for continuous variables) were used to compare characteristics of new users of ESAs before and after the policy change. This study used logistic regression models to examine the impact of the policy change on the risks of MI, stroke, and VTE associated with ESAs. Odds ratios (ORs) of MI, stroke, and VTE between the pre- and post-policy periods were estimated. In the subgroup analysis, similar logistic regression models were used to measure ORs among patients with different types of cancer.

Results:  
This study identified 17,621 new users of ESAs, including 13,066 (74.15%) before the policy change and 4,555 (25.85%) after the policy change. Compared to those in the pre-policy period, new users of ESAs in the post-policy period were more likely to be non-White, lived in non-metropolitan areas, and lived in South. After controlling for potential confounding variables, the risks of MI (OR: 1.03; 95% CI: 0.75-1.41), stroke (OR: 0.98; 95% CI: 0.84-1.15), and VTE (OR: 0.93; 95% CI: 0.84-1.03) were not changed after the policy. In the subgroup analysis, the risk of VTE was reduced by 46% (OR: 0.54; 95% CI: 0.39-0.76) after the policy among patients with lung cancer.

Conclusions:  
The risks of MI, stroke, and VTE associated with ESAs were not changed after the implementation of Medicare reimbursement policy in the overall Medicare cancer population. However, the policy change was effective in reducing the risk of VTE in patients with lung cancer. This study provided critical empirical evidence for CMS’s future policy considerations.
Liang, Jiaxin  
Mentor(s): Prof. Igor Rononsin  
Role of CDK8 in colon cancer hepatic metastasis

About half of all colon cancer patients will develop liver metastases and the 5-year survival for these patients is less than 13%, making colon cancer the second most lethal cancer worldwide. Cyclin dependent kinase 8 (CDK8) has been identified as an oncogene amplified in many colon cancers where it acts as a positive mediator of oncogenic transcription pathways regulated by wnt/beta-catenin and TGF-beta, and both pathways are highly involved in tumor metastasis. In a colon cancer metastasis model based on splenic injection of CT26 cells, treatment with Senexin B, a selective small-molecule inhibitor of a transcription-regulating kinase CDK8, strongly inhibited metastasis in the liver and prolonged the survival of mice with liver metastatic disease, with little or no effect on cell growth in culture or at primary tumor sites. Liver metastasis was inhibited to the same extent when Senexin B was administered from the start of the study or only in its later part, suggesting that the drug affected primarily metastatic growth in the liver rather than initial colonization. Liver metastasis was similarly decreased by CDK8 knockdown in CT26 cells, suggesting that the anti-metastatic activity of Senexin B was due at least in part to its effect on tumor cells. Transcription profiling indicated that CDK8 inhibition by shRNA or Senexin B strongly decreased the expression of metastasis-associated metalloproteinases MMP 13, MMP10, and MMP3 and at the same time drastically increased the expression of TIMP3, a metalloproteinase inhibitor. Knockdown of beta-catenin in CT26 cells decreased the expression of MMP3 and MMP13, while knockdown of SMAD4 (transcriptional mediator of TGF-beta pathway) induced TIMP3 expression to the same extent as CDK8 knockdown. Beta-catenin knockdown decreased both the primary tumor growth in the spleen and metastatic growth in the liver, whereas SMAD4 knockdown, like that of CDK8, selectively inhibited liver metastasis. Similarly to SMAD4 knockdown, TIMP3 overexpression in CT26 cells decreased hepatic metastasis. Senexin B also suppressed the liver metastasis of human HCT116 colon carcinoma cells. In summary, our data revealed CDK8 as a key transcriptional regulator of colon cancer metastatic growth in the liver, interacting with TGF-beta and wnt/ beta-catenin pathways and regulating the expression of MMPs and Timp3. CDK8 may be an effective target for the treatment of hepatic metastasis of colon cancer.

Lin, Xiao  
Mentor(s): Prof. Gabriel Terejanu  
Computational Tool for Identifying Growth Patterns in Fungi

In this project, I developed a computational tool to accelerate the identification of growth patterns in fungi. This is significant in developing computational models for understanding the growth of fungi such as Aspergillus flavus and Aspergillus parasiticus on various solid media. These two types of fungi present a fundamental challenge for grain industry, makers of dairy products and crop insurers, as they naturally produce a carcinogenic toxin called aflatoxin, which is estimated to have an economic impact in the US agriculture in the range of $276 - $709 million annually and it is estimated that 5 billion people worldwide are at risk of aflatoxin exposure.

Liu, Zhonghao  
Mentor(s): Dr. Jianjun Hu  
Deep Learning in Bioinformatics

Deep learning has gained huge success in computer vision and language processing. It’s viewed as the most promising future of strong AI. We are trying to apply this powerful computational tools on huge datasets from Bioinformatics hoping to solve some most challenging and critical problems in this area.
Ma, Kyunghee  
Mentor(s): Dr. Ronald Pitner  
Acculturation Stress, Social Support, and Depression among International Graduate Students from Collectivist Cultures

Introduction  
Depression is one of the major health concerns for international students, and studies have shown a direct link between acculturation stress and depression. Students from collectivist cultures are more susceptible to depression due to familial expectations of academic achievement, cultural emphasis on internal regulation, and distrust regarding mental health services. In this context of adjustment, social support is known to lessen the negative impact of acculturation stress. There is, however, a paucity of literature examining this important issue. Therefore, this study explored the relationship between acculturation stress and depression among international students from collectivist cultures studying in the U.S. and examined the role that social support plays in this relationship.

Methods  
The sample was drawn from first-year international graduate students enrolled in degree programs at the University of South Carolina. Hofstede’s study was used to determine collectivist countries. Participants were categorized into three groups: Chinese, Indian, and Other. An online survey was administered, and consisted of demographics and psychosocial measures (i.e., Acculturation Stress Scale for International Students, CES-D, and Multidimensional Scale of Perceived Social Support). A total of 74 students (Chinese: n=32, Indian: n=23, and Other: n = 19) participated in the study.

Results  
ANOVA tests revealed no significant differences in the average level of acculturation stress, social support, and depression across three groups. There was a positive correlation between length of U.S. residence and acculturation stress ($r = .249$, $p < .05$) and between acculturation stress and depression ($r = .640$, $p < .01$), and a negative correlation between perceived comfort with spoken English and acculturation stress ($r = -.278$, $p < .05$) and between social support satisfaction and acculturation stress ($r = -.252$, $p < .05$). Multiple regression analysis indicated that, collectively, the key variables in the study (i.e., length of U.S. residence, prior education in the U.S., perceived comfort with spoken English, communication with host nationals, funding sufficiency, financial concerns, social support, and acculturation stress) were significantly associated with depression among participants [$F(9, 63) = 6.22$, $p < .0001$, adjR2 = .40]. There was a main effect for acculturation stress ($ï¿½ï¿½ = .66$, $p < .0001$), which accounted for 31% of the overall variance.

Discussion  
The findings suggest that acculturation stress among international students from collectivist cultures increased as their stay in the U.S. lengthened. This may be because they are under cultural pressure to succeed academically, and this internalized pressure likely increases as they advance in their education. Social support was not a strong predictor of depression. Implications for university services and programs targeting international students will be presented.
Ma, Xiaonan
Mentor(s): Prof. Angela Liese, Dr. Bethany Bell, Dr. Jihong Liu, Dr. Kellee White, Prof. Patricia Sharpe
Food shopping patterns of residents living in food desert communities in South Carolina

Background: Food deserts as defined by the US Department of Agriculture are low-income areas in which residents have poor food access. While residing in a food desert (low income and low food access) places a resident at a clear disadvantage with respect to spatial access to supermarkets and grocery stores, not much is known about the actual shopping behaviors of residents living in food deserts. Our purpose was to identify distinct food shopping patterns or profiles in a population residing in low-income, low access communities in South Carolina (SC) and to characterize the patterns with respect to the residents’ socioeconomic status (SES) attributes, nutritional knowledge, and perceptions of the food environment.

Methods: 522 participants were recruited between November 2013 and May 2014 from two SC counties. Participants were interviewed about their means of food acquisition and grocery shopping habits at their three most frequented utilized stores. Thirteen measures of shopping behaviors (i.e. travel distances between residential location and three utilized stores, shopping frequency, store type, transportation mode (store 1 only); and free community food sources, such as food banks or pantries, or church-based resources) were used in the food shopping pattern analysis. Latent class analysis was employed to explore the food shopping patterns. Also, associations between the shopping patterns and various factors such as SES, nutrition knowledge, perception of food environment were examined.

Results: 80% of participants were living in a low income and low food access census tract. Three patterns were identified, including the infrequent grocery shoppers & utilizers of free community food resources (40.3%), the more frequent, proximal grocery shoppers & utilizers of community food resources (39.2%), and the distal shoppers & non-users of community food resources (20.6%). The participants of the infrequent grocery shoppers & utilizers of free community food resources had lower SES status, higher proportion of food insecurity, and perceived that food access was a problem. The more frequent, more proximal grocery shoppers & utilizers of community food resources were very similar with the infrequent grocery shoppers & utilizers of free community food resources, except their food shopping access perceptions. More distal shoppers & non-users of community food resources had higher SES, but also perceived food shopping access as a problem. Type of grocery store utilized did not distinguish the patterns.

Conclusion: Food shopping frequency and utilization of free community food resources were the key factors that defined the shopping patterns among this low-income population. Future studies should investigate the association between these shopping patterns and dietary intake and health outcomes. If shopping patterns were associated with dietary intake or health outcomes, future intervention work would need to focus more on these foods shopping/acquisition patterns.

Mandelbaum, Jennifer
Mentor(s): Prof. Spencer Moore, Prof. Laurette Dub
Network Transformation in Complex Systems: Using Social Brokerage to Raise Farmers’ Agricultural Productivity in an Indian Agricultural Intervention

Background: eKutir is an India-based social enterprise that leverages micro-entrepreneurs and network intervention forms to foster agricultural production and reduce poverty among smallholder farmers. As part of the VeggieLite intervention, micro-entrepreneurs organized farmers into Farmer Intervention Groups (FIGs) to facilitate sharing of information and resources. Objective: To examine the impact of FIGs on farmers’ social networks, specifically social brokerage, over a one-year period. Methods: A quasi-experimental design with pre- and post-measures after one year was utilized. Data were collected from 392 farming households in 32 rural villages. Network data were gathered using a name generator, which asked farmers to name three people with whom they discussed farming/agricultural and cooking/food matters. Changes in brokerage (the degree to which a farmer was a go-between for pairs of farmers) were examined using multilevel linear regression. Results: Social brokerage declined among all farmers, but the decline was smaller for FIG compared to non-FIG farmers. On average, brokerage decreased by 4.32 units over one year (p<0.001). Brokerage among non-FIG farmers declined 3.66 units more than FIG farmers (p<0.001). Having greater household assets was associated with a 0.76-unit decrease in brokerage (p<0.01). Conclusion: This study demonstrates the impact of a complex intervention for farmers’ social connectivity and social relationships. By maintaining their social brokerage, FIG farmers are in a more strategic position to access resources through their social networks, which may be especially important in resource-limited settings. Social networks are a critical dimension of complex systems and a principal mechanism for reducing inequalities through redistributing resources.
Marsh, Christopher  
Mentor(s): Dr. Djamel Kaoumi  
Temperature Dependence of the Fracture Behavior of X-750 Alloy and Effect of Heat Treatment

X-750 is a nickel-chromium based superalloy applied in a variety of applications such as gas turbines, rocket engines, nuclear reactors. The fracture mechanism of X-750 was investigated at different temperatures both on heat-treated and non-heat-treated samples. Uniaxial tensile tests were conducted from room temperatures up to 900°C; fracture surfaces were analyzed by means of SEM observations. The microstructure of both HT and NHT materials were studied utilizing SEM and TEM. Between room temperature and 650°C, the fracture surface of HT material evolves from purely intergranular to purely transgranular, while the rupture of the NHT is due to the coalescence of voids induced by decohesion at the MC carbides/matrix interface. Environmentally-induced intergranular cracking and ductility minimum were observed at 750°C for both NHT and HT specimen. At higher temperatures such as 900°C, the grain boundary mobility during dynamic recrystallization increases and leads to rupture by grain boundary slipping.

Martone, Lena  
Mentor(s): Dr. Lesly Wade-Woolley  
Reading Through the Ears: How McGurk Effects Reflect Reading History

This project investigates whether audiovisual integration problems, as reflected in a reduced McGurk effect, are evident in adults with a childhood history of reading difficulty compared to those with typical reading development.

McCombs, Alexandria  
Mentor(s): Dr. April Hiscox, Dr. Cuizhen Wang  
An empirical modeling approach to estimating regional scale net ecosystem exchange in maize and soybean fields in the US corn belt

It is important to understand the carbon dynamics at the ecosystem scale to provide a more detailed understanding of the mechanisms driving the carbon cycle at a regional scale. Numerous measurements have been collected that remotely sense the earth's surface via satellite, and have potential to provide information about carbon dynamics at regional scales. Research conducted by other scientists have sought to model the underlying physics of carbon dynamics between the ecosystem and the atmosphere, although one major weakness is that many of these models generalize diverse ecosystems into a single category. For instance, all agricultural land covers are considered equivalent. This generalization can lead to large discrepancies between in-situ carbon measurements and remotely sensed carbon values in areas with varying crop types. Here we present an empirical model, which addresses this inaccuracy. More specifically, we focus on modeling net ecosystem exchange (NEE) at regional scales in maize and soybean fields by comparing ground based NEE observations with MODIS and Landsat surface reflectance observations. The surface reflectance bands that best explained the variance in ground-based NEE observations were identified using a quadratic and linear regression analysis. A stepwise regression analysis was conducted to determine the best combination of surface reflectance observations in addition to the meteorological variables included in the analysis, which include air temperature and vapor pressure deficit. This new methodology provides a better way to predict carbon dynamics in maize and soybean fields with greater spatial resolution and higher precision, and confirms the hypothesis that NEE in agricultural fields needs to be modeled by crop type.
McCullough, John  
Mentor(s): Dr. Stan Dubinsky  
Affixation and reduplication patterns of Western Subanon

As a Philippine-type language, Western Subanon exhibits many of the morphological features that tie it typologically to other members of the Austronesian family. This is exemplified by two phenomena- a verbal focus system and reduplication. This project examines in what domains reduplication can occur and how productive it is as a morphological construct, as well as analyzing how verbal morphology interacts with the focus system to produce a variety of “focused” paradigms with a mixture of affixation, word order transformations, and contentious “ergative/passive” constructions. Certain foci restrict which affixes can be used, which has morphosyntactic considerations, especially in regards to the existence of a verb class system in the language.

McLaurin, Kristen  
Mentor(s): Dr. Charles Mactutus, Dr. Rosemarie Booze  
Minding the Gap: Progression of Temporal Processing Deficits in the HIV-1 Transgenic Rat

Despite the success of combination antiretroviral therapy (cART) in diminishing the prevalence of progressive HIV-1 encephalopathy (PHE) in children, high rates of chronic neurological impairment are still being reported. Temporal processing, as indexed by prepulse inhibition, appears to be a fundamental neurocognitive impairment in HIV-1. A longitudinal analysis of temporal processing deficits, assessed using the gap-prepulse inhibition (gap-PPI) experimental paradigm, may provide insight into the effect of long-term HIV-1 viral protein exposure on the development of chronic neurologic impairment. Male and female Fischer HIV-1 Tg and control animals were tested at 30-day intervals from postnatal day (PD) 30 to PD 180. HIV-1 Tg rats, which express 7 of the 9 HIV-1 genes, displayed alterations in the development of temporal processing on measures of the startle response (0 and 4000 msec interstimulus intervals (ISI)) and, more profoundly, on prepulse inhibition, assessed using mean area under the amplitude curve measurements. Presence of the HIV-1 transgene was diagnosed with 90.8% accuracy using measures of prepulse inhibition and temporal sensitivity. Temporal processing deficits observed in the HIV-1 Tg rat, as assessed using gap-PPI resemble sensorimotor gating deficits commonly exhibited in HIV-1 seropositive individuals. Understanding the progression of temporal processing deficits in the HIV-1 Tg rat affords an opportunity to increase our understanding of the role of long-term exposure to HIV-1 viral proteins, observed in pediatric HIV-1, in the development of chronic neurological impairment, as well as suggest an innovative point-of-care screening tool. [NIH Grants: DA013137 to RMB, HD043680 and MH106392 to CFM; SPARC to KAM]

Miller, Karen  
Mentor(s): Dr. Jennifer Arns  
Exploring Rural Public Library Assets for Asset-Based Community Development

This study of US rural public libraries utilizes the asset-based community development framework developed by John Kretzmann and John McKnight of the Center of Urban Affairs and Policy Research at Northwestern University. Developed in the early 1990s as an alternative to the needs-driven policy approach to solving community problems, asset-based community development (ABCD) theory informs social work praxis and drives domestic and international community development initiatives. Rural public libraries hold and create economic, cultural, and social capital assets that can be mobilized in community development activities, and this study combines data from the Institute of Museum and Library Services (IMLS) and the US Department of Agriculture to: (1) identify variables representing the rural public library economic, cultural, and social capital that is available for ABCD initiatives; (2) explore the differences in the asset holdings of fringe, distant, and remote rural libraries; and (3) investigate relationships between fringe, distant, and remote rural public library asset holdings and library service area population size, geographic regions, political (governance) structures, and community demographics. Utilizing supervised data mining algorithms and nonparametric statistics, this study of rural public library assets enables the identification of under- and highly-capitalized rural public library clusters, provides a new dimension to the description of rural public libraries, and expands the analytical and advocacy toolsets available to rural library researchers and practitioners.
Miranda, Kathryn  
**Mentor(s):** Dr. Mitzi Nagarkatti, Dr. Prakash Nagarkatti  
**Cannabinoid receptor 1 blockade alters dysbiosis in gut microbiota contributing to its anti-obesity effects.**

Obesity and insulin resistance (IR) are key precursors for type 2 diabetes and cardiovascular disorders. Excessive energy intake results in elevated adiposity, IR, chronic low-grade inflammation, endocannabinoid system hyper-activation, and gut microbiobial dysbiosis. Pharmacological intervention of diet-induced obesity (DIO) using cannabinoid receptor 1 (CB1) antagonists ameliorates obesity, IR, and inflammation; however, its effects on microbial dysbiosis are yet-to-be fully explored. CB1 is mainly expressed in the central nervous system where it can regulate appetite but is also expressed peripherally in adipose tissue and the gastrointestinal tract. A healthy gut microbiome comprises of commensal flora, which aid in proper food digestion and intestinal barrier function. Environmental factors, such as high-fat diet (HFD) and obesity, are associated with gut dysbiosis, which can cause inflammation, gut leakage, and increased energy harvest. In the current study, we sought to determine if CB1 blockade alters DIO-associated dysbiosis in gut microbiota, then if these microbial changes contribute to improvement in obese phenotype. Six-week-old C57Bl/6 mice were fed HFD for 12 weeks then treated with the selective CB1 antagonist AM251 daily for 4 weeks. Treated mice showed significant loss of fat mass, improved glucose homeostasis, decreased adipose tissue inflammation, and modestly increased colon length. Stool was collected at weeks 0, 2, & 4 of treatment for 16S rDNA metagenomics sequencing. Analysis revealed AM251 treatment increased alpha-diversity while decreasing richness of gram-positive Firmicutes belonging to the Peptostreptococcaceae and Lactobacillaceae families. Correlation of these data with short chain fatty acid profile from cecal contents and colon sections interrogated for mucin layer thickness and localization of bacteria will provide insights into the mechanistic role of AM251 on gut microbiota in treatment of obesity. Furthermore, corroborative fecal transplantation studies should shed light on interplay between gut microbial alteration and obesity phenotype. This study implies novel microbial therapies may be developed to treat obesity, IR, and related diseases, and may be used to circumvent adverse side effects of CB1 antagonist treatment. (Supported in part by NIH grants P01AT003961, R01AT006888, R01ES019313, R01MH094755 and P20GM103641).

Mirshahghassemi, Seyyedali  
**Mentor(s):** Dr. Jamie Lead  
**Evaluation of Polymer-Coated Magnetic Nanoparticles for Oil Separation from Oil-Water Mixture in Natural Waters**

Oil can be released into the environment from different sources such as runoff, accidental oil spills and oily wastewater discharges produced during industrial activities and can have dramatic impacts on the environment. The limitations of current clean-up techniques have inspired researchers to study the application of nanotechnology for oil remediation. Previously, we reported excellent oil-removal efficiency of a reference MC252 oil using polyvinylpyrrolidone (PVP)-coated magnetic nanoparticles (NPs) from an oil-water mixture under a wide range of environmentally relevant conditions. However, natural waters are more complex and contain a range of complex organic macromolecules often at high concentration, major ions, trace metals, viruses, bacteria and other materials which make the natural systems much more challenging for oil removal by NPs than synthetic solutions. In this study, the NP capability and efficiency for oil remediation from oil-water mixtures using natural waters were investigated. Increase in natural organic matter (NOM) concentration led to a statistically significant decrease in oil removal with NOM acting as a competitive phase for either PVP or oil and reducing NP–oil interactions driven by the hydrophobic effect of PVP coating. Ionic strength facilitated oil sorption presumably by enhancing the magnetic separation of the oil–NP complex or altering PVP hydrophobicity. Nearly 80% of short chain alkanes (C9–C20) were removed as measured by gas chromatography–mass spectrometry (GC-MS), although removal of the longer chain alkanes was lower. Our results show that PVP-coated magnetic NPs have excellent oil removal capacity from natural water samples.
Mittag, Dana
Mentor(s): Dr. Crystal Hill-Chapman
The Perceived Utility of Personalized Genomic in Individuals with a Family History of Heart Disease

We conducted a study to explore the perceptions of individuals with a family history of cardiovascular diseases in regards to genetic risk factors associated with heart conditions, such as coronary heart disease. This study had four goals: (1) to assess individuals’ understanding of the genetic basis of heart disease, (2) to determine whether these individuals think personalized genomic medicine would be helpful in assessing their own risk and other family members’ risks, (3) to identify the genetic counselor’s role in providing genomic risk information, and (4) to determine whether these individuals intend to make lifestyle modifications having learned about the genetic basis of heart disease. A questionnaire was developed through SurveyMonkey and distributed to undergraduate students, a local cardiology clinic, and Facebook. Statistical analyses included calculating frequencies and Chi-squared tests. Analysis of these results are currently pending.

Mohammed, Zahraa
Mentor(s): Dr. Gregorio Gomez
Adenosine regulates cytokine production from human mast cells

Allergic disease is the 5th leading chronic disease. Mast cells are the cell type that causes allergies, and are implicated in asthma pathogenesis. Allergic reactions are caused by pre-formed mediators like histamine that are contained within cytoplasmic granules of mast cells that are released immediately following the crosslinking of the high affinity receptor for IgE, FceRI, with allergen. Adenosine is an endogenously produced purine nucleoside that is known to affect mast cell function, and induces bronchoconstriction in asthmatics, by acting through one or more adenosine receptors (A2aAR, A2bAR, and A3AR). In this study, we investigated the role of adenosine on the production of pro-inflammatory cytokines from human skin mast cells. We show that adenosine or NECA inhibited the production of pro-inflammatory tumor necrosis factor (TNF). We further show that forskolin, which induces cAMP, also inhibited TNF synthesis. Lastly, we demonstrate TNF production was inhibited with the A2aAR-specific agonist CGS21680, and that the A2aAR-specific antagonist ZM241385 prevented the inhibitory effect of adenosine. Thus, these data identify Gs-coupled A2aAR as the adenosine receptor that inhibits FcεRI-induced TNF from human skin mast cells.

Mohammed, Amira
Mentor(s): Prof. Mitzi Nagarkatti
Protective effects of Δ9-Tetrahydrocannabinol (THC) results from alteration in lung dysbiosis mediated by SEB-induced acute lung injury

Inhalation of Staphylococcal Enterotoxin B (SEB) is known to induce acute lung injury (ALI) and studies from our laboratory have shown that THC, a psychoactive ingredient found in Cannabis sativa, can attenuate the ALI. In the current study, we investigated the role played by lung microbiota in ALI with or without THC treatment. A dual-dose of SEB was given to C3H/HeJ mice, which were then treated either with vehicle or THC. SEB-administration caused ALI and 100% mortality while all THC-treated mice survived and suppressed the inflammation in the lungs. Furthermore, lung microbiota was collected and 16S rRNA sequencing was performed. The data were analyzed to determine the alpha and beta diversity. The major phylum was Proteobacteria, class Alphaproteobacteria and orders were Caulobacterles and Rhodobacteralesin in the lungs of vehicle-treated SEB group. Moreover, THC treatment led to elevated Firmicutes phylum due to significant increase in the beneficial genus, Lactobacillus. Lipopolysaccharide (LPS), gram negative bacterial endotoxin was found at significantly higher concentration in the BALF of vehicle-treated group in comparison with THC-treated mice. Beneficial metabolome levels were significantly higher in the colonic flush of THC-treated mice when compared to vehicle-treated SEB group, specifically butyric, propionic and acetic acids. Together, our data suggest that THC attenuates SEB-induced mortality and ALI by altering the microbiota in the lungs (Supported by NIH grants P01AT003961, R01AT006888, R01ES019313, R01MH094755, P20GM103641 to PN and MN and MoHESR fellowship for AKM).
Monreal, Tim  
**Mentor(s):** Dr. Piyal Shah  
**Mapping the Terrain of Latinx Teachers in the Southeast: Rasquache Style**

Spurred by a cheaper cost of living, globalization, and stable work in meat processing, poultry, construction, and light industry the United States Southeast (SE) has emerged as the center of the “New Latino Diaspora” (Hamann & Harklau, 2015; Levinson, 2002; Odem & Lacy, 2009; Villenas, 2001, 2002;). In South Carolina, 2000-2010 saw a 148% increase in the state’s Latinx population good for the largest percentage growth in the U.S. over that time period (Cooper-Lewter, 2013; Ennis, Rios-Vargas, & Albert, 2011). A larger Latinx population naturally means changes in school demographics. Although there is an growing field of scholarship about Latinx education in the SE, there is a dearth of research about Latinx K-12 teachers in this geographic area. This talk presents a rasquache (Chicanx resourcefulness) inspired literature review to help create foundational knowledge about Latinx teachers in the SE, an emerging and under researched topic. It concludes by laying out the goal of creating a collective of South Carolina Latinx educators.

Murphy, Patrick  
**Mentor(s):** Dr. David Matolak  
**K-Band Weather Station**

The purpose of this project is to install a research station that will measure and compute statistics for the signal loss (attenuation) due to atmospheric conditions, primarily rain, by collecting data from a geostationary satellite to ground signal within the K frequency band. The K frequency band is a range of frequencies from 12 to 40 GHz. These frequencies are commonly used for satellite to ground communications (e.g., direct broadcast television, some NASA and NOAA satellites). These frequencies and those higher are susceptible to significant attenuation from rain, and this can cause outages and loss of data. Measuring this attenuation will help to create more accurate models for future communication systems. This is important since more and more systems are planning to use these higher frequencies due to the “crowdedness” of lower frequency bands in the spectrum. Two undergraduate electrical engineering senior design teams configured and tested parts of the research station, but significant design challenges still remain, including installation and operational testing. We describe the system and its components, initial results, and plans for future work.

Neal, Sarah  
**Mentor(s):** Ms. Erin Hurst, Ms. Margaret Johnson  
**Neurobasis of Impaired Voice Motor Control in Parkinson’s Disease**

Authors: Erin Hurst, Meg Johnson, Sarah Neal, Karim Johari, Priyantha Herath, and Roozbeh Behroozmand

Patients suffering from Parkinson’s Disease (PD) have an impaired ability to generate and control motor actions. This neurological impairment can also be observed in the PD patient’s speech and voice motor subsystems, resulting in an abnormal voice motor control. The purpose of this study was to determine how neural activity and vocal behavior differ between PD patients and control group subjects when presented with a voice control task. The experiment used electroencephalogram (EEG) testing while the participants completed a pitch shift paradigm and behavioral response task to measure the neural activity of the voice in both the PD and control subjects. Both the neural activity and voice pitch were recorded for analysis. The results revealed abnormal overshooting patterns in voice motor behavior and diminished neural activity. PD participants also demonstrated impairments in their voice motor control systems. In identifying these impairments, specific dysfunctions in brain activity were highlighted. These identified neural and behavioral biomarkers have future in being applied as clinical tool for assessing a patient’s degree of impairment, prognosis, as well as how Speech Language Pathologists can use this information to offer effective treatment options.
Neamah, Wurood
Mentor(s): Prof. Mitzi Nagarkatti, Prof. Prakash Nagarkatti

2,3,7,8-tetrachloridbenzo-p-dioxin (TCDD)-induced MDSCs mediate immunosuppressive activity through microRNA dysregulation

Myeloid-Derived Suppressor cells (MDSCs) are a heterogeneous population of immunosuppressive cells derived from the bone marrow. MDSCs serve an important, if not paradoxical role, during early and late stages of infection and inflammation. The compound 2,3,7,8-Tetrachlorodibenzo-p-dioxin (TCDD), one of the most potent environmental contaminants, is formed not only as an unwanted byproduct in the manufacturing of chlorinated hydrocarbons, but also in incineration processes, paper and pulp bleaching, and emissions from steel foundries and motor vehicles. TCDD is known to suppress the immune response by many mechanisms, such as induction of T regulatory cells. However, in our current study, we demonstrated that TCDD treatment mediates immunosuppression by inducing unique cells known as MDSCs that express both the macrophage marker, CD11b and neutrophil marker, Gr-1. For this purpose, we injected C57BL/6 mice with vehicle or 10µg/kg TCDD intraperitoneally and harvested the cells from the peritoneal cavity and estimated the MDSCs and MDSC subsets by flow cytometry when we found increased numbers both monocytic and granulocytic MDSCs following TCDD treatment when compared to vehicle treated group. Further studies revealed TCDD-induced MDSC can suppress ConA-mediated T-cell proliferation, we next investigated the epigenetic mechanisms including microRNA dysregulation underlying the induction and immunosuppressive effects of MDSC induced by TCDD. MiRNA are small non-coding RNA molecules involved in transcriptional and post-transcriptional inhibition in gene expression. We performed high throughput microarray analysis of MDSC isolated from TCDD and vehicle treated groups. We found that in TCDD-induced MDSCs, certain miRNAs such as mir-543-3p and mir-150-5p were downregulated. These miRNA target genes including ARG, IL-10, STAT-3 and, PIM1 which are involved in MDSC induction and function. In summary, our data shows that TCDD can affect MDSC induction and function through modulation of miRNA. (Supported in part by NIH grants P01AT003961, R01AT006888, R01ES019313, R01MH094755, and P20GM103641).

Negraia, Daniela
Mentor(s): Dr. Jennifer Augustine

Are Parents Less Happy Than Nonparents? Evidence from the Wellbeing Module of the American Time Use Survey

The aim of this project is to better understand how the presence or absence of children from adults’ lives affects their affective wellbeing: a question that continues to challenge social scientists. Whether or not someone is a parent may have significant implications for affective wellbeing, since parenthood plays a major structuring role in people’s lives and carries the possibility of both costs and rewards. We use the Wellbeing Module of the American Time Use Survey (2010, 2012, and 2013) to measure how parents and nonparents compare in terms of affective wellbeing across some of the most common daily activities (i.e., work for pay, leisure and housework). We find that parents are happier than nonparents in all activities except for housework. Parents also report more meaning than nonparents, across all activities. At the same time, parents report more negative emotions – particularly stress and fatigue – when engaged in housework and leisure activities.
Nelson, Peter  
Mentor(s): Prof. Amit Almor, Prof. Paul Malovhr  
Effects of verb class and animacy on sentence processing in first and second language

Sentence processing is incremental and relies on the interpretation of cues throughout the sentence. Both verbs and nouns serve as strong cues. Whether a noun represents an animate (e.g., doctor, tiger) or an inanimate (e.g., table, sadness) concept influences predictions about what type of situation is being described. Verbs inform a comprehender about the event and participant structure: who was doing what in the situation described. Inanimate subjects should be a strong cue for classes of verbs where the subject is not a volitional agent (e.g. receive, fall, die), and therefore in the incremental processing of a sentence, comprehenders should be better able to predict, and therefore show less processing load with these verbs, following an inanimate subject. In sentence processing in a second language, much debate has focused on the availability or preference for semantic over syntactic information. In this view, animacy should have exaggerated effects in second language processing compared to first language processing. Influence of first language on second language processing is also well-documented, and in the current research the first language (Chinese) is considered more sensitive to noun animacy than the second language (English), likely reinforcing the predicted divergence in first and second language processing.

Nichols, Alecia  
Mentor(s): Dr. Amit Almor  
Implicit causality and intentionality in native English reference resolution

Comprehending language requires quick and efficient processing of the language input. To increase the efficiency of this process, comprehension involves incremental processing of the unfolding input and making predictions about upcoming material. Verb meanings (semantics) provide an important source of information about the likelihood of different continuations. Such effects have been documented in the area of pronoun reference resolution, where different verbs have been shown to affect the resolution of an ambiguous pronoun in different ways. For example, people are more likely to interpret the pronoun he in (1a) below as referring to the object Henry in the main clause, while they tend to resolve the same pronoun as a reference to the subject John in (1b), and this difference likely reflects the fact that the two verbs fear and frighten convey different implications as to who is responsible for the cause of the event expressed by the verb (Garvey & Caramazza, 1974). Verbs like fear attribute cause to the object whereas verbs like frighten attribute cause to the subject. This phenomenon is known as implicit causality (IC).

(1) a. John feared Henry because he…  
   b. John frightened Henry because he…

An important aspect of understanding causality in the context of events describing actions by animate agents is the intentionality attributed to the agent. The present study examines the role of intentionality in IC biases during language processing by adding adverbs that explicitly express the degree of agent intentionality to sentences with varying degrees of IC bias, like the ones shown above. Previous research by Cheng and Almor (2015) introduced intentionality-biasing adverbs into this field of research, and the present experiments expand this examination to include neutrally-biased adverbs (e.g. already, recently) in addition to those that increase intentionality (e.g. purposely, deliberately) and those that decrease the intentionality of the verb (e.g. accidentally, unwittingly). This experiment was conducted using a Qualtrics survey through the SONA participant recruitment system. Participants read 146 sentences and rated (on a seven-point Likert scale) how intentionally they thought each person in the sentence acted, beginning with the subject. Preliminary results suggest that the inclusion of adverbs does indeed modify the extent to which native English speakers attribute intentionality to the sentential subject.
Muslims and Islam often face the ire of both French society and the French state, with the notion that Islam and Muslims do not “belong” in the state. The spate of high-profile terror attacks in the past two years, most recently in the beach city of Nice, spurred aggressive measures by local French politicians in beach resort towns to remove Islamic images from the French cultural landscape.

The image under attack? The “burkini,” a swimsuit that covers the whole body except the face, the hands, and the feet, while being light enough for swimming. Mayors around France banned the image and threatened women violating it with a fine. But Muslim women did not accept this ban without a fight. Multiple legal challenges ensued. One of them resulted in a decision by France’s highest administrative court that overturned the ban in one town.

Drawing on Marco Antonsich’s framework for analyzing belonging, this paper focuses on the language used by France’s highest administrative court in overturning one city’s ban, as well as language used by French political leaders in supporting the bans, to examine the message of belonging being conveyed to Muslims in the country.

Background: Human papilloma virus (HPV) infections and related diseases are responsible for high morbidity and mortality rates globally. Though preventable, HPV infection remains the most sexually transmitted infection globally. Preventive measures such as HPV vaccination and Papanicolau (Pap) smear have been underutilized globally, and when international students move to the United States, they may be at increased risk for HPV infection. However, little research has examined their knowledge surrounding HPV.

Objective: The aim of this qualitative descriptive study was to explore university international students' knowledge, attitudes, and practices regarding HPV and prevention.

Methods: Participants included undergraduate and graduate international students at a southeastern university. Data included transcripts of audio-recorded interviews and a focus group discussion, which were then analyzed using thematic analysis.

Results: Participants (n=15) included 8 females and 7 males, with countries of origin including Nigeria, China, India, Bangladesh, and Saudi Arabia. Five themes emerged: Sources of Health Information; Differences in Health and Healthcare Systems; Limited Knowledge about HPV, associated Cancers, and Prevention; Attitudes toward Health, Vaccination, and Screening; and Student Expectations, Perceptions, and Suggestions. The students had limited knowledge about HPV and associated diseases, as well as gendered assumptions about HPV risk and negative attitudes toward health and healthcare. However, they expressed willingness to learn more about their health, and offered suggestions in how to target HPV education for international students.

Conclusions: Our findings address a knowledge gap regarding international students and HPV. These students represent an important catch-up population for HPV vaccination and cervical cancer screening. Healthcare providers in variety of health settings, including student health centers, can use this evidence to design interventions that meet the needs of this vulnerable population. Future research should examine differences between students based on country/culture of origin in order to more effectively target and message specific international students.
Noochpoung, Rakchanok  
Mentor(s): Prof. Chen Brian  
The cost effectiveness of sealant program between public and private hospital in Chiang Mai, Thailand

Background: Dental cavities are the major dental health problem of children in Chiang Mai. To reduce the cavities prevalence the government implemented the prevention program called the sealant program. It needs public and private collaboration to provide dental procedures for the students in Chiang Mai.

Objective: The study aims to evaluate the cost effectiveness of the sealant program between the public and the private sectors.

Method: Data was collected from Grade 1 students in four primary schools in Chiang Mai which participated in the sealant program. Then, the follow up procedure was conducted with the same students in the same schools in 2014. The program was implemented by McCormick a private hospital, and Nakornping the public hospital. The dental status on the tooth surface of the left and right first molars were used to determine the effectiveness of the sealant program. Unit cost of the sealant procedure was derived from the Ministry of Public Health study in 2007.

Results: In 2014, the students who received dental preventive care from public hospital had first molar teeth that were 81.9% healthy, while students who receive care from private hospital had 74.4% healthy. There were $6.75 and $9.83 per tooth in the public sector and the private sector, respectively. This showed that the public sector has dominant cost-effectiveness compared to the private sector. The incremental cost-effectiveness ratios in different value of dental health effectiveness at private fixed rate can show that by decreasing the dental health effectiveness of public sector at private sector fixed rate, the cost-effectiveness of the private provider decreases.

Conclusion: The dental health care services practically need public and private participation to deliver care comprehensively and fairly. The results of this study should be the good introductory evidence needed for the health care administrators and policy makers.

Nye, James  
Mentor(s): Prof. Jennifer Vendemia  
Intending to deceive alters access to semantic memory

Lies are responses which contradict one's beliefs. Liars access true beliefs, inhibit the prepotent honest response, and deploy a lie. We hypothesized that, in addition to response-inhibition, the degree to which the lie contradicts semantic memory may influence deceptive responses. Participants elicited honest and deceptive judgements to declarative statements that either contained critical semantic features (Gardeners plant flowers/weeds) or noncritical semantic features (Gardeners plant clothes). Differences between honesty and deception were consistently largest for judgements of critical semantic features. We argue that inhibitory control of semantic memory may be similarly relevant to deception as inhibitory control of response deployment.
Odahowski, Cassie  
*Mentor(s):* Dr. Jan Eberth, Dr. James Hebert  
**Evaluating Regional Variation in Lung and Bronchus Cancer Survival in the US using Mortality-to-Incidence Ratios**

Background: Regional disparities exist in rates of lung and bronchus cancer within the United States. Underlying reasons may include access to care, screening utilization, quality of treatment, socioeconomic, or cultural (including lifestyle) characteristics, or some combination of these. The mortality-to-incidence ratio (MIR) provides a relative measure of cancer survival and a means for identifying regional disparities that is easily derived from traditional cancer incidence and mortality data.  

Methods: Mortality and incidence rates for lung and bronchus cancer for 49 states (i.e., excluding Nevada) and the District of Columbia (D.C.) were obtained from the National Cancer Institute State Cancer Profiles. Rates were given as 5-year averages for the years 2008-2012. MIRs were calculated by dividing the age-adjusted mortality rate by the age-adjusted incidence rate per 100,000 for a given state. States were ranked by ascending MIR and divided into deciles. These categories were mapped using ArcGIS software in order to highlight the geographic variation in lung and bronchus cancer survival.  

Results: A mean MIR of 0.75 was observed for the 49 states and D.C. MIRs ranged from 0.65 to 0.83. The five states with the lowest relative survival from lung and bronchus cancer, as measured by the highest MIRs, were all in the South: Arkansas, Oklahoma, Tennessee, Alabama, and Louisiana. The states with the lowest MIR, indicating the highest relative survival, were mostly in the Northeast: Connecticut, New York, Massachusetts, New Jersey, and Hawaii.  

Conclusions: The calculation and mapping of state level MIRs for lung and bronchus cancer revealed that many southern states have the lowest relative lung and bronchus cancer survival. Future research should focus on identifying the underlying risk factors for poor lung and bronchus cancer outcomes. This may entail exploring variation at smaller scales (e.g., counties).

O’Hara, Stephen  
*Mentor(s):* Prof. Lauren Sklaroff  
**The United Nations, Hollywood, and Televising the End of the World**

Television as a vehicle for peace in the 1960s. Adlai Stevenson, U.S. ambassador to the United Nations, laid out this vision in November 1963 before an intimate group of Oscar-winning writers, producers, and directors. He hoped that Hollywood’s best might create provocative, dramatic television specials to foster among Americans a spirit of order and stability. Stevenson initiated a call-to-arms merging the glitz and glamour of Hollywood, the burgeoning power of the television industry, and faith in popular culture as a counter to domestic and international turmoil during the 1960s. This paper examines the Telsun Foundation, which produced for the United Nations four dramatic television specials on ABC from 1964-66, beginning with Rod Serling’s cautionary nuclear annihilation parable, “Carol for Another Christmas.” The paper uses archival research in the Stevenson, U.N., and Serling papers, as well as newspapers, trade magazines, correspondence, and scripts, to examine 1960s television drama, the context for Telsun’s formation, the ideological and dramatic content of its programs, and audience responses. Recent work on the 1960s and television has examined television’s social power, how network news and primetime entertainment slowly produced works that shaped attitudes on civil rights. This paper examines Telsun as an international extension of television and society, a ground-breaking but flawed experiment to harness Hollywood and television toward a social and global good amidst escalations in the Cold War and Vietnam. Telsun ultimately failed not in its misunderstanding of television, but its audiences, who expected the allegorical subtlety and nuance of contemporary television dramas.
Oliver, Benjamin
Mentor(s): Dr. David Barbeau
Detrital Zircon Ages Shed Light on What's Beneath the Ice of the Antarctic Peninsula

The Antarctic Peninsula, an arcuate, mountainous landmass stretching north from West Antarctica toward South America, has been shrouded by glaciers for the past 34 million years. Once part of the western shore of Gondwana, an ancient supercontinent, its rocks record a wide array of important geologic events relating to the history of that supercontinent, its break-up, and the post-breakup evolution of the Peninsula itself. However, ice cover prevents geologists from accessing over 95% of the Peninsula's rocks; much of our current understanding is inferred from widely-spread locations where outcrop is exposed and accessible. Sediment from the nearby Larsen Basin could help fill in the gaps. Using laser-ablation techniques at the USC Center for Elemental Mass Spectrometry, we measured the ages of zircons from more than 50 Larsen Basin sandstones. We can use those ages as fingerprints for rocks on the Antarctic Peninsula, enabling us to piece together its history without seeing all of its rocks directly.

Olscamp, Kate
Mentor(s): Dr. Daniela Friedman, Dr. Sara Wilcox, Ms. Weizhou Tang, Dr. Seul Ki Choi
Organizational and Public Perceptions on Physical Activity and Brain Health

The American demographic is rapidly changing. In 2014 adults 65 and older made up 14.5% of American population, a number expected to rise to over 20% over the next three decades. With this aging population appears a growing impact of Alzheimer's disease and related dementias in the U.S. One in nine Americans over 65 have Alzheimer's disease (AD), a figure that increases to one in three for adults over the age of 85. Although there is currently no cure for AD, evidence suggests that regular physical activity delays the incidence of dementia and onset of cognitive decline associated with aging. Despite this, mass media coverage of cognitive health and prevention behaviors is not proportionate to the amount of available scientific evidence. Past research has shown a great deal of variety and confusion in exercise-cognition messages and suggests that practitioners need to develop relevant and understandable messages, geared to specific audiences, and disseminate these messages across multiple channels.

This study aims to (1) understand the magnitude, content, and delivery mode of brain health messages being distributed by physical activity related organizations and (2) to understand how targeted publics receive, understand and feel about these messages. The first aim was satisfied with a comprehensive content analysis. A sample of available materials was collected by searching the webpages of nationally representative physical activity or fitness organizations. Search terms included “aging”, “seniors”, and “older adults”. Materials were evaluated using a systematic codebook that examined document length, target audience, content focus, and specific physical activity guidance. Descriptive statistics were used to assess the sample and determine trends. Achievement of the second aim involved two community-based focus groups centered on physical activity and brain health messages. Topics of discussion included health information seeking behaviors, how information about PA and brain health impacts behavior, and preferred sources of information. Focus groups transcripts and notes were analyzed for common themes and experiences. Results of this two phased project will help to guide physical activity messaging from community facing organizations, ensuring that public perceptions and desires are represented throughout aging related physical activity messages.
Filamentous fungi can degrade a wide variety of environmental contaminants due to their ability to sense and decompose complex compounds in their environment, making them excellent candidates for bioremediation. The textile industry boom introduced dye contaminants into drinking and recreational waters making the polluted waters toxic and mutagenic killing ecosystems and effecting human health drastically. Conventional clean-up has drawbacks such as high cost and low effectiveness but bioremediation has shown potential with low cost, high efficiency and easy handling. In this study we use the fungal model of Aspergillus niger to decolorize rose Bengal dyed media and to elucidate the signaling pathway involved. G-protein coupled receptors (GPCRs) are the transmembrane receptors involved in fungal pheromone sensing, nutrient sensing, and amino acid sensing. Recently a group of GPCRs were identified to play a role in sugar sensing. Our results will help address our long-term goal of this study is to identify and study the signaling pathway involved in sensing and decolorization of environmental textile dyes by filamentous fungi. These discoveries will help us use fungal bioremediation more efficiently.

O'Shields, Katherine
Mentor(s): Dr. Kellee White
Light intensity physical activity and cardiometabolic risk factor control among middle-aged and older-adults

Background: Cardiovascular disease is the leading cause of death among older adults and is driven largely by cardiometabolic risk factors including elevated blood pressure, blood glucose, and cholesterol. Studies have found a protective effect with moderate and vigorous intensity physical activity on cardiometabolic risk. However, the association between light intensity physical activity (LIPA) and cardiometabolic risk among older adults is not as well established. Methods: This cross-sectional analysis used data from the 2010 and 2012 Health and Retirement Study (the RAND data file and Biomarker dataset; N=13,862). The responses to questions about frequency of light, moderate, and vigorous physical activity were converted to weighted metabolic equivalent of tasks (METS). Cardiometabolic risk factors included objectively measured systolic and diastolic blood pressure, HbA1c, and high-density lipoprotein (HDL), which were measured continuously. Mean levels of blood pressure, HbA1c, and HDL were compared across physical activity intensity groups. Separate linear regression models were used to examine the independent association between light intensity physical activity and cardiometabolic risk factors after adjusting for potential sociodemographic, behavioral, and clinical confounders.

Results: Overall, 15.86% of the participants were sedentary, 22.27% engaged in LIPA, 33.77% engaged in moderate, and 28.10% engaged in vigorous physical activity. We did not find a significant association between LIPA and average systolic blood pressure ($\beta=.1016; 95\% \text{ CI}, -1.020, 1.2227$) or HbA1c ($\beta= .0185; 95\% \text{ CI}, -.0307, .0676$) in comparison to participants in the sedentary group. Average diastolic blood pressure was significantly lower for those who engaged in LIPA ($\beta= -.7176; 95\% \text{ CI}, -1.3791, -.0560$) compared to participants in the sedentary group. Average HDL was significantly higher for those who engaged in LIPA ($\beta=1.1869; 95\% \text{ CI}, .3130, 2.0608$) compared to participants in the sedentary group.

Conclusion: The findings from this study suggest that LIPA is independently associated with lowering certain cardiometabolic risk factors among older adults. More studies need to be conducted to verify these associations using more objective measurement of physical activity.
Parker Hayne, Pearman
Mentor(s): Dr. Sue P. Heiney, Dr. Hongtu Chen, Mrs. Eleanor Jones, Dr. Sue Levkoff
Implementation Challenges in a mHealth Feasibility Study with a Technologically Naïve Sample

BACKGROUND
African Americans (AA) are at a greater risk of heart failure leading to increased hospital admissions. We piloted a smartphone application (app) to monitor symptoms and improve self-care in elderly AAs with heart failure. We encountered several implementation challenges; thus, our purpose is to describe the problems encountered with a smartphone app during usability and feasibility testing.

METHODS
A week after consent and assessment, we delivered a prepaid smartphone with a preloaded app for participants to use over four weeks. Upon delivery, staff instructed the participants how to use the phone. Staff taught the participants about the major components of the app including daily weight reminders, weekly weight graph, alert messages if weight change was drastic, daily question to monitor shortness of breath, and motivational messages. Participants could call staff if they had questions and staff followed up with a call about a week after the instructional session.

RESULTS
Our feasibility sample consisted of seven men and five women, aged 51 to 69. The problems we encountered for this study included: reluctance to use a smart phone, lack of knowledge of basic phone functions (dialing and answering) and terminology (swipe), misunderstanding app instructions, confusion about accessing messages, and data deletion. To overcome challenges, we improved the instruction booklet using low literacy guidelines including directional graphics, arrows, and descriptors to illustrate smartphone navigation. The recruiter increased instruction time and checked on understanding. We also partnered with the app developers to hide the reset button and require a passcode to prevent participants from accidentally erasing data.

CONCLUSION
We did not anticipate participants' unfamiliarity with smartphones. We extrapolated from health literacy literature and framed our problem as low smartphone literacy. Future mHealth interventions for individuals aged 50 and over should assess smartphone literacy, i.e. ability use the phone and the app being tested.

Parman, Claire
Mentor(s): Dr. Suzanne Adlof
Using an experimental word learning task to predict vocabulary growth between second and fourth grades

Vocabulary knowledge is an important predictor of children's future academic outcomes. The purpose of this study is to determine how students’ performance on an experimental word learning task in second grade predicts performance on a norm-referenced receptive vocabulary measure up to two years later. This study makes use of data collected for a study investigating word learning in children with specific language impairment (SLI), dyslexia, both, or typical development. At time 1, second grade students completed an experimental word learning task, and a large battery of language, reading, and cognitive assessments, including measures of expressive and receptive vocabulary. The students' vocabulary was re-assessed 10 months to 2 years later. Analyses will examine the extent to which performance on the experimental word learning measures predicted growth in expressive and receptive vocabulary knowledge between Time 1 and Time 2. Implications for research and educational practice will be discussed.
HER2 overexpression is linked with poor prognosis and outcome in breast cancer. In our previous study, we have found miR-489 was specifically down-regulated by HER2 overexpression. Restoration of miR-489 in multiple breast cancer cell lines significantly inhibited cell growth in vitro and decreased tumor growth in xenograft mice. To study role of miR-489 in Her2 mediated tumorigenesis, for the first time we generated MMTV-miR-489 transgenic mice, which overexpress miR-489 specifically in mammary gland. Our qRT-PCR data has confirmed transgenic mice have significantly more miR-489 expression than FVB mice. Our western blot data has confirmed DEK and PTPN11 both are going down significantly with overexpression of miR-489. DEK has been previously demonstrated as miR-489 target. Our western blot data revealed both miR-489 target DEK and PTPN11 are going down in transgenic mice. To find out whether miR-489 has any role in mammary gland development, mammary gland whole mount was performed from FVB and MMTV-miR-489 mice at different age. Mammary gland from MMTV-miR-489 mice demonstrated reduction in growth at early age and also our immunohistochemistry staining has demonstrated significantly reduction in Ki-67 positive cells in MMTV-miR-489 mammary gland at 6 early age. However, we also have found no significant effect on weight of litters of MMTV-miR-489 female since after 8-week, mammary gland able to recover growth. To find out effect of miR-489 overexpression on Her2 mediated tumorigenesis, we generated double transgenic mice MMTV-Her2/miR-489 by crossing MMTV-miR-489 mice with MMTV-Her2 mice. We have observed significant delay in tumor onset and reduced tumor growth in MMTV-Her2/miR-489 mice compare to MMTV-Her2 mice. Also, we have observed less number of metastatic site in lung by performing H and E staining of lung. Our IHC data showed reduction in PTPN11 and DEK in miR-489 overexpress mammary tumor. Overall, our results indicated miR-489 overexpression suppresses mammary gland development at early age, reduced mammary tumorigenesis and decrease lung metastasis by targeting PTPN11 and DEK.

Peng, Yujia
Mentor(s): Dr. Guoan Wang

**Design and Application of Miniaturized Frequency Reconfigurable RF Components on Engineered Substrate in Wireless Sensor System**

The proposal presents a novel approach of designing both high-efficiency and miniaturized wireless sensor system for the telemetry of implantable sensor network using patterned permalloy(Py) thin film embedded in engineered substrate. Incorporating a frequency reconfigurable transmitting antenna into the WPH system, the frequency of the transmitted RF power can thus be tuned to adapt to the frequency shift of the rectenna in sensor network to ensure the maximum power harvesting efficiency. Using patterned Py thin film embedded in engineered substrate, both the frequency reconfiguration and the miniaturization of the devices can be achieved simultaneously. The development of this kind of special substrate has been investigated and implemented in different RF components and proved to be an efficient and cost-effective approach to design both of tunable and miniaturized devices without deteriorating the performance.
Stroke may cause language difficulties that have a devastating effect on the quality of life of those involved. Increasing language function after a stroke is one important aspect of rehabilitation. Regaining control over speech motor plans may be served by repetitive articulatory training. Most patients only have limited access to therapy with a clinician after the first year post-stroke. Having a computer-based program for repetitive training of speech production allow patients to continue therapy independently, or as a supplement to clinician-based therapy. Computer applications for speech and language comprehension are available, but programs for practicing speech production with feedback are not. The proposed study aims to use speech recognition software that has shown promising results in preliminary studies. This program allows speakers to train single-word production in a motivating game environment. Previous studies have shown that “overlearning” skills in a drill-based therapy benefits cognitive skill acquisition and maintenance. Due to time limits, overlearning is not typically a part of therapy. Having a computer program that allows individuals to practice correct speech output allows for a continuation of this drill-based therapy, without the need for clinician supervision or feedback.

This project trained two participants with a video-game-based program aimed at improving accuracy and timing of single-word speech production. The video game involves repetitive, drill-like training of object naming, masked by a game setting. Integrated speech recognition software allows for immediate and trial-specific feedback on lexical and rhythmic accuracy to the participant in the form of points scored in the game, to enhance motivation and facilitate autonomous use of the training method. In a pilot study, the method has been tested in a group of speakers with apraxia of speech and aphasia, with varying levels of success. This means that more information is needed about optimal levels of practice intensity, as well as about individual patient characteristics that may affect training outcome. This study investigated whether an intensive video-game-based training program (2 hrs/day, 4 days/week, 3 weeks) yields better results than a shorter, less intense training program studied previously in a group of speakers with apraxia of speech and aphasia (1hr/day, 4 days/week, 2 weeks). The single-subject format allows for more extensive testing to include outcome measures reflecting quality of life and connected speech, as well as detailed monitoring of daily progress.
Peters, Nathan  
**Mentor(s): Dr. Andrew Kaczynski, Mrs. Caroline Dunn, Dr. Danielle Jake-Schoffman, Dr. Sara Wilcox**  
**Development of a Church Environment Audit Tool for Evaluating Behavioral Health Supports in Faith-Based Settings**

Objective: To develop an environmental audit tool enabling researchers to reliably assess supports for healthy eating (HE) and physical activity (PA) within churches.

Target Audience: The Church Environment Audit Tool was created for use in faith-based health behavior research.

Theory, Prior Research, Rationale: Churches are key community settings that serve diverse groups frequently underrepresented in preventive health research. Recently, there has been increased attention on creating partnerships with churches for health promotion. However, audit tools to assess a church’s HE/PA environment are lacking.

Description: The multiphase process for audit tool development included drafting an initial tool comprised of elements from audit tools used for comparable settings designed to measure similar environmental features of interest, obtaining stakeholder and expert feedback, and pilot testing in three churches in a South Carolina county. Recommendations from stakeholder and expert reviews were combined with modifications after pilot testing to create the Church Environment Audit Tool. The tool assesses support for indoor and outdoor PA, food preparation, food and beverage vending, and media such as bulletin boards and other materials about HE/PA. A script for use during administration and extensive data collection instructions are included in the tool to ensure consistency across data collectors.

Evaluation: The Church Environment Audit Tool is being tested for reliability within 54 churches in a rural South Carolina county.

Conclusions and Implications: The Church Environment Audit Tool provides a resource to objectively measure the physical environment of churches as it relates to HE/PA behaviors. The tool could be used in faith-based interventions and as part of ongoing community assessments in health behavior programming.

Piperato, Sarah  
**Mentor(s): Dr. Melinda Forthofer**  
**A Population-Based Study of Body Mass Index and Physical Activity Disparities Among Sexual Minority Identified Women**

Sexual minority identified (SMI) women may exhibit higher rates of obesity than heterosexual identified women, though the underlying reasons for this disparity are unclear. The purpose of this study is to examine differences in body mass index and physical activity between SMI and heterosexual identified (HSI) women.

This study utilizes data from the National Health and Nutrition Examination Survey, 2007-2014. The total study population included 6,797 women, 6,342 HSI women and 455 SMI women. We assessed differences between sexual identity groups for four outcomes: body mass index, moderate physical activity, vigorous physical activity and meeting physical activity recommendations. Multivariate logistic regression models were used to determine differences in outcomes by sexual identity.

SMI women were more likely to be obese compared to HSI women (OR= 1.81, 95% CI 1.23, 2.65). No significant differences were observed between sexual identity groups for moderate physical activity, vigorous physical activity or meeting physical activity recommendations (p=0.8154, p=0.3622, p=0.5925, respectively).

SMI women had a higher prevalence of obesity compared to HSI women. These disparities between sexual identity groups do not appear to be attributable to differences in physical activity. Additional health-related mechanisms need to be studied to gain a greater understanding of this health disparity.
Effects of Spice-TRP activator drink on performance during intermittent high-intensity exercise

PURPOSE: Transient Receptor Potential (TRP) channel activation in the mouth, esophagus and stomach after ingestion of spicy food extracts can have direct effects on central nervous system (CNS) function that have been linked to increased maximal power output and decreased muscle cramps. However, no studies have evaluated the effects of consuming TRP agonists on exercise performance. METHODS: This “proof of concept” study was designed to test the effects of a spice-TRP channel activator drink (1.7 fl oz with organic spice extracts, known TRPV1 and TRPA1 agonists; STA) on intermittent high-intensity cycling (IHI) using a randomized, double-blinded, placebo-controlled (PLA), crossover design in 20 healthy, active, college-aged men (n=10) and women (n=10). Subjects performed 2 trials (STA and PLA), each trial consisting of a 30-s maximal sprint (MS), 10-min rest, 45-min IHI (60%VO2max ride with 1-min 100% VO2max sprints every 5 min), 15-min rest, and a 10-min time trial (TT). Drinks were given before MS and TT. Performance measures included power output during MS (5-s intervals, mean, total), and distance covered during TT. Leg muscle pain (pain), heart rate, mean arterial pressure, core body temperature, profile of mood state (mood), plasma glucose, IL-6, and IL-10 were also measured at multiple times during exercise and rest. Data were analyzed via paired t-tests and 2-way repeated-measures ANOVA. RESULTS: No significant differences (p<0.05) were found between STA and PLA for any of the variables. However, there was a consistent trend toward benefits of STA, including increased muscular power output (5s intervals, mean, total, p=0.09), increased TT distance (13 of 19 subjects, p=0.20), reduced pain (p=0.17), and enhanced mood (p=0.20); all except TT produced moderate-to-large effect sizes (Cohen’s d and partial Eta2). Meanwhile, no treatment differences were observed for cardiovascular, metabolic, and inflammatory measures. CONCLUSION: Results of this “proof of concept” study support further research on the CNS benefits of consuming natural spice-derived TRPV1 and TRPA1 agonists as a novel intervention to improve performance during intermittent high-intensity exercise, with no apparent adverse side effects. Supported by Flex Pharma, Inc.

Landing Zones - Model Transfer in Chemistry

The cross-discipline transfer of computational tools - equations, functions, formalisms - is a burgeoning area of discussion in Philosophy of Science. My research uses the Quantum Theory of Atoms in Molecules (QTAIM) model in chemistry as a case study of this model transfer. I argue that QTAIM’s construction indicates that there are preparatory and constitutive requirements to model transfer.
Prose, Alexa  
Mentor(s): Mrs. Victoria Vincent  
The Decision-Making Process for Individuals at Risk for Hereditary Diffuse Gastric Cancer

Hereditary diffuse gastric cancer (HDGC) is caused by mutations in the CDH1 gene. Individuals who carry mutations in the CDH1 gene have as high as an 80% lifetime risk for gastric cancer. To reduce the high lifetime risk of gastric cancer, CDH1 mutation carriers are recommended to undergo a prophylactic total gastrectomy (TG). Individuals within this at-risk population face a daunting task of deciding whether to have genetic testing for the CDH1 mutation. Although genetic testing is informative for clinical management, it is possible that many patients may struggle emotionally with the definitive nature of a positive test result. An even more daunting decision may be to decide whether to undergo a prophylactic total gastrectomy to reduce the high lifetime risk of gastric cancer. Currently, there is little research that examines the specific informational and support needs of this population during their decision-making process. We hypothesized that individuals who are less informed and lacking resources regarding genetic testing and a prophylactic total gastrectomy will face more decisional conflict and will have less understanding of their resulting quality of life. Additionally, we predicted that individuals with more family members impacted by HDGC will be more likely to pursue genetic testing and prophylactic surgical options. We conducted semi-structured telephone interviews on 26 individuals at different points of this decision-making process. Some participants had already undergone a total gastrectomy, some were identified as CDH1 mutation carriers but are currently evaluating their prophylactic options, and some had a family history of CDH1 but had not yet pursued genetic testing. This study will contribute to the literature by allowing the participants to share their experiences in their own voices. The collective information regarding the motivations and hesitancies toward genetic testing and surgery will provide insight to genetic counselors and other medical professionals of how to help facilitate the decision-making process for this population.

Rann, Jonathan  
Mentor(s): Dr. Amit Almor  
Generalizability of pursuit tracking tasks to tasks involving driving simulators

Dual-tasking and attention are well-researched topics in the cognitive sciences. Studies in these areas have a multitude of applications for the real world, with one of the most prevalent relating to the world of driving. Driving is a complex activity which requires a great deal of executive resources for proper execution. Unfortunately, drivers may not be aware of these demands and as a result often do not give their full attention to the road; instead, they engage in concurrent activities while driving. Studies regarding dual-tasking have been used to measure deficits in performance of concurrent tasks, and previous research in the area has utilized pursuit tracking tasks for studying the simultaneous performance of multiple tasks. A concern about these studies is whether their results apply to real world driving situations. Studies utilizing driving simulator tasks can provide a bridge between those using pursuit tracking tasks and actual driving, but research is needed to verify that the results from pursuit tracking tasks can generalize to driving simulator tasks. The present study aims to determine whether some of the results from previous tracking tasks can be replicated using a driving simulator. Specifically, three questions are posed: 1) Can a controlled driving simulator task measuring lane position yield the same performance measures as a tracking task? 2) How do those same results compare during slow, medium, and fast conditions? 3) Does the presence of conversation interfere with the driving task as it does the tracking task? Given the outcomes from previous studies, it is predicted that: 1) carefully controlled driving simulator tasks in which lane position is continually measured will yield similar, if not the same, measures as a tracking task; 2) when speed conditions are introduced into the experiment, measures will yield the same results as tracking task; and 3) the introduction of conversation does interfere with the driving task in similar ways as the tracking task.
Reyes, Ligia  
Mentor(s): Dr. Edward Frongillo  
Understanding the Local Food System and Mothers’ Food Choice Decisions on Behalf of Children Under Five in Rural Mexico

Mothers, as primary caregivers, are the most influential nutrition delivery agents for children under five. While the first 1,000 days are critical for nutrition to support adequate development, child development remains highly sensitive through age five. Although the sensitivity of this period and the important role of nutrition is recognized, little is known about the underlying local food systems that mothers access and how these food environments contribute to the food-choice decisions mothers make on behalf of their children.

The objective of this study is to understand the local food system that mothers of children aged 1 and 5 years access in rural Mexico, and how mothers decide what to feed their children. The significance of this research lies in defining, and potentially redefining, what we know about local food systems utilizing an inductive approach to identify available food sources, variety of foods, and seasonality effects. Furthermore, this research also expands our understanding about how mothers make food choice decisions on behalf of their children in low- and middle-income countries during this sensitive child development period. We explore the role of personal factors, social network, knowledge, and strategies to understand how these drivers come together in mothers’ decisional process.

Gaining this understanding is important and timely particularly in the context of the nutritional transition that Mexico currently faces and potential changes in economic conditions that may impact food supply and food choice decisions in Mexico.

Romagnolo, Shannon  
Mentor(s): Dr. Dodie Limberg  
Development of a Social Justice-Focused Curriculum for School Counseling Trainees

In an increasingly racially, ethnically, and socioeconomically diverse society, longstanding and well-documented differences in academic achievement persist between students of color and students who are white and between students of varying socioeconomic backgrounds. School counselors are ethically and professionally bound to ensure equity and access for all students, and counseling scholars and practitioners consider social justice to be both a goal of counseling and part of the counseling process. However, few social justice practices have been identified, and there are few resources available for counselor educators in preparing school counseling trainees to serve as social justice agents. In this poster, the author will present the framework for a curriculum designed to prepare school counseling graduate students to engage in social justice practices in their fieldwork and professional practice.
BACKGROUND: Cardiorespiratory fitness (CRF) is well established as having a strong inverse association with numerous cardiovascular disease (CVD) risk factors and mortality. As CVD remains the number one cause of death in America, the detrimental effects of low CRF present a substantial health threat. In order to help combat these detrimental effects, aerobic exercise interventions are used to increase CRF, as measured by maximal oxygen uptake (V̇O₂max). However, considerable interindividual variation exists in the ability to improve V̇O₂max and CVD risk factors in response to regular exercise. Given the strong relationship between V̇O₂max and CVD risk factors, identifying individuals who do not experience clinically significant gains in CRF with aerobic training (i.e., uncertain V̇O₂max response) is of great interest to the exercise science field.

PURPOSE: To assess the prevalence of uncertain V̇O₂max response across 14 large aerobic exercise interventions.

METHODS: The prevalence of uncertain V̇O₂max response was examined in 1,725 previously sedentary adults (63.6% female; 29.2% minorities) who completed one of 14 exercise programs from eight exercise training studies: DREW (n=361), E-MECHANIC (n=117), Energy Flux (n=65), GERS (n=171), INFLAME (n=66), HERITAGE (n=715), and STRRIDE I and II (n=227). The training programs ranged from doses of 4-35 kcal·kg⁻¹·week⁻¹ (KKW); intensities of 50-85% V̇O₂max; and durations of 16-35 weeks. Baseline and post-training V̇O₂max was assessed via maximal exercise testing. Uncertain V̇O₂max response was defined in both absolute (gain <120 ml/min from baseline value) and relative (gain < 5% of study-specific baseline average V̇O₂max) terms based on technical error and coefficient of variation values derived from three repeatability studies in HERITAGE.

RESULTS: All studies produced significant mean increases in V̇O₂max with training. However, upon evaluation of individual changes in V̇O₂max using the above definitions, 34% (absolute) and 23.8% (relative) of the total sample displayed uncertain V̇O₂max response. Upon evaluation of each intervention group, the prevalence of individuals with an uncertain V̇O₂max response varied greatly, ranging from 7.4% (HERITAGE) to 84% (DREW 4 KKW) depending on whether the absolute or relative definition was used.

CONCLUSION: Our study found a high prevalence of uncertain V̇O₂max response across eight diverse exercise training studies, which differed based on how uncertain response was defined. These results underscore the need for further investigation to refine the identification of uncertain V̇O₂max response to enhance the utilization of exercise as medicine and provide appropriate guidance to improve health and attenuate risk for CVD.

Ross, Walker
Mentor(s): Dr. Haylee Mercado
Studying Abroad at the International Olympic Academy

The International Olympic Academy (IOA) in Olympia, Greece is a highly selective institution that serves the purpose of educating scholars from all over the world on Olympic issues. Each year, approximately twenty-five postgraduate students are invited to attend the IOA and learn from some of the most respected scholars studying the Olympic Games. As the only American invited to attend, I was excited to be given the opportunity to learn from and connect with an international community. This poster presentation will present some highlights of my experience in Greece as well as offer reflections on the importance of global sport and a global scholastic community. The other participants are now considered to be lifelong friends and partners in the Olympic community. I have since been able to publish a paper on the ancient Nemean Games with a Polish scholar from the IOA. This dialogue between scholars is critical for future Olympic research. Many of us were attempting to study the same issues, but from the perspective of our home countries. Now, we share the same education foundation, and we can collaborate on research that addresses some of the most pressing topics of the current Olympic Games.
Eocene sedimentary rocks record topographic, climatic, and tectonic conditions within the southern Canadian Cordillera during orogenic collapse. Sediments were deposited in various environments within one or more basins, and include rock units consisting of conglomerates, sandstones, and mudstones. In order to better understand where the sediments originated from, reconstruct the interconnectedness between basins, and determine the uplifted areas of the southern Canadian Cordillera, sedimentary rocks were measured, mapped, and integrated with detrital zircon uranium-lead (U-Pb) and hafnium (Hf) analyses.

Zircons from sedimentary rocks exposed in Princeton and Merritt, BC have a large U-Pb age population that differs from the primary zircon U-Pb age population found in samples from Republic, WA, and Kelowna, BC. Hf values from detrital zircon samples differ by location: Merritt Hf values are primarily positive; Kelowna has a mixture of positive and negative Hf values; and Republic has primarily negative Hf values. Differences in U-Pb ages and Hf values between areas suggest localized sediment sources, and multiple, isolated basins in the interior of the southern Canadian Cordillera during the Eocene.
Part Criticality in inventory Management

Due to uncertainties in demand, some parts might go out of stock during the manufacturing process. This might lead to delays in delivery if an out-of-stock part is critical in this process. Hence, being out-of-stock might lead to additional costs and customer lost is among them. A back order is a customer order that cannot be filled when presented or on time, and for which the customer is prepared to wait for some time. The percentage of items backordered and the number of backorder days are important measures of the quality of a company's customer service and the effectiveness of its inventory management. Backorders are an important factor in Inventory Management analysis. If a business consistently sees items in backorder then this could be taken as a signal that it is running too lean, and that it is losing out on business by not providing the products demanded by its customers. On the other hand, businesses incur costs to store, track and insure inventory. Inventories that are mismanaged can create significant financial problems for a business, whether the mismanagement results in an inventory surplus or an inventory shortage. Two frequently applied inventory-management approaches are the just-in-time (JIT) method, where businesses plan to obtain parts as they are needed instead of maintaining high inventory levels, and materials requirement planning (MRP), which schedules material deliveries based on sales forecasts. To balance JIT style of inventory management, manufacturers and retailers must work together to monitor the availability of resources on the manufacturer's end and consumer demand on the retailer's. Or else, JIT inventory management can be risky. The MRP inventory management method is sales-forecast defendant. This means that manufacturers must have accurate sales records to enable accurate planning of inventory needs and to communicate those needs with materials suppliers in a timely manner. In order to achieve a balance between efficient customer service and low inventory cost, an optimization model should be set in place. The main problem in this situation is dealing with a part that is critical among most of the bills of material. A part criticality index will be generated in order to persistently target critical parts on inventory floor. In this paper, we determined the Part Criticality defined as Compound Global Index. A set of simple products having common parts was employed in order to validate the algorithm. Results showed that on the short term, Criticality might vary form one term to another. This is mainly caused by the variability of demand and supply. Furthermore, this criticality was affected by the inventory policy set in place for this simulation. A further step would be to simulate other inventory policies in order to study their effect on the Part Criticality. As for the long run results, it was realized that one part was the most critical. This short run/long run differentiation helps the management have a plan to tackle parts that are critical on the short term as well as creating a long term improvement policies to decrease the long term part criticality. Our next step is to create a program that optimizes inventory management by identifying the criticality of parts to a company's production. The program will allow a company to insert data from their production line and the most important parts will then be determined using a part criticality algorithm. These parts will then be given priority in the preexisting inventory management system. The long term goal for this project will be to create a wiki-like database where companies involved in the aerospace industry can use our part criticality algorithm to find the most important parts and then insert these parts in a database to be matched with local manufacturers in South Carolina. This would be a part of the actions taken in order to get more engagement of local suppliers in the advancement of the aerospace market in South Carolina.

Multi-Scale Modeling of Transport inside GDL utilizing Computational Fluid Dynamics with the Lattice Boltzmann Method

The objective of this work is to gain a mechanical understanding of the water management in the gas diffusion layer (GDL) of the proton exchange membrane fuel cell (PEMFC). Water is a byproduct of the fuel cell reaction and its amount is proportion to the current of fuel cell load. Water is used to retain the proper hydration level in the proton exchange membrane. However, at the same time, condensed water in the flow-field and the gas diffusion layer reduces oxygen transport to the catalyst layer where the oxygen reduction reaction (ORR) occurs. Therefore, excess accumulation of condensed water causes lower performance, particularly at the higher current densities. Detailed simulation of two-phase water in the GDL is very important to understand water management. This work shows successful development of a multi-scale calculation technique that incorporates various types of numerical modeling in a fuel cell and simultaneously performs a prediction. The outcome of this work is to develop a two-phase fluid model in the microscale porous structure of the GDL, and solve detailed distributions of the variables on the microscale GDL imported by macroscale model.
Schlachter, Caleb - Supervisor(s): , , , - Mentor(s): Dr. Maksymilian Chruszcz, , , , -- Comparison of structures and functions of 2-methylcitrate synthase (mcsA) from Aspergillus fumigatus and citrate synthase (hCS) from Homo sapiens -- Aspergillus fumigatus is a saprophytic, filamentous fungus that is an opportunistic human pathogen and worldwide agricultural pest that causes one of the most devastating systemic mycoses. Normally, A. fumigatus spores that are inhaled by healthy individuals are eradicated by the immune system; however, spores inhaled by immuno-compromised individuals can lead to infection with a mortality rate of 50-85%. Anti-fungal resistance in A. fumigatus is becoming more prevalent due to the widespread use of pesticides in agriculture, which results in a need for new drugs to treat A. fumigatus infections. A. fumigatus fulfills its nutritional needs by breaking down host proteins that results in the generation of the toxic metabolite propionyl-CoA. An enzyme found in A. fumigatus, 2-methylcitrate synthase (mcsA), is responsible for condensing propionyl-CoA with oxaloacetate and water to produce 2-methylcitrate and Coenzyme-A (CoA) as products. The mcsA enzyme is not found in mammals and is a good candidate for designing new drugs to combat A. fumigatus infections; it does, however, share structural similarities to the enzyme citrate synthase (hCS) found in humans. Therefore, this study aims to determine structural similarities and functional differences between mcsA and hCS. The results of this comparison can be used to guide the development of mcsA-specific inhibitors. Inhibitory and structural studies of mcsA will not only provide the groundwork for designing drugs targeting A. fumigatus, but also other problematic and drug-resistant fungi that are prominent in agriculture and healthcare.

Schramm, Andrew
Mentor(s): Dr. Suzanne Swan
Help-seeking and intimate partner violence re-victimization: Exploring disparities by sexual orientation

Recent estimates indicate that 18.5% of heterosexual college students and 30.3% of sexual minority college students are victims of physical intimate partner violence (IPV; Edwards, Sylaska, Barry, et al., 2015). Research among adult women in opposite- sex relationships has shown that once an individual is victimized by IPV she is subsequently at high risk for future IPV victimization. Re-victimization is associated with more severe physical and mental health consequences of IPV. No prior study has assessed the rate of re-victimization among sexual minority adults. Help-seeking behavior, which refers to accessing a range of sources of support (e.g., family and friends, law enforcement, mental health professionals), may mitigate many of the consequences of IPV, including re-victimization. However, no prior study has explored the effect of help-seeking on the re-victimization of sexual minorities. Results from this longitudinal study show that sexual minorities were approximately two times more likely than their heterosexual counterparts to be victims of IPV. Sexual minority victims at the first study time point (T1) were, as compared to heterosexual victims, also at heightened risk for re-victimization one year later while controlling for severity of the violence at T1. Contrary to expectations, sexual minority victims more often sought help than heterosexual ones. This may be due to the more severe IPV reported by sexual minorities. Help-seeking did not influence risk for re-victimization. Continued research on IPV re-victimization and the help-seeking behavior of sexual minority victims of IPV is needed to better understand this phenomenon, which has substantial public health implications.
Schroer, William
Mentor(s): Dr. Claudia Benitez-Nelson, Dr. Erik Smith, Dr. Lori Ziolkowski
Coastal stormwater ponds: Sediment accumulation and nutrient sequestration

The South Carolina coast is one of the most rapidly developing regions in the United States. Detention ponds are common stormwater control structures used to meet state water management regulations. Recent development has lead to the creation of more than 21,000 ponds in a region where, historically, there were none; prompting questions about the role these ponds play in a coastal ecosystem's biogeochemistry. Ponds receive water carrying both suspended sediments and nutrients. As sediments accumulate, pond water volume is reduced, leading to a decrease in runoff retention. Periodic dredging is required to maintain pond function, but it is costly. The goals of this research are twofold: 1) To quantify the rate of sediment accumulation, and subsequent volume loss, as well as the sources of organic matter to sediments, and 2) To quantify the role these ponds play in regional carbon and nutrient cycling. In addition to bulk nutrient and carbon analyses, biomarkers were used to determine organic matter origin (i.e., aquatic verses terrestrial). Fourteen residential ponds were sampled, representing a wide range of development densities. Initial findings suggest that the rate of sediment accumulation is directly linked to development density, however those rates are significantly lower than previously anticipated. In contrast, sediment nutrient composition does not appear to vary with development density. We hypothesize that regional sediment composition is homogeneous and that nutrient sequestration is driven by the mass accumulation rate. Finally, sediment organic matter was predominantly of terrestrial origin suggesting internal algal production does not drive sediment accumulation.

Sellick, Gary
Mentor(s): Dr. Woody Holton
Black Skin, Red Coats; The Carolina Corps and the Evolution of Military Policy in the British Caribbean

In 1782, a unit of runaway slaves were created that would change the history of the British military forever. Looking at this unit, the Carolina Corps, within the broader context of the British military in the Age of Revolutions, shows the roles that the regiment played in protecting the British Caribbean, which included tracking the same sort of runaway slaves that they had once been. It will discuss the rights given to these men, and show the attitudes towards the unit of the white men who officered them. In short, my project will explore the changing racial attitudes of the British military in the Caribbean while telling the story of a unique group of men that helped to change the structure of the organization in the region forever.
Sevoyan, Maria  
Mentor(s): Dr. James Hebert, Dr. Alexander Ayvazyan  
Predictors of Renal Amyloidosis in patients with Familial Mediterranean Fever in Armenia

Introduction: Familial Mediterranean fever (FMF) is an inherited auto-inflammatory disease that is characterized by recurrent attacks of fever, severe abdominal, thoracic and joint pain. Typical attack lasts 1-4 days, and between attacks patients are symptom free. Prevalence of FMF in Armenia is estimated to be approximately 1.5%. Late diagnosis of FMF, misinterpretation of FMF symptoms and inadequate treatment usually lead to serious complication such as renal amyloidosis (RA), which determines the disease prognosis. Epidemiological studies that examine the predictors of RA are limited.

Aim: To evaluate the demographic and clinical predictors of RA in patients with FMF in Armenia during the natural course of disease.

Methods: We retrospectively studied 3484 Armenian patients with clinically confirmed FMF diagnosis from the FMF patient registry in Armenia from 1977 to 2000. We restricted our sample to FMF patients who never had been treated with colchicine, had a clinically confirmed FMF diagnosis and had information on important risk factors. The study included 641 patients with RA and 2843 FMF patients without RA. FMF disease information was collected by medical chart reviews and interviews with physicians. Multiple logistic regression was used to estimate the effect of characteristics of interest on odds of developing RA. Odds Ratios (OR) and associated 95% CI were obtained.

Results: About 18.4% of sample had RA. FMF male patients have 62% greater odds of developing RA compared to females (OR male vs female =1.62, 95% CI: 1.34, 1.95). The older the patients at the time of disease onset, the lower the odds of RA (OR onset, continuous = 0.98, 95% CI: 0.97, 0.99). Presence of arthritis during the course of the disease about doubles the odds of RA (OR yes vs no=2.04, 95% CI: 1.70, 2.4). FMF patients with isolated pleuritis have much lower odds of RA compared to patients with pleuritis and peritonitis (OR pleuritis vs mixed =0.29, 95% CI: 0.17, 0.47). Patients with a family history of RA are at nearly double risk of those without family history of RA (OR yes vs no=1.91, 95% CI: 1.10, 3.32), while family history of FMF does not seem important factor for predicting RA.

Conclusion: FMF patients with RA were more likely to be male, younger at the time of disease onset, more likely to have frequent abdominal attacks, to have arthritis and to be more likely to have a family history of RA compared to patients without RA. It is important to identify the FMF patients at high risk of developing RA and start regular colchicine treatment early in the natural history of the disease.

Shaw, Jr., George  
Mentor(s): Dr. Feili Tu-Keefner  
A content analysis of South Carolina public schools dissemination of health information using the web: Using SC Academic Standards for Health and Safety Education as a framework

K-12 School Websites can be used to help parents, teachers, and students find reliable information. Moreover, they can assist with providing the information necessary to understand general concepts related to health promotion to enhance health, or identify health-enhancing behaviors and to avoid or reduce health risks. It is estimated that the economic cost associated with physical inactivity in the county of Orangeburg, SC alone in 2013 was $70 million dollars. That was roughly 14% of the state’s $503 million dollar total physical inactivity cost. According to the SC Department of Health and Environmental Control (SCDHEC): Lee, Orangeburg, and Williamsburg counties had the highest overall Obesity prevalence of children 2-17 in SC in 2013.

School websites provide an unique opportunity to disseminate health information to the aforementioned stakeholders, but it is necessary to identify how that is currently done and cost-efficient ways to enhance the accessibility of this information. This research highlights the results from a practicum deliverable for the Health Communication Certificate degree. A content analysis of the health information that is available on elementary schools websites in five counties in South Carolina (SC), with high obesity rates according to SCDHEC, was conducted. The SC Academic Standards for Health and Safety Education (SCASHSE) is use as a framework to evaluate the content. Complete results and recommendations from the practicum will be made available during the presentation.
Shayesteh Moghaddam, Nahid  
Mentor(s): Prof. Millind Kunchur  
**Electromagnetic properties of NbTiN superconducting films**

In a normal conductor, when applying a constant voltage across it, the charge carriers speed up and then move at an average, constant speed (called drift velocity). This is because there is resistance in the wire, and the current is determined by that voltage and the resistance. For a superconductor, which has no resistance, by applying an electric field, the charges will accelerate until the superconducting state is broken. When it is broken, the system is said to be in the normal state, and acts just like any other conductor. The amount of current density required to turn the superconductor normal is known as the depairing current density. We explore these properties of NbTiN superconducting films in different states, and under a range of magnetic fields and electric current densities. The variation of resistance with temperature, magnetic field and current provide us the necessary information about superconducting parameters.

Sibley, Ivy  
Mentor(s): Dr. Christian Anderson  
**Sustainability in Higher Education**

The aim of this presentation is to give insight on how to create a sustainable campus by providing the best practices of campus sustainability for colleges and universities. We compare the literature on the best evidence-based practices of sustainability at institutions of higher education in the United States (U.S.) and in Iceland to show how to be more sustainable. The purpose of presenting examples from the U.S. and Iceland is to highlight the sustainable practices before the presenters study abroad in Iceland. Institutions that aim to create lasting and holistic improvements for greater sustainability should focus on three areas: economic, social, and environmental changes. Sustainable development refers to strategically meeting needs of the present while being conscious of the future. With the objective of creating sustainable change that includes these three fundamentals at higher education institutions, all major stakeholders at the institution must be involved in pursuing the goal of sustainability. Implementing sustainable development through improving campus structures, implementing sustainable practices in student organizations and training of staff members, and incorporating sustainability into all areas of education at a university are tangible and measurable ways to achieve campus sustainability.

Siddiqi, Khairul Alam  
Mentor(s): Mr. Mohammad Rifat Haider, Dr. Ibrahim Demir, Dr. M. Mahmud Khan  
**Acuity Trends of Emergency Department Visits, and Factors Predicting Non-Urgent and Semi-urgent ED Visits in the United States, 2006-11**

OBJECTIVES: Emergency Department (ED) visits for nonemergency health condition is a long debated issue in the United States. Study assesses latest trends of ED visits and associated socio-demographic and facility level factors of non-urgent and semi-urgent ED visits to explore if non-urgent ED visits deserve special attention anymore and if semi-urgent visits should be discussed more closely.

METHODS: Present study performed retrospective analyses of nationally representative ED visit data from National Hospital Ambulatory Medical Care Survey (NHAMCS) 2006 through 2011. Trend analysis, designed based F test, and weighted multinomial logistic regression were performed as statistical tools.

RESULTS: Proportion of non-urgent ED visits were decreased each year until 2009 from 14% to 8% and almost got stuck for rest of the years. Most of the non-urgent visits received some sort of diagnostic or therapeutic services. Percentage of semi-urgent ED visits increased largely over the study period (25% to 36%), while proportion of urgent increased little, and immediate and emergent acuity level decreased. In cross tabulation, residence type, source of payment, episode of care, availability of non-urgent fast track, and use of EMR are found significantly associated with all ED visits. In multivariable analysis, patients with Medicaid, no insurance, younger, male, non-Hispanic Black, and who visit in nonurban hospitals are highly likely to visited ED for non-urgent health conditions, whereas, self-pay patients, younger, male, and who visited voluntary non-profit hospitals are highly likely, and Medicare recipients and patient living in nursing home are less likely to visit ED with semi-urgent health conditions.

CONCLUSION: Non-urgent ED visits, along with semi-urgent visits deserve close attention and efforts to reduce these visits should focus on some particular groups who pose higher risks rather than blocking access to EDs.
Sikder, Mithun  
**Mentor(s):** Dr. Mohammed Baalousha, Dr. G. Thomas Chandler, Ms. Emily Stewart, Mr. Mark Losavio  
**Size-dependent toxicity of PVP-coated platinum nanoparticles**

The release of platinum nanoparticles (PtNPs) from automobiles equipped with exhaust catalytic converter system increased the platinum concentration in the urban environment. Although exposure to soluble Pt has revealed toxicity to aquatic life under laboratory conditions, little is known about the environmental effects and potential toxicity of PtNPs. Here we investigate the size-dependent toxicity of PtNPs on estuarine copepod, Amphiascus tenuiremis, using 96 hour acute toxicity test. Monodispersed spherically shaped polyvinylpiroldine (PVP) coated PtNPs of four different sizes (e.g. 10-30 nm) were synthesized using seed-mediated growth process. Dynamic light scattering (DLS) and atomic force microscopy (AFM) were used to measure hydrodynamic size and core size of the PtNPs, respectively. Inductively coupled plasma-mass spectroscopy (ICP-MS) along with ultrafiltration was used to quantify Pt ion release. The acute toxicity study shows that the toxicity of PVP-PtNPs is size dependent and result demonstrates that smaller (ca. 10.2 ± 1.1 nm) PtNPs are more toxic compared to larger (ca. 29.4 ± 1.4 nm) PtNPs. Future studies will investigate the toxicity of these PVP-PtNPs using microplate-based life-cycle toxicity test.

Sill, Danielle  
**Mentor(s):** Dr. Myriam Torres, Dr. Lucy Annang-Ingram, Dr. Feifei Xiao  
**The association between sexual risk behaviors of Latinos and HIV Knowledge in South Carolina**

HIV/AIDS disproportionately affects Hispanics/Latinos which are the fastest growing minority group in the United States. 16,222 South Carolinians are infected with HIV with 70 new cases being diagnosed each month. Few studies have been conducted to determine if HIV knowledge is associated with sexual risk behaviors. We hypothesized that Hispanics/Latinos with high HIV knowledge would have lower odds of participating in risky sexual behaviors. We conducted a study of Latinos living in the Pee Dee and Midlands regions of South Carolina. All surveys were conducted by a bilingual/bicultural interviewer. Questions regarding demographic characteristics, HIV knowledge, and sexual risk behaviors were included in the questionnaire. We enrolled 203 participants in which 193 were eligible for our study (97 females and 96 males). Results show the most prevalent risky sexual behaviors were inconsistent condom use during oral and vaginal sex, as most of the study population only had 1 sexual partner in the last twelve months. 87.63% of females and 92.71% of males sometimes or never wore a condom during oral sex matching condom use during vaginal sex with 91.75% of females sometimes or never wearing a condom during vaginal sex and 83.33% of males sometimes or never wearing a condom during vaginal sex. The median HIV knowledge score of males and females was 11 out of 18 with 65.8% of the study participants having a below average HIV knowledge score when using a dichotomized variable. Logistic regression found for every correct answer on the HIV knowledge questionnaire, the odds of high sexual risk behavior decreased by 18% when adjusting for age, sex, and years of school completed (OR: 0.820, OR CI: 0.684-0.982). 5 HIV knowledge questions were answered incorrectly by more than 50% of males and females. Other studies found similar misconceptions warranting a specific focus on prevalent HIV misconceptions during development of new HIV/AIDS education programs.
An Evidenced-based clinic process change to improve mammography compliance.

BACKGROUND/SIGNIFICANCE
Breast cancer is a significant disease affecting 12% of American women in a lifetime. Breast cancer costs $180 billion annually in healthcare expenditures and productivity. Mammography has been identified as the greatest tool to mitigate morbidity, yet in many organizations mammography compliance rates are decreased. This process improvement is proposed to address the barriers to patient follow through with mammography and to recommend strategies to improve the current breast screening process.

PURPOSE
To implement a process improvement change to increase the utilization of screening mammography in a breast screening clinic.

METHODS
Design: Process Improvement. Mammography utilization will be determined at 1 month and 3 months after intervention. Population: Women aged 40 years and over, predominantly low-income and with low literacy skills, who have not had a mammogram in a year.
Intervention: The intervention is an evidenced based process change to increase the likelihood that women who are prescribed a mammography will follow through and complete their screening. The interventions include: assessing barriers to mammography during registration of clinic visit, alerting staff and providers of participants that meet criteria for mammography by flagging or marking the patients' charts, communicating a tailored provider message regarding importance of mammography and relevance of financial counseling.
Analysis: Principles of the Six Sigma DAMA framework were utilized to analyze the breast screening clinic process. Chart reviews and organization databases were utilized to determine mammography compliance. The opportunities to improve current practices were identified by outlining the current practice flow, chart reviews, data mining mammography compliance, and obtaining a baseline convenience sample of clinic patients who did not follow up with mammography. Informal interviews of providers were conducted as well. The structure of the organization was outlined and internal and external resources were identified.

RESULTS
An extensive review of the literature was conducted to identify best practices and barriers to mammography screening to elicit strategies to improve the breast screening process. The data revealed that in our clinic in 2015 and 2016 mammography screening rates were 23.7% and 27.8% respectively, well below standard expectations. An evidenced –based process change was developed and will be implemented. The outcome measure is mammography compliance. Ultimately, the goal is to increase mammography utilization, which is linked to mitigating the disease burden of breast cancer through early detection.

CONCLUSIONS
Optimizing the cancer screening process requires strategic planning of healthcare leaders to structure a process to address the needs of the organization, providers, and patients that are being served. Thus, the goals of this project are to implement and evaluate the effects of the evidenced-based process change, and continually improve the delivery of health services.
Smith, Raymond  
Mentor(s): Dr. Ronald Pitner  
**Teaching Colorblind Awareness Through Diversity Education**

The purpose of this study was to examine whether a dedicated diversity course model or an infusion model was more effective at reducing students’ level of colorblindness. The National Association of Social Workers and the Council for Social Work Education require schools of social work to design curricula in ways that produce culturally responsive and competent practitioners. Schools, however, have discretion in how they meet this requirement in regards to teaching diversity through an infusion model, or a dedicated diversity course. One measure of diversity is practitioner maintained color-blind ideology (CBI). Students completed the Color-Blind Racial Attitudes (CoBRA) Scale, which measured these three subcomponents of CBI: 1) awareness of racial privilege, 2) awareness of institutional racism, and 3) awareness of racial discrimination. From baseline to posttest, revealed that the diversity course group scored significantly better on colorblindness overall, however, this seemed to be more a function of their scores on the awareness of racial privilege subcomponent of CoBRA. Both groups scored significantly lower than the psychology students did on all subcomponents of colorblindness. Our findings suggest that a dedicated diversity course model is an effective approach for decreasing students’ levels of colorblind ideology.

Smith, Albert  
Mentor(s): Dr. David Matolak  
**Communications link investigation for unmanned aerial systems**

With the increasing demand for applications of unmanned aerial systems (UAS, also known as UA vehicles, UAVs, or drones), determination of requirements for reliable radio links for command and control communications is paramount to ensure safe integration into the national airspace system (NAS). Requirements definition is aided through testing radio setups in various types of environments, e.g., different types of terrain, such as hilly terrain and over water, on which this presentation is focused. After verification of aircraft antenna and cable characteristics, simulation of the air-ground links in a sophisticated software package called Systems ToolKit was performed. This was followed by data processing of actual test flight data. Link quality metrics for our specific tests were received power and percentage of frame loss. The simulation and measurement metrics were compared. Close examination of geographical data revealed that durations of large attenuation were caused by terrain obstructions, revealing the need for greater accuracy in simulations.

Smith, Cameron  
Mentor(s): Dr. Amit Almor  
**Spatial indexing: Spatial representations influence reference processing in spoken language**

Two experiments tested the hypothesis that spatial representations are used for reference tracking during language comprehension. Participants listened to two characters introduce themselves from distinct spatial locations and responded to an auditory probe from one of the two spatial locations. In E1, probes were character names and participants indicated whether they were the correct answer to questions they read. In E2, probes were names that appeared at one of three points during a sentence that participants read on-screen. Results from these experiment suggest that listeners use a general amodal spatial indexing mechanism during reference processing in spoken language comprehension.
**Smith, Meagan**  
**Mentor(s): Dr. John Ferry**  
**Autooxidation of gallic acid as an initiator for the production of reactive oxygen species**  

Lignin is the structural polymer that provides strength to the stems of vascular plants. The dissolution of lignin during the humification of fallen biomass results in the release of a steady supply of phenolic acids to surface waters, where they are incorporated in the encompassing term “natural organic matter” or NOM. Oxidation of NOM by oxygen has been known to produce reactive oxygen species (ROS). 3,4,5-trihydroxybenzoic acid (gallic acid) loss and hydrogen peroxide were measured over a pH range of 4-10. Gallic acid was measured using ultra-high pressure liquid chromatography tandem mass spectrometry with electrospray ionization in the negative mode. Hydrogen peroxide was measured using the amplex red assay, a sensitive fluorescence technique. Hydrogen peroxide production converged corresponding to an approximate yield of 2.3 H2O2/mole gallic acid at maximum. The yield of hydroxyl radical was determined through the application of the fluorometric terephthalic acid probe. Hydroxyl radical production was noted only in the presence of transition metals, particularly Fe(III) or Fe(II). Superoxide dismutase was added to probe the role of superoxide as a chain carrier or terminal product of the oxidation and it was determined to be a chain carrier. The generation of ROS during spontaneous oxidation of NOM results in an apparent increase in degradation rate as they open parallel pathways for the loss of starting material.

**Solomon, Benson**  
**Mentor(s): Dr. John Ferry**  
**Zeolite promoted hetergenous ozonation for water treatment**  

The need for clean water in North America is projected to increase by 50% by the year 2030. That means our society must consider water sources that were previously unacceptable because of pollution related issues. The Advanced Oxidation Processes (AOPs) are technologies for completely destroying persistent organic pollutants. The AOPs work but are chemically unselective for pollutants and are expensive. We have been exploring ways to bring down these costs by making them more efficient. We do this by conducting ozonolysis in heterogenous systems that we think are faster and more efficient. We test these systems by adsorbing organic contaminants to a zeolite substrate prior to ozonation with the hypothesis that the system may yield a more selective environment for the oxidation of organic molecules. We used the hydroxyl radical probe 3-nitro-1,1,1-trifluorotoluene (TFT) at pH 7.8 during ozone exposure and monitored its oxidation. TFT was extracted with MTBE and analyzed using a low thermal mass gas chromatograph with electron capture detection. O3 was measured colorimetrically using the indigo trisulfonate assay. The rate of TFT removal was determined in the absence and presence of an added zeolite suspension, CBV 720 (0.1 wt%; SiO2:Al2O3 = 30, unit cell 24.3 Å and surface area = 780 m2/gram). The rate of TFT removal in the presence of CBV 720 was approximately 1.5x that of TFT in solution alone, indicating co-adsorption of TFT and ozone to the zeolite surface. The addition of carbonate ion decreased TFT oxidation rates in solution and the suspension was generally less affected by the scavenger, consistent with the effect of a negatively charged surface repelling carbonate from the local environment. Theoretical steady state concentrations of hydroxyl radical were calculated and modeled vs. decreasing ozone concentrations and compared to the observed loss of TFT.
Over the past decade, numerous studies have shown that miRNAs can control several key biological processes such as cell cycle, apoptosis, differentiation and stem cell regulation. Hence, dysregulation of such miRNAs (miRNAs) play a key role in cancer initiation, progression and metastasis. Our lab and several other studies have demonstrated miR-489 as a tumor suppressor miRNA in breast cancer. We have established a double-negative feedback loop between miR-489 and the HER2-SHP2-MAPK signaling. To further understand role of miR-489 in breast cancer, we performed microarray analysis and used target predication tools. These analysis revealed autophagy as one of the pathway affected by miR-489. By western blot and RT-PCR, we found that miR-489 inhibits autophagy by downregulating multiple genes involved in the pathway such as ULK1, ATG4A and LAPT M4B. Through confocal microscopy using mCherry-EGFP-LC3B tandem repeat, we demonstrated that miR-489 specifically affects maturation step of the autophagy. We then investigated role of autophagy in miR-489 mediated tumor suppression. Since, autophagy has been linked with chemo-resistance and cancer stem cells, we suspected that these might be a mechanism by which miR-489 mediated autophagy inhibition could render tumor growth. Using flow cytometry we found that miR-489 over-expression indeed reduces cancer stem cell population as measured by CD24low CD44high population, ALDEFLOUR positive population and mammosphere assay. We then studied if miR-489 can sensitize resistant breast cancer cell line by inhibiting autophagy. Indeed, we found that miR-489 over expression can sensitize multiple breast cancer cell line to doxorubicin. Mechanistically, we found that miR-489 mediated downregulation of lysosomal transmembrane protein LAPT M4B causes lysosomal membrane permeabilization. This leads to redistribution of doxorubicin and increased penetration into the nucleus thereby increasing sensitivity of the drug. Together, our results indicate that miR-489 inhibits breast cancer by affecting multiple processes such as autophagy, drug resistance and cancer stem cells. Hence, it could serve as a novel biomarker for diagnosis or a potential therapeutic intervention in breast cancer.

INTRODUCTION: Metabolic regulation plays an important role in maintaining overall health. It is well-known that even modest weight loss can induce beneficial changes in metabolism. The importance of sleep in metabolic regulation is increasingly recognized; however, it is unknown whether chronic sleep restriction, a popular phenomenon, affects the metabolic effects of weight loss on metabolism. HYPOTHESIS: It was hypothesized that a calorie restriction (CR) only intervention will create a greater shift from carbohydrate to fat utilization at rest and after consumption of glucose when compared to a combined calorie and sleep restriction (CR+SR) intervention. METHODS: Nineteen sedentary, overweight individuals were randomized into an 8-week CR group (n = 7; age = 45.4 ± 3.7 years) or CR+SR group (n = 12; age = 46.2 ± 6.3 years). The CR was restricting daily caloric intake to 95% of each individual's measured resting metabolic rate. SR for the CR+SR group was up to 90 minutes reduction from their regular sleep duration for 5 days each week, and ad libitum sleep on the other 2 days. Indirect calorimetry was used to determine energy expenditure (EE) and substrate utilization at rest and during a 2-hour oral glucose tolerance test (OGTT) with 75g glucose, prior to randomization and after completion of intervention. RESULTS: A significant decrease in body weight in both the CR (-5.1 %, p<0.05) and CR+SR (-3.9 %, p<0.01) with similar degree between groups (p>0.05) was noticed. However, only the CR showed a significant increase in fat substrate utilization (65.1 ± 11 % to 76.1 ± 10.4 %, p<0.001) and a significant decrease in carbohydrate substrate utilization (35.3 ± 11.1 % to 24.2 ± 10.4 %, p<0.001) at rest following the intervention. No observable changes in EE or substrate utilization were detected during the OGTT. CONCLUSION: There were shifts to greater fat and less carbohydrate substrate utilization at rest after CR. The addition of SR abolished these shifts in substrate utilization with similar weight loss. The results support a portion of the hypothesis as that these changes occurred during resting and no observable changes were noted during the OGTT. Thus, adequate sleep may aid in favorable shifts to a more efficient metabolic state with weight loss.
Sriram, Shyamkumar  
**Mentor(s):** Prof. Mahmud Khan  
**Exploring the Health System of Taiwan: An Unique Study Abroad Experience**

Taiwan with a population of 23 million has one of the best health systems in the world. Taiwan achieved universal health coverage in 1995 with the establishment of National Health Insurance (NHI) system. Health system of Taiwan provides high level of access to its citizens, comprehensive coverage with high quality and relatively low cost serving as the global model for an effective, efficient, equitable, high quality and humane system. Taiwan has achieved an Infant Mortality Rate of 4.5/1000 live births, which is lower than the US rate. Life expectancy at birth has reached 80 year mark. The health system of Taiwan is highly responsive with a satisfaction rate of 73% among its citizens, highlighting its popularity. The study abroad experience last year provided great opportunities to visit the National Health Insurance Bureau, a number of hospitals such as the Show Chwan health care system, China Medical University health system and the traditional Chinese Medicine Museum and Chinese Medicine Factory. The study abroad experience helped us to meet and learn from the experts who were involved in designing the National Health Insurance system of Taiwan. Outside of classroom, the experience exposed us to Taiwanese culture, food and a variety of other activities from visiting famous tourist destinations like the Sun-Moon Lake to practicing Tai-Chi. Many developing and developed countries are struggling with performance, quality, equity and financial sustainability challenges in their health systems and Taiwan appears to be a good model to carefully evaluate and emulate. The newer challenges that Taiwanese health system is facing are epidemiological transition, demographic transition with relatively high proportion of elderly and declining births which will affect long-term financial sustainability of the system. Despite providing universal, comprehensive, high-quality care with little or no restrictions on the use of specialized medical care, Taiwan’s national health expenditure is still relatively low, less than 7% of GDP of the country.

Steiner, Alex  
**Mentor(s):** Dr. Charles Mactutus, Dr. Rosemarie Booze  
**Estimating Steatosis in livers of Melanocortin-4 Receptor knockout rats.**

Obesity in the United States is an extreme health risk that approximately represents 20% of all medical spending. Steatosis, the accumulation of lipid deposits in the liver, affects many of these obese individuals and can lead to cirrhosis, liver cancer, or liver failure. While diet and exercise are the main contributing factor to obesity, there are many other causes. Melanocortin-4 receptor haploinsufficiency has been found to be the most common monogenetic form of obesity in humans, effecting approximately 4% of the obese population. Individuals with this haploinsufficiency exhibit hyperphagia, as well as other metabolic deficiencies, caused by a lack of satiety signals. Using unbiased quantitative stereology, we pursued if MC4R haploinsufficiency produces fat storage accumulation in the liver by quantifying steatosis. Using MC4R +/- rats as a model, stereology was performed on the livers to determine steatosis after the subjects were exposed to lifelong ad libitum access to fatty diets. The diets were a control diet of 1.7% saturated fat (12.2% total fat), two high fat diets of 6% and 12% saturated fat (40% total kcal from fat), and a 12.2% total fat inflammatory diet with a 20:1 omega-6:omega-3 fatty acid ratio. Each liver was sectioned using a cryostat at 20um and stained using Oil Red O. Using a brightfield microscope coupled with stereological techniques, accurate estimations of the volume of lipid deposits in each liver can be made. Preliminary data shows a difference in volume in respect to the high fat and low fat diets; the final data analysis is pending.

This work was supported by USC ASPIRE and NIH grants HD072153 and HD043680.
Steward, Rachel  
Mentor(s): Dr. Carol Boggs  
Genomic signatures for divergent host plant use in the context of an evolutionary trap

Pieris macdunnoughii, a North American butterfly native to the Rocky Mountains, specializes on plants in the mustard family (Brassicaceae). Female butterflies use chemical compounds (glucosinolates) to identify host plants and larvae happily feed on many native Brassicaceae species. Four decades ago, researchers observed that females – following an evolved recognition system – also lay eggs on nonnative mustards, including the invasive species Thlaspi arvense. However, T. arvense is lethal to P. macdunnoughii larvae, generating an evolutionary trap wherein the evolved recognition system is no longer reliably linked to good host plants. Lethality of T. arvense to P. macdunnoughii larvae is particularly puzzling because the closely-related butterfly Pieris napi lays eggs and develops normally on T. arvense where they cooccur in their native Eurasian ranges. We hybridized and backcrossed P. macdunnoughii and P. napi butterflies. In these crosses, survival on T. arvense followed standard patterns of Mendelian inheritance at a single locus. We used a pooled sequencing approach to search for regions of the Pieris genome associated with the ability to survive on T. arvense, comparing the genomes of pure P. macdunnoughii and P. napi females to backcrossed larvae with known phenotypes. Results suggest much greater divergence between the two species than originally thought. We identified key chemical resistance genes within regions of divergence. By exploring the genomic basis for shifts in feeding ability between closely related species, we seek to understand the dynamics of host plant specialization and the rapid evolution of resistance to plant defenses.

Stilwell, Matthew  
Mentor(s): Dr. Kevin Hull  
Examining the University of North Carolina Academic Scandal: An analysis of American media coverage in college sports

The purpose of this study is to examine the way American newspaper coverage covered the University of North Carolina (UNC) academic scandal. More specifically, The Raleigh News & Observer will be analyzed to see how a local media outlet portrays a controversial collegiate sporting scandal. Guided by Goffman's (1974) framing theory, this study will analyze the dominant frames that were emphasized or resistant in a local media news outlet in proximity to UNC. As for the methodology of this study, the unit of analysis being investigated will be the articles of The Raleigh News & Observer. To gather the articles, the database NewsBank was used to accumulate all articles (n=81). The timeline for this sample consists of the time between the formal NCAA notice of allegations and first sanctions that were administered by the NCAA to the football team (Friedlander, 2014). The study investigated specific research questions regarding dominant frames, mentions of individuals associated with the university, and which sports were present in the articles. Using a content analysis as the methodology, the articles were coded using the coding scheme developed by Armstrong, Hull, and Saunders (2016) that analyzed the focus of stories and blame that was being portrayed. Overall, this study will give insight to how the local media portrayed a serious academic fraud within the realm of intercollegiate athletics. Practical and theoretical implications for American media coverage will be discussed.
Due to the popularity of soccer and the purposeful use of the head during play, traumatic brain injury to soccer players has been a concern for decades. However, there is a sense of urgency now in understanding and preventing concussions better, due to raising public awareness.

Towards that end, intra-oral devices such as Vector MouthGuards are being studied to measure the athlete's head's linear and rotational accelerations from impacts experienced in practices and games. But given the players' natural distaste for such intra-oral devices, more palatable alternatives for head impact monitoring are being developed.

X2 Biosystems xPatch is an electronic skin patch that is worn behind the ear. Reebok Checklight embeds the impact sensor in the back of a skullcap which can be worn with or without a helmet. Triax SIM-P is placed inside a headband for non-helmeted sports and a skullcap for helmeted sports.

While all these devices are much more convenient to wear than intra-oral devices, it is yet to be seen whether they gain wider acceptance, particularly by the millions of amateur soccer players all over the world.

Instead of mounting sensors on the players' heads, we wondered, why not embed the sensors and smartness in the ball? Such a smartball is ideally suited for soccer, since headers, which involve contact with the ball, can cause concussions. Therefore, it is conceivable that impact of headers can be measured by the sensors inside the smartball.

Imagine a smartball that beeps (perhaps literally during practice and wirelessly to a monitor on the sideline during official games) upon a “dangerous” header, indicating that the corresponding player needs attention.

There are many advantages with such a smart soccer ball:

1) Instead of 22 players in a game wearing head mounted devices (without forgetting), a single smartball can help monitor impacts on all of them.
2) Once the technology is proven to be accurate, it will likely be deployed rapidly in professional leagues, as there will be less resistance to adoption from players.
3) Rapid adoption of the smartball leads to mass production, bringing down its cost significantly.
4) Affordable price brings the technology within the reach of millions of amateur players too, extending safety features to a wider population of soccer players.

For all these reasons, it is worth investigating the potential for a smart soccer ball to measure header impacts and mitigate concussions.
Sultan, Muthanna  
**Mentor(s):** Prof. Mitzi Nagarkatti  
**Endocannabinoid as anti-inflammatory agents in acute Lung Injury-Role of micro-RNA**

Muthanna Sultan, Hasan Alghetaa, Prakash Nagarkatti and Mitzi Nagarkatti

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**Abstract**

Staphylococcus Enterotoxin B (SEB), produced by Staphylococcus aureus causes a wide range of symptoms. It is a superantigen that activates up to 30% T cells by crosslinking the T cell receptor (TCR) to nonpolymorphic region of MHC class II on antigen presenting cells (APC). The inhalation of SEB leads to toxic shock syndrome and death. SEB is a CDC select agent of bioterrorism. In the current study, we used an intranasal dose of SEB to induce acute lung injury (ALI) in C57BL/6 mice. Anandamide (AEA), an endogenous cannabinoid, is part of endocannabinoid system (ECs) and binds to CB1 and CB2 receptors. In our study, we found that using AEA alleviated ALI in SEB-exposed mice. Lungs were excised from naïve and SEB-treated mice administered with vehicle (SEB+Veh) or AEA (SEB+AEA) for histopathological analysis. There was a significant decrease in the infiltration of inflammatory cells in the lungs from SEB+AEA mice compared to SEB+Veh. Flow cytometric analysis demonstrated a decrease in CD4+, CD8+ and NKT cells as well as Vβ8+ T cells whereas an increase in CD11b+Gr1+ myeloid-derived suppressor cells (MDSC) and FoxP3+ T regulatory cells in SEB+AEA group when compared to SEB+Veh treated mice. We next examined whether miRNA mediated the protective effects of AEA on SEB-induced ALI. Microarray analysis of lung-infiltrating cells revealed 60 up- and 77 down-regulated miRNA in SEB+AEA mice relative to SEB+Veh. Using Ingenuity Pathway Analysis (IPA), we identified target genes for miRNAs with > 1.5 fold change. We found that miR-34a-5p, miR23a and miR27a were downregulated, which target the T regulatory cell transcription factor, FOXP3, NOS1 and cytokines, TGF-β2 and IL-10 genes, respectively. Also, miR-30c-5p, which targets anti-inflammatory genes, SOCS1 and SOCS3 were downregulated. The miRs and target genes were validated by RT-PCR. Thus, we have identified miRNAs that play a role in protection from SEB-induced ALI by AEA. (Supported by NIH grants P01AT003961, R01AT006888, R01ES019313, R01MH094755 , P20GM103641 and Iraqi Higher Committee Education Development-HCED).

Swartz, Tracey  
**Mentor(s):** Dr. Kartik Kalaignanam, Dr. Satish Jayachandran  
**The Impact of on CMO Tenure on Brand Assets and Cost of Capital: Insights from Business to Consumer Industries**

This paper investigates the performance effects of CMO tenure. The authors develop a conceptual model linking the impact of CMO tenure to a firms’ cost of capital through its impact on brand value. By synthesizing insights from field interviews, the authors posit that the impact of CMO tenure on brand value will be moderated by prior CEO-CMO work overlap, CEO prior marketing experience and CEO general ability. The predictions are tested using data on 126 public US-based firms between 2004 and 2013. The findings suggest that longer CMO tenure results in higher brand value. Further, longer CMO tenure reduces cost of capital through its impact on brand value. The authors also find that the impact of CMO tenure on brand value is strengthened when the CEO has prior marketing experience as well as when the CEO and CMO have prior work overlap. This supports prior literature which suggests shared mental models among the top management team is beneficial. CEO general ability weakens the relationship between CMO tenure and brand value, suggesting that CMOs may need to work harder at opening the lines of communication to avoid butting heads with CEOs, resulting in negative consequences to the brand.
Glioblastoma is the most common and aggressive primary brain tumor, with a prevalence of approximately 20,000 new cases per year in the United States and a 3-year survival rate of just 2%. Surgery alone does not cure glioblastoma because the defused residual tumor cells, which are never eliminated by surgery, eventually cause recurrence of the tumor. Due to the poor prognosis and limited current treatment options for this malignant disease, new therapeutic strategies must be investigated. Nutrient deficiency and hypoxia in the tumor foster autophagy, which acts as a process of recycling of building blocks of cells to promote survival and proliferation of glioblastoma cells. Different molecular attributes contribute to prevention of apoptosis in glioblastoma cells. We explored the synergistic efficacy of quercetin (QCT) and sodium butyrate (NaB) in rat C6 as well as in human T98G and LN18 glioblastoma cell lines using Trypan Blue dye staining. The results indicated that 25 µM QCT and 1 mM NaB exhibited the greatest synergistic effect. The synergistic effect of QCT + NaB was measured in inhibition of autophagy in the 48-h serum-starved glioblastoma cells using acridine orange staining. We found down regulation of autophagy due to treatment with combination of drugs, when compared with a single drug. Next, the morphological feature of apoptosis was measured by Wright Staining, which showed occurrence of approximately 50% apoptosis in each cell line; with the greatest impact being on LN18. Exposure of cell membrane phospholipids, an early biochemical feature of apoptosis, was quantified via Annexin V staining and run through the flow cytometer. We found that glioblastoma cells treated with QCT + NaB increased induction of apoptosis (between 50 and 60%), whereas the single treatment caused less induction of apoptosis (between 20 and 40%). Our study is designed for understanding the morphological and biochemical features of inhibition of autophagy and enhancement of apoptosis in the serum-starved glioblastoma cells due to synergistic effect of QCT and NaB.

The purpose of this study was to assess the relationships between experiential value-relationship quality, and relationship quality-behavioral intentions within the context of the growing pop-up restaurant industry (pop-ups). The current study also assessed the moderating roles of generation, variety seeking behavior and involvement regarding dining out. Results indicated that the experiential value of pop-ups is leading to increased levels of relationship quality, as reflected in satisfaction and trust toward pop-ups, and this is leading to an increase in behavioral intentions, specifically intention to spread positive WOM, return intentions and an increased WTP for a meal at a pop-up. Furthermore, significant differences were found between groups based on generation, variety seeking and involvement. Findings are discussed in terms of both academic and practitioner implications.
Tedder, Jonathan
Mentor(s): Dr. Richard Adams
Organometallic Chemistry of Ruthenium-Gold Carbonyl Cluster Complexes Containing Aryl and Alkyl Ligands

The ability to convert simple hydrocarbons into higher value commodity chemicals catalytically is of great importance to the chemical industry. Transition metal catalysts are used to activate and functionalize C-H bonds selectively. Bimetallic catalysts often show enhanced catalytic activity compared to their monometallic counterparts. Gold has recently been shown to be valuable for the selective oxidation of hydrocarbons. Aryl-gold complexes readily react with iridium, osmium and rhenium carbonyl complexes and alkyl-gold with osmium-carbonyl complexes to yield new organo-gold-iridium, organo-gold-osmium and organo-gold-rhenium bimetallic cluster compounds that can serve as models for hydrocarbon-transition metal interactions in heterogeneous catalysis. These compounds were shown to exhibit interesting new transformations of their aryl/alkyl containing ligands. This research has now been expanded to ruthenium carbonyl clusters obtained through the oxidative addition of phenyl-gold or methyl-gold to ruthenium cluster complexes such as Ru5C(CO)15. These new organo-gold-ruthenium complexes show interesting properties such as dynamic rotation of aryl ligands and the ability to form carbon-carbon bonds. Recent studies with formyl groups have revealed similar chemistry that eliminates the need for the use of gold in some of these reactions. The transformations of the new acyl-ruthenium clusters will be presented as well.

Trott, Corinne
Mentor(s): Prof. Subra Bulusu
Variability in the Somali Current and Eddies during the Southwest Monsoon Regime

The semiannually reversing Somali Current (SC) is considerably turbulent partly due to the impacts of its three strongest anticyclonic circulations: the Great Whirl (GW), the Socotra Eddy (SE), and the Southern Gyre (SG), which all display interannual variability in location, shape, radial velocity, and amplitude due to the effects of upper-level mixing with surrounding eddies. Previous studies have been unable to fully explain the variation and formation mechanisms of the discrete high-amplitude (of above 20 cm) eddies in the western Arabian Sea. We have used satellite observations from 1993 to the present to analyze the upper-level mixing dynamics of the SC and eddies to discover that strong and normal intensity monsoon seasons are more conducive to a higher number of high-amplitude anticyclones. Increased Ekman pumping strengthens coastal upwelling off Somalia and the upwelled colder waters undergo mixing by the GW anticyclonic circulation and by a series of eddy dipoles (SE and other high-amplitude eddies) that extend into the open ocean of the Arabian Sea. Our investigation also reveals that latitudinal location of the SG has no relationship with the strength of the monsoon.

Umling, Natalie
Mentor(s): Dr. Robert Thunell
Deglacial variability in Eastern Equatorial Pacific deep-water ventilation and oxygenation Natalie Umling

The last deglaciation is marked by two periods of gradual atmospheric CO2 rise during the Younger Dryas and Heinrich Stadial 1. These millennial-scale events are overprinted by periods of rapid (100-200 yrs) increase at 11.7 ka, 14.8 ka, and 16.3 ka. The deep and intermediate ocean is thought to be a major contributor of excess atmospheric CO2 during the last deglaciation. However, the mechanisms associated with oceanic respired carbon storage are not as well constrained. Changes in the efficiency of the biological pump and in meridional overturning circulation have both been cited as possible mechanisms of respired carbon storage. We investigate the role of these mechanisms in the Eastern Equatorial Pacific (EEP) over the last 25,000 years by developing records of ventilation and oxygenation. This study focuses on sediment core TR163-23 located at 2,730 m water-depth off the Galapagos margin. This core site is currently bathed in Pacific Deep Water with thermocline depth waters influenced by upwelling Equatorial Undercurrent waters.
In the ocean, tiny plants called phytoplankton, are important for the marine ecosystem as they are the base of the food web and they create, through photosynthesis, 50% of the oxygen we breathe. But, some of them are harmful and are able to release toxins in seawater. That is the case of Pseudo-nitzschia, a type of phytoplankton that secretes a neurotoxin, domoic acid (DA). The reason why Pseudo-nitzschia releases DA is still unknown. It has been hypothesized that DA is an allelochemical allowing Pseudo-nitzschia to outcompete the other phytoplankton species by inhibiting their growth. The purpose of this research was to examine the phytoplankton response to dissolved DA (dDA) exposure on natural estuarine and benthic microalgal communities from North Inlet and Winyah Bay estuaries, ecosystems not exposed to intense toxigenic blooms of Pseudo-nitzschia. In particular we detail here the microalgal responses over different dDA concentrations ranging from 2 to 650 ng/ml based on measurements of total microalgal cell abundances, photopigment concentrations, and abundances of the different phytoplankton genera. Benthic and estuarine phytoplankton communities responded differently to the exposure to dDA but they were not significantly affected.

Introduction: Several cancers such as cervical, most oropharyngeal, and anal are caused by human papillomavirus (HPV). HPV infection is very common, however HPV-mediated cancers are relatively rare. The reasons why certain individuals among the many who are infected with HPV develop cancer are poorly understood, and there are currently no biomarkers that allow for the detection of HPV infections that have a higher risk to produce cancer. Recent findings have demonstrated that the culture of normal human keratinocytes (NHKc) as 3-D multicellular spheroids on soft agar selects for cells with stem cell properties. Previous work on NHKc strains from 59 different individuals showed that only 40% of NHKc strains have the ability to form spheroids. In addition, we observed that spheroid-derived NHKc are much more efficiently transformed than their corresponding mass-cultured NHKc when transfected with HPV16 DNA. Therefore, it appears that individual NHKc cultures have different densities of stem cells, and that individuals with a higher stem cell density are more susceptible to HPV16-mediated transformation. We are now determining whether a different epidermal stem cell density is an intrinsic property of individuals, or is a result of differences in age and processing of the individual skin specimens.

Methods: Neonatal foreskins were collected at the neonatal unit of a local hospital within 24 hours of the circumcision. This reduced the potential time variable that may have affected stem cell viability/numbers in skin specimens, and spheroid formation. Each skin specimen was then divided into two segments: one was processed to separate the dermal from the epidermal layers and establish primary cell cultures. The epidermis gave rise to NHKc, which were placed in 3D cultures for spheroid formation; the dermis was utilized to establish cultures of fibroblasts, for DNA extraction. The second portion of each specimen was fixed in 10% neutral buffered formalin (NBF) and paraffin embedded. Using in situ hybridization on a section of each tissue sample, we assessed the expression levels of 4 basal stem cell markers: keratin-5 (K5), keratin-14 (K14), epidermal growth factor receptor (EGFR), and integrin Ė-6 (ITGĒ’6).

Results: After primary NHKc were grown to confluency, we performed a spheroid assay to determine whether the individual NHKc strain formed spheroids under non-adhesive conditions. Next, using RNAscope in situ hybridization, we determined the mRNA expression levels of 4 basal stem cell markers: keratin-5 (K5), keratin-14 (K14), epidermal growth factor receptor (EGFR), and integrin Ė-6 (ITGĒ’6).

Conclusions: To determine the effect that basal stem cell density has on spheroid formation, we also need to observe the protein expression of the stem cell markers. Future experiments include immunohistochemistry to analyze the protein expression of the same basal stem cell markers. In addition, we plan to use next generation sequencing of DNA extracted from the fibroblasts derived from each specimen to determine if any polymorphisms are correlated with the ability to form spheroids.
Background: Diabetes has been shown to increase the risk of colorectal cancer (CRC). However, very few studies have assessed the association between duration of diabetes and either CRC risk or disease aggressiveness. Even more rarely have studies confirmed the status of type 2 diabetes mellitus (T2DM) while determining the diabetes-CRC association.

Methods: Using data from the Prostate Lung Colorectal Ovarian Cancer Screening Trial (PLCO), we examined the impact of T2DM and diabetes duration on CRC risk, as well as grade and stage at diagnosis. Diabetes duration was calculated using information on age at diabetes diagnosis. CRC information was derived using annually administered questionnaires and confirmed using medical records. We fit a Cox proportional hazards model for cancer incidence and conducted logistic regression analysis for cancer grade and stage.

Results: T2DM was related to an increased risk (hazard) of CRC (HR=1.22; 95%CI: 1.02, 1.47). Participants with >10 years of diabetes had a higher risk (HR=1.37; 95%CI:1.06, 1.77) of CRC incidence compared to non-diabetics. An apparently smaller effect was observed among people with <10 years of diabetes duration (HR=1.13; 95%CI:0.89, 1.43); however, it was not significant. Although results were non-significant, the risk of higher grade and stage of cancer was high among non-diabetics as compared to diabetics.

Conclusion: CRC risk was higher among people with longer duration of diabetes, even after accounting for the potential confounders.

The Queer Cola Oral History and Digital Archive Project (QCOHDAP) creates a community-born and community-curated digital archive and oral history collection that chronicles, reflects and celebrates the experiences of the LGBTQ+ community of South Carolina. Focused on building a collection that is digital in nature, the project aims to create an ever evolving, technologically forward looking space to match a community whose identity remains in flux. The project aims to give voice, agency and chances to build an alternative history to those persons whose identities remain excluded within queer histories. Specifically, this project pushes against the emergence of a “new homonormativity” (Duggan, 2002) which posits the possibility of equality within heteronormative, capitalist discourses, always at the exclusion of other members of the LGBTQ+ community (p. 179). The QCOHDAP expressly works against a neoliberal coopting of groups and instead aims to examine those groups not included in current constructions of Southern queer history. This project looks towards queer spaces within Columbia that remain underserved, underrepresented and, frankly speaking, marginalized by prominent organizations and figures in Columbia’s LGBTQ+ community. The groups QCOHDAP aims to serve include, but are not limited to: Columbia’s queer youth, queers of color, trans college students and homeless/lower class queers. QCOHDAP operates within logics of community archiving, which unlike institutional archives, embrace their inability to adhere to ‘best practices’ and, alternatively, treat the act of saving histories as one mired in frenzy and actualities of failure. This means that QCODHA reconceptualizes how a digital repository of oral histories and documents looks, while knowing it can never wholly be a complete account of queer history. Thus, the QCODHA works towards a queering of archival logics. More specifically, the project accepts that it must purposefully regulate access as potential donors/subjects whose identities, while important, carry with them social stigmatization outside of the hallowed comforts of an accepting archive.
Walker, Denetra
Mentor(s): Dr. Sei-Hill Kim
Anyone to Blame? News Framing of Press Coverage of Police Shootings

Police shootings are a controversial issue that have captured headlines of news organizations on numerous occasions. By using content analysis, the purpose of this study is to utilize the communication theory of “Framing” to analyze who the media identifies as being responsible for police shootings in the U.S. over a 20-year time period. Researchers for this project will use articles of police shootings (n=450) from 9 newspapers which vary from Liberal (3), Conservative (3) and African American (3) to identify whether this issue is presented at a personal or societal level. This content analysis will also evaluate whether the frames change in identifying who (police/victim/society) the media blames in the newspaper articles over the 20-year time span and how the stories are presented.

Wang, Fan
Mentor(s): Dr. John Ferry
Co-oxidation of Halides during the Autoxidation of Fe(II)

Hypohalite ions (-OX) are formed in the environment due to the autoxidation of Fe(II). Aqueous Fe(II) is not a strong oxidant, yet it generates a suite of strong oxidants when it is oxidized by dioxygen, including superoxide, hydrogen peroxide and the hydroxyl radical. These species in turn have a reduction potential sufficient to the oxidation of dissolved organic matter and even some inorganic ions. Here we show the reactions of HO with I- and Br- to produce I and Br radicals with their corresponding dihalide radical ions (X2-), and through dismutation of the radical ions hypohalite ions (-OX). This study reports a test of the hypothesis that conditions favoring the formation of reactive halogen species exist at points of porewater discharge in estuaries, particularly in association with tidally driven efflux.

A multifactor experimental design reporting the yield of hypohalous acid as a function of covarying ferrous and ferric iron, as well as I- or Br- and other environmental factors such as bicarbonate or natural organic matter is reported. Hypohalites were measured using the leucocrystal violet method and N,N-diethyl-p-phenylenediamine assays. Experimental parameters vary from nominal zero to 1.5 times those normally reported for marine estuaries. The yield of and optimal conditions for maximizing HOX yields are reported at pH 8.0.

Warden, Deborah
Mentor(s): Dr. Robin Estrada
Nurse leaders: Social processes of becoming

Background: Nursing is an autonomous practice discipline, and in most hospitals and health care facilities, nurses occupy high-level directorships and executive roles. Succession planning and development of leaders are crucial requirements for long-term organizational stability. Providing high-quality, well-prepared candidates for these positions is critical for the discipline of nursing to remain an important advocate for patient care. The purpose of this study is to describe the development experiences of nurses who are managers, directors and executives.

Approach: This study is a qualitative descriptive study using grounded theory data analysis techniques. Five interviews were initially conducted for this study, and an additional five interviews were reviewed for secondary analysis and comparison.

Results: While all the participants moved into formal leadership at different points in their career trajectories, there were similarities in their experiences regarding their changing roles and identities. The social processes involved in their development into leaders are those of Being Called, Being Called Out, and Becoming. Through this process, the nurse transcends being an occupant of a position and embraces the identity of a formal leader. Throughout these stages, the nurse receives preparation from individual knowledge-bearers and from formal opportunities for learning.

Conclusion: Early identification of potential formal leaders is crucial in guiding the next generation of nurse leaders and in effective succession planning for organizational stability. Understanding the social processes involved in growing nurse leaders essential for providing opportunities for identification, practice, and identity integration.
Weber, Christine  
Mentor(s): Dr. Douglas Wedell  
Manipulating preferences through evaluative conditioning  

Evaluative conditioning is the process of pairing neutral target stimuli with positive or negative stimuli to produce changes in attitudes toward the target. In the present study, pictures of consumer products that were individually selected to be neutrally liked were paired with positive and negative music. After several repetitions of these pairings, participants completed two test phases, where they made preference choices between positively and negatively paired products, and rated how much they liked each product. Participants were more likely to prefer the positively paired products, and also rated positively paired products higher on liking. These results show successful manipulation of product preferences using evaluative conditioning. This experimental paradigm is being extended into the eye tracker, where participants’ eye movements and pupillary responses in reaction to the previously paired products will be measured.

Weiser, Gavin  
Mentor(s): Dr. Allison Marsh  
Exploration of Emotions: PhotoVoice Diaries 2016/2017  

Using photos & narratives, explore the experiences with regards to emotions of several women. Guided by a commitment to co-creation of narratives, this project employed participatory action research to engage a community as co-researchers to guide the direction of the research. This project, with its critical focus on improving & understanding the educational experiences of women and those who identify as women, will serve to educate others about an experience that is often dismissed and ignored.

White, Nicole  
Mentor(s): Dr. Suzanne Swan  
Intimate Partner Violence and Sexual Assault Among Black College Women at Predominantly White Institutions (PWIs)  

Studies have found that between one fifth to one fourth of college women are sexually victimized over their college years (i.e. Cantor et al., 2015; Fisher et al., 2000). Some researchers have found that physical violence occurs in 20-37% of college relationships (Shorey et al., 2008; Bell & Naugle, 2007). Despite the growing research on college populations, there is a dearth of studies on minority populations, particularly Black students. The majority of the literature on Black women and their experience with sexual assault and intimate partner violence (IPV) has been based on community samples. The few studies done with college populations have been conducted at Historically Black Colleges and Universities (HBCUs), which have a different environment than predominantly White institutions (PWIs). Researchers have found a relationship between drinking alcohol and sexual assault and IPV (e.g. Fisher et al., 2000), but victims’ alcohol usage is rarely compared by race. Help-seeking, i.e., pursuing formal and informal resources for support, may be able to alleviate some of the adverse effects of sexual assault and IPV. These adverse outcomes can include depression, a decline in academic performance, and increased alcohol use. No prior studies were found examining the help-seeking behaviors of victimized Black college women at PWIs. The current study seeks to examine the differences between: 1) the prevalence of IPV and sexual violence for Black and White female students; 2) the adverse effects of victimization including depression, negative academic outcomes, and binge drinking by race; and 3) racial differences in help-seeking following victimization. The sample size for the study is 491 Black and 4,914 White female students from three large PWIs in the United States.
Wilkins, Cody  
Mentor(s): Dr. John Weidner, Dr. Taylor Garrick  
Performance of Sulfonated Polybenzimidazole membranes for use in the Hybrid Sulfur Electrolyzer for Hydrogen Production

The hybrid sulfur (HyS) thermochemical cycle has shown the potential to produce clean hydrogen on a large scale at much lower potentials than that of standard electrolysis of water, allowing for a more efficient process. The two step process involves the high temperature decomposition of sulfuric acid to produce sulfur dioxide, oxygen, and water, as well as a low temperature electrochemical oxidation of sulfur dioxide in the presence of water to produce sulfuric acid and gaseous hydrogen. The sulfur compounds are internally recycled in the process, so overall you just have the decomposition of water into gaseous hydrogen and oxygen. This process is very interesting because the high temperature decomposition step could be coupled to next generation solar power plants or high temperature nuclear reactors in order to produce hydrogen for other applications such as fuel cells or the hydrogen could be used as energy storage. Proton exchange membrane such as Nafion in the HyS electrolyzer has been thoroughly examined via the prediction of mass transport through the membrane as a function of operating potential and other design variables. However, Nafion presents several drawbacks, including the inability to operate at elevated temperatures and the decreased performance seen when exposed to high acid concentrations. Therefore, we are investigating sulfonated polybenzimidazole membranes (s-PBI) for use in the hybrid sulfur electrolyzer over Nafion for improved performance. We studied the s-PBI membranes to find and model parameters to predict kinetics and membrane conductivity. This allow us to see what the contributions to the overall cell potential are and extend our understanding of how to lower the overall cell potential to allow the HyS electrolyzer to be economically viable.

Williams, Derek  
Mentor(s): Dr. Natalia Shustova  
Metal-Organic Frameworks (MOFs): A Versatile Platform for Light Harvesting and Energy Transfer

Energy consumption is continually increasing and, as a result, humanity faces the problem for alternative energy supplies. Development of photovoltaic materials capable of efficient light harvesting and energy transfer can address these growing demands. Metal-Organic Frameworks (MOFs), a versatile class of crystalline, highly-ordered, porous materials, can be employed to address the challenge of efficient light harvesting and directional energy transfer.1 Assembled from organic linkers anchored through metal nodes, MOFs offer modularity resulting in high tunability of not only their topology but also material properties. For instance, efficient light harvesting can be achieved through ligand design, while highly-ordered chromophore arrangement could result in efficient energy transfer.1

In my work, the focus is on energy transfer processes in three types of donor-acceptor MOFs including fulleretic materials, photochromic scaffolds, and frameworks mimicking the photophysical response of green fluorescent protein (GFP). For example, assembling fullerene, a well-known electron acceptor in organic photovoltaics, with a porphyrin-based donor results in a three-dimensional MOF capable of light harvesting.2 In that case, energy transfer efficiency of 50% was accomplished.2 To achieve directional energy transfer, a hybrid framework containing a photochromic linker was designed. In that case, an organic linker acts as a photoswitch capable of turning “ON” and “OFF” the material emission profile as a function of an excitation wavelength through the closing and opening of energy transfer pathways.3

I have also utilized a MOF matrix to control dynamics and photophysics of chromophores with a benzylidene imidazolone core, which are responsible for emission of GFP and its analogs.4 In other words, a MOF matrix was used as a mimic of the GFP β-barrel through restriction of low energy vibrational modes of chromophores. Notably, this class of chromophores is typically non-emissive outside the β-barrel, and therefore, lab-synthesized chromophores are very difficult to study. A MOF matrix allowed us to restore the emission profile of the artificial non-emissive chromophores and thereby, provide an avenue to study their photophysical properties outside of natural proteins. As a result, the emission profile of the chromophores inside the prepared MOFs is very close to the one observed for natural GFP analogs.4

To summarize, the mentioned findings foreshadow a new avenue for utilization of well-ordered hybrid materials in applications varying from solar cells to photocatalysts.
Willingham, Allison  
**Mentor(s): Dr. Tia Stevens-Anderson**  
**Understanding Traumatic Brain Injuries in Intimate Partner Violence**

This research is an exploratory qualitative study about survivors of domestic violence who have sustained traumatic brain injury (TBI) as a result of the endured abuse. Findings detail the ways in which TBI was caused, the effects of TBI on the survivors’ day to day lives, and the resources the survivors have accessed to cope with TBI. This paper also examines the way TBI interacts with other comorbid conditions, such as post-traumatic stress disorder (TBI), rape trauma syndrome, depression, and other relevant mental illnesses.

Wolf, Lauren  
**Mentor(s): Dr. Melissa Moss**  
**RAGE Expression and Inflammation with Amyloid-beta Exposure in Alzheimer’s Disease**

Alzheimer’s disease (AD) is a costly and devastating illness that to date has no effective treatment or cure. Although we understand little about the etiology of AD, it may be possible to understand more about its development and progression through the exploration of potential therapeutic targets. The Receptor for Advanced Glycation End Products (RAGE) is one such target: Azeliragon, a RAGE antagonist, has received renewed attention for its long term benefit in patients with mild to moderate AD. RAGE does, therefore, appear to play some role in AD progression, and A is a known ligand of RAGE.

Early scientific efforts cast amyloid- (A) as the culprit of AD, but more recent research has recast A as a participant in the disease rather than its sole cause. In contrast, chronic neuroinflammation emerged as a singularly important factor in disease etiology; our knowledge of this facet of the disease mechanism is limited at best, and less is known about changes in RAGE expression despite its implications in the immune response. Recent studies with RAGE have shown that both membrane-bound and soluble RAGE expression is altered as part of a feed forward mechanism for environmental stress or exposure; therefore RAGE is a means through which cells anticipate and interpret their local environment, and may also be a source of dysfunction in chronic inflammation.

To determine how chronic inflammatory stress and stimulation with A influences inflammatory cell signaling and RAGE expression, I assessed the impact of chronic and acute LPS and A exposure on RAGE expression in differentiated THP1 macrophages exposed daily for 3 days to low level (nM) A42 oligomers (believed to be the primary pathological species of A), low dose lipopolysaccharide (LPS) to stimulate an inflammatory response, or both. At the end of this time, treated and untreated macrophages will be briefly exposed to high (nM to M) concentrations of A42 oligomers. The supernatant was harvested pre and post acute stimulus exposure and evaluated via ELISA for inflammatory cytokine expression (IL-1, IL-6, IL-8, IL-10, TNF, and GM-CSF. Cells were fixed, stained, and imaged with confocal microscopy to evaluate membrane-bound RAGE expression.

Yan, Wuzhao  
**Mentor(s): Dr. Bin Zhang**  
**Lebesgue sampling based fault diagnosis and prognosis design with application to Lithium-ion batteries**

The concept of Lebesgue sampling is introduced into FDP and a novel Lebesgue sampling-based FDP approach with an philosophy of “execution only when necessary” or an “as-needed” basis. With this new feature is developed, the LS-FDP enables the FDP on systems with limited computation capabilities and enables the distributed FDP.
Yazdani, Shafagh - Supervisor(s): , , , - Mentor(s): Dr. Troy Herter, , , , -- Cortical lesions and disconnection after stroke contribute independently to motor impairments -- Stroke is the leading cause of neurological impairments affecting motor function in the US. The relationship between stroke-induced behavioral impairments and brain damage can be investigated with neuroimaging techniques that assess anatomical damage to brain structures and anatomical disconnection within brain networks. Coupling lesion- and connectivity-based analyses have helped advance our understanding of the neural mechanisms that underlie perceptual and cognitive functions. Specifically, studies have shown that lesions and disconnection contribute independently to perceptual and cognitive impairments. Most studies of motor function, however, have focused on lesion-based approaches. As a result, it remains unclear if lesions and disconnection contribute independently to motor impairments. The purpose of this study was to examine if disconnection is an independent and complementary contributor to motor impairments. We examined the relationships between upper-limb motor impairments (KINARM Endpoint Lab) and anatomical lesions (T1- and T2-Weighted Magnetic Resonance Imaging) and disconnection (Diffusion Tensor Imaging) in 53 patients with left hemispheric stroke. We examined lesions and disconnection of five cortical regions with key sensorimotor structures: 1) Precentral Gyrus, 2) Postcentral Gyrus, 3) Middle Frontal Gyrus, 4) Superior Frontal Gyrus, and 5) Superior Parietal Gyrus. Lesion volume within regions was only weakly correlated with the magnitude of disconnection between regions. Importantly, the lesions and disconnection were independent predictors of motor impairment. These results suggest that combining lesion- and connectively-based analyses can improve our understanding of the neural mechanisms that underlie motor function.

Yi, Zebang
Mentor(s): Dr. Mohammed Baalousha
Using the H- and O- isotopic data and Br/Cl ratio as a tracer to identify the origin of salinity in shallow groundwater in Guangzhou region, China

Groundwater salinization is a significant global environmental issue. Groundwater salinization in Guangzhou region, China has posed public concern which directly hampers the daily life of the general public and local industrial and agricultural growth. The D/H and 18O/16O isotopic ratios, chloride and bromine concentrations of groundwater samples of Guangzhou region along with seawater and unsaline groundwater samples have been employed to explore the water salinization degree, source and the mechanisms of groundwater salinization in Guangzhou region. The results show that the main source of the groundwater salinization in the Guangzhou region is sea water intrusion. The groundwater salinity area mainly localized in the south part of Guangzhou region. The salinity of the groundwater is caused by the mixture of sea water and fresh water. No other source of groundwater salinity increase was identified. This result thus provides a useful means for evaluation of quality groundwater resources of Guangzhou region.

Yoho, Deborah
Mentor(s): Dr. Kirk Foster
Storage Space for Individuals experiencing Homelessness

This project researched the need for local storage space for homeless persons to enable them to secure their belongings while attending job interviews or other appointments or accessing services.
Young, Tyra  
Mentor(s): Dr. Christian Anderson  
Sustainability in Higher Education

The aim of this presentation is to give insight on how to create a sustainable campus by providing the best practices of campus sustainability for colleges and universities. We compare the literature on the best evidence-based practices of sustainability at institutions of higher education in the United States (U.S.) and in Iceland to show how to be more sustainable. The purpose of presenting examples from the U.S. and Iceland is to highlight the sustainable practices before the presenters study abroad in Iceland. Institutions that aim to create lasting and holistic improvements for greater sustainability should focus on three areas: economic, social, and environmental changes. Sustainable development refers to strategically meeting needs of the present while being conscious of the future. With the objective of creating sustainable change that includes these three fundamentals at higher education institutions, all major stakeholders at the institution must be involved in pursuing the goal of sustainability. Implementing sustainable development through improving campus structures, implementing sustainable practices in student organizations and training of staff members, and incorporating sustainability into all areas of education at a university are tangible and measurable ways to achieve campus sustainability.

Zamir, Md Hassan  
Mentor(s): Prof. David Lankes  
Understanding perceptions and behaviors of social media users during protest: A Machine Learning Approach

This poster represents how we can understand the perceptions and activities of protesters in social media. It specifically discusses how protesters of the Shahbag Movement happened in 2013 in Bangladesh used Twitter and shared their views about the movement. This study examines the tweets of the Shahbag Movement protesters, both supporters and detractors, by using machine learning techniques to gather insights of the movement. This poster includes the exploratory data analysis of the movement including the results of who were the protesters, their level of opinions, geographical locations and types of networks they had on Twitter.

Zhang, Qingfeng  
Mentor(s): Prof. Hui Wang  
Insights on Plasmon-Driven Oxidative Coupling of Thiophenol-Derivates: Evidence on Steady-State Active Oxygen Species

Plasmonics is a newly emerging field that has profound impact on energy storage and conversion, sub-wavelength light manipulation, photothermal cancer therapy, and ultrasensitive biomolecular sensing. It has been recently observed that the localized surface plasmon resonance supported by metallic nanostructures plays a crucial role in driving or enhancing a series of interesting chemical or photochemical reactions on metallic nanoparticle surfaces, though the detailed mechanisms of these plasmon-mediated reactions are still poorly understood and under intense debate. Therefore, it is imperative to gain quantitative insights into the kinetics and underlying pathways of these plasmon-driven photoreactions to fully understand the obstacles that might limit the wide applications of plasmonic nanostructures as high-performance photocatalysts. In this poster presentation, I will talk about our latest progress on developing quantitative understanding of the kinetics and underlying pathways of plasmon-driven oxidative coupling of thiophenol-derivates. We used single-particle surface-enhanced Raman spectroscopy (SERS) to precisely monitor, in real time, the plasmon-driven photoreaction kinetics at the molecule-nanoparticle interfaces. A unique hybrid nanostructure composed of a SiO2 bead decorated with Ag nanocubes was used as a plasmonically addressable substrate for SERS measurement. The plasmon-driven oxidative coupling of 4-aminothiophenol was chosen as a model reaction to explore the effects of local electromagnetic field enhancement, concentration of oxygen species, molecular structure of thiophenol-derivates, thermal annealing, and photothermal processes, on the plasmon-driven photoreactions. A steady-state kinetics model of active molecular oxygen species in guiding the plasmon-driven oxidative coupling of thiophenol-derivates was proposed, in which the activation of surface adsorbed thiophenol-derivates was found to be the rate-limiting step during the overall photocatalytic reaction.
Zhang, Yingsha  
Mentor(s): Dr. David Cardenas  
Origin-side Theme Park Demand, Theme Park Attractiveness, and Visitors’ Choices of Theme Park

This dissertation mainly studies the relationship among theme park demand, theme park attractiveness, and visitors’ choices of theme parks. It consists of three studies addressing three questions: 1) How to measure theme park demand and theme park attractiveness? 2) How is the spatial interaction between theme park demand and theme park attractiveness? 3) How do visitors select theme parks? The first study measures origin-side theme park demand and theme park attractiveness with the reversed gravity model and particle swarm optimization. The second study firstly explores the size distribution and spatial structure of theme park demand and theme park attractiveness via Zipf’s Law and Central Place Theory. Then, it examines the spatial interaction between theme park demand and theme park attractiveness using the model of Tourism Field. The last study investigates visitors’ choices of theme park using Push and Pull Model and Random Utility Theory via multinomial logistic regression and agent-based modeling. The main data include theme park review data extracted from online travel agency and data from U.S. census bureau. This study will provide significant resources to aid in theme park planning, investment, and marketing.

Zheng, Jiali  
Mentor(s): Prof. Susan Steck  
Dietary inflammatory index and risk of pancreatic cancer in the Prostate, Lung, Colorectal and Ovarian Cancer Screening Trial (PLCO) cohort

Background: Inflammation plays a key role in pancreatic ductal adenocarcinoma (PDA) development and can be modulated by dietary exposures. Our study aimed to prospectively examine the inflammatory potential of diet, assessed using the Dietary Inflammatory Index (DIITM), with PDA risk in the Prostate, Lung, Colorectal and Ovarian (PLCO) Cancer Screening Trial cohort.

Methods: After exclusions, a total of 101,522 participants aged 52 to 78 years at baseline (1993-2001) who completed diet history questionnaire (DHQ) with a median of three years after baseline and provided health data were included in the analyses. Participants were followed from DHQ completion until incident PDA diagnosis, death, study withdrawal, or end of data collection. Energy-adjusted DII (E-DII) scores were calculated from food and supplements using a nutrient density approach. Cox proportional hazards models were used to estimate hazard ratios (HRs) and 95% confidence intervals (CI), with participants in the lowest E-DII quintile (most anti-inflammatory scores) as referent.

Results: After a median 8.9 years of follow-up, 365 PDA cases were identified. E-DII scores were not associated with PDA risk after controlling for key confounders (HRQ5 vs Q1 =1.02; 95% CI=0.73-1.41; P-trend=0.30). In stratified analyses, participants with follow-up time less than 3 years had an inverse association between E-DII and PDA (HRQ5 vs Q1=0.40; 95% CI=0.21-0.77; P-trend=0.01), while there was a suggestion of a positive association among those with follow-up time longer than 3 years (HRQ5 vs Q1 =1.29; 95% CI=0.87-1.90; P-trend=0.02, P-interaction=0.001). Sex, body mass index, history of diabetes and smoking status did not modify the E-DII and PDA association.

Conclusions: Reverse causality due to undetected diseases may account for the inverse association we observed between dietary inflammatory potential and PDA in the first three years of follow-up. After three years, a positive trend between dietary inflammatory potential and PDA was observed. Confirmation of these findings in other large cohorts is warranted.
Zhou, Jie
Mentor(s): Prof. Jiajia Zhang
Joint Model of the CVD Mortality and Nonlinear Longitudinal Effect of Physical Activity

Physical inactivity, mainly due to the sedentary lifestyle, has been shown to have a positive association with CVD mortality. The repeated records of cardiorespiratory fitness in the Aerobics Center Longitudinal Study (ACLS) database facilitate the analysis of the longitudinal effect of fitness on the CVD mortality. According to recent studies, the age-associated decline in fitness is not linear but accelerated. Therefore, a nonlinear interaction effect between fitness and age should be considered to reveal the true association between physical activity and CVD mortality. We developed a novel statistical tool to jointly model the CVD mortality and nonlinear longitudinal effect of physical activity, while adjusting for other possible confounding factors such as the tobacco and alcohol use. The EM algorithm is used to estimate the unknown parameters and the variance estimators are obtained based on the empirical Fisher information matrix of the profile likelihood. The performance of the proposed model is evaluated through a comprehensive simulation study, where different censoring proportions, baseline hazard functions and sample sizes are considered. The application on the ACLS dataset is also discussed.
Postdoctoral Scholars presentations
Alghetaa, Hasan  
Mentor(s): Mitzi Nagarkatti  
Protective role of resveratrol against lung dysbiosis in SEB-induced acute lung injury

While the lungs were believed to be sterile, recent studies have demonstrated the presence of lung microbiota. Any pulmonary disease, therefore, will affect the commensal bacterial communities. This study focuses on the alteration of the lung microbiota during acute lung injury (ALI). To achieve this goal, C3H/HeJ mice were administrated by intranasal and intraperitoneal doses of Staphylococcal enterotoxin B (SEB) to induce ALI. Resveratrol (RES), an anti-inflammatory agent at a dose of 100mg/kg or vehicle (VEH, 1% carboxl methylcellulose) were administrated twice orally as preventative. Forty eight hours later, blood, broncho-alveolar lavage (BALF), spleen and lung tissues were collected for evaluation. RES-treated mice survived when compared to VEH-treated mice having SEB-induced ALI. Furthermore, lung microbiota was collected and 16S rRNA sequencing was performed. The data was analyzed to determine the alpha and beta diversity. We found that major phyla of the lung microbiota, Firmicutes and Proteobacteria were markedly changed when exposed to SEB. RES treatment caused a significant decrease in Proteobacteria phylum, particularly families, Oxalobacteraceae and Pasteurellaceae as well as Rheinheimera spp., but resulted in a significant increase in the beneficial genus of Lysoabacter which produces β-lactam, a novel antibiotic with effects on other microorganisms, in comparison with VEH-treated mice. Moreover, RES treatment led to elevate Firmicutes phylum because of increase in the beneficial genus, Lactobacillus. Lipopolysaccharide (LPS), gram negative bacterial endotoxin was found at significantly higher concentration in the BALF of VEH-treated group in comparison with RES-treated mice. Beneficial metabolome levels were significantly higher in the serum of RES-treated mice versus VEH-treated mice, specifically propionic and acetic acids. Together, resveratrol has a major impact as a prebiotic in reverting pulmonary homeostasis during severe inflammation caused by the superantigen, SEB. (Supported by NIH grants P01AT003961, R01AT006888, R01ES019313, R01AI123947, R01AI129788, R01MH094755 and P20GM103641).

Bam, Marpe  
Mentor(s): Dr. Mitzi Nagarkatti  
Inflammation in PTSD is an outcome of the dysregulated miRNA biogenesis pathway.

Marpe Bam, Xiaoming Yang, Prakash S. Nagarkatti and Mitzi Nagarkatti  
Department of Pathology, Microbiology and Immunology, School of Medicine, University of South Carolina, Columbia, SC 29209, USA

It is well established that PTSD patients exhibit chronic systemic inflammation characterized by upregulated expression of proinflammatory cytokines, IFNγ and IL12. However, the mechanism of regulation of these genes is inadequately understood. The role played by miRNAs is one of the key mechanisms of gene regulation. An alteration in miRNA biosynthesis pathway can result in dysregulation in their expression which can impact the target genes. We observed that AGO2 and DICER1 expression is lower in the PBMCs of PTSD by RNA-Seq analysis. These proteins are responsible for the generation of mature miRNAs. Furthermore, we observed a massive downregulation of miRNAs in the PBMCs from PTSD patients by microarray analysis, thereby leading us to hypothesize that lower expression of AGO2 and DICER1 occurs during PTSD and this probably results in the downregulated expression of miRNAs. Upon analysis of the target genes of the dysregulated miRNAs, we observed that several of the pro-inflammatory and related genes are targets of the downregulated miRNAs. Thus, we further hypothesized that dysregulated expression of the immune system genes during PTSD is contributed by defective miRNA biogenesis. We further confirmed miRNA dysregulation by performing microarray on a replication sample group which further confirmed our initial observations. In vitro experiments showed that the expression of several dysregulated miRNAs is altered as a result of the knockdown of AGO2 and DICER1 independently. Upon further investigation, we observed that STAT3, which we found to be downregulated in PTSD, is probably the one responsible for the downregulated expression of AGO2 and DCR1. The findings strongly indicate a role for the downregulated expression of STAT3, AGO2 and DCR1 in inflammation seen in PTSD patients. The present data further provide strong evidence that PTSD manifests an inflammatory condition which is epigenetically regulated and these molecules can be used as biomarkers for PTSD diagnosis and for combating the chronic inflammation. (This work was supported in part by National Institutes of Health grants P01AT003961, R01AT006888, R01ES019313, R01MH094755, and P20GM103641).
Background: The average age at death for diabetes as the underlying cause has improved overall in South Carolina; however, this improved longevity was observed for whites only and not blacks. The implication of prolonged life translates into living longer with diabetes and may lead to an increase in comorbid conditions. In South Carolina, hospitalizations with diabetes as the primary diagnosis is now more commonly accompanied by secondary diagnoses for other conditions, which was not previously observed 20 years ago. This project was designed to examine the racial differences in the number of comorbid conditions among individuals hospitalized for diabetes as the primary diagnosis in 1996 versus 2014.

Methods: The International Classification of Diseases Version 9 (ICD-9) diagnoses codes for each inpatient visit in 1996 and 2014 were used to identify the existence of 30 comorbid conditions using the Elixhauser Comorbidity algorithm. Only visits for patients 25 years and older were included in this analysis. The total number of comorbid conditions in addition to the primary diagnosis of diabetes was calculated for each inpatient visit. This total number did not include the following comorbidity categories: diabetes mellitus or diabetes mellitus with complications. Each inpatient visit was then categorized by the number of comorbid conditions as follows: none, 1, 2, or 3+ comorbid conditions. Age-adjusted hospitalization rates were calculated for each comorbid condition category using the age-specific adjustment weights from the 2000 U.S. Standard Population and the estimated diabetes population in 1996 and 2014 as the denominator (SC BRFSS). Comparisons were made between 1996 and 2014 to examine any differences in rates.

Results: Between 1996 and 2014, the diabetes hospitalization rate declined by 90% among adults with no comorbid conditions (-88% among whites and -92% among blacks), 65% among adults with 1 comorbid condition (-54% among whites and -77% among blacks), and 36% among adults with 2 comorbid conditions (-28% among whites and -50% among blacks). However, diabetes hospitalization rates increased by 20% among adults with 3 or more comorbid conditions (31% increase among whites but a 4% decline among blacks) between 1996 and 2014.

Conclusions: Diabetes hospitalization rates among adults with 2 or less comorbid conditions declined between 1996 and 2014. This decline was of similar magnitude for whites and blacks. However, there was an increased risk of diabetes-related hospitalization among white adults with 3 or more comorbid conditions; while diabetes hospitalization rates declined among black adults between 1996 and 2014. The presence of multiple comorbid conditions should be considered when treating patients with diabetes because early intervention and continuity of care is needed in order to reduce the progression of the disease and the deterioration of their health overtime.
Busbee, Philip
Mentor(s): Mitzi Nagarkatti
Indole-3-carbinol ameliorates murine colitis symptoms through alterations in gut microbial composition and metabolomic pathways, particularly through decreasing disease-associated Bacteroides acidifaciens species.

Colitis is an autoimmune disease characterized by acute or chronic inflammation of the large intestine. Currently there is no cure for patients suffering from colitis, and most treatments involve the use of immunosuppressive drugs that can have adverse side-effects or increased toxicity. In the current study, we show that indole-3-carbinol (I3C), a naturally-occurring plant product found in a number of cruciferous vegetables, was able to ameliorate symptoms in two well-established murine colitis models (DSS and TNBS). In particular, I3C was able to prevent weight loss, reverse colon shortening, as well as reduce accumulation of disease-associated infiltrating immune cells and inflammatory biomarkers, such as serum amyloid A (SAA). We performed 16S rRNA metagenomic sequencing to investigate alterations in the gut microbiome after induction of colitis by TNBS and treatment with I3C. 16S analysis of cecal flushes and validation by PCR revealed that TNBS-induced colitis leads to a significant increase in the species Bacteroides acidifaciens, whereas colitis mice treated with I3C had decreased levels of this species, comparative to naïve controls. In addition, I3C was able to modulate gut microbial metabolites by way of altering short chain fatty acid (SCFA) production during disease induction. Lastly, transfer of disease (TNBS) and treated (TNBS+I3C) fecal material in antibiotic-treated disease mice confirmed I3C-mediated alterations in the gut microbial environment contributed to the ability of this natural compound to alleviate deleterious effects attributed to colitis. Collectively, these data suggest that I3C is able to ameliorate colitis by preventing pathogenic gut microbial dysbiosis and restoring gut microbiome composition to a more homeostatic state. (Supported in part by NIH grants P01AT003961, R01AT006888, R01ES019313, R01MH094755, P20GM103641, and R01AI129788).

Chakrabarti, Mrinmay
Mentor(s): Mohamad Azhar
Loss of TGFβ2 causes aortic aneurysm via augmented TGFβ1/SMAD2 signaling pathways

Aortic aneurysm, dissection and rupture is a major lethal cardiovascular disease in patients with connective tissue disorders, like Loeys-Dietz syndrome, Marfan syndrome, Shprintzen-Goldberg syndrome, and Ehlers–Danlos syndrome. TGFβ2 mutations cause Loeys-Dietz syndrome 4, with patients exhibiting aortic root/annulus dilation and/or rupture, congenital heart disease (CHD), cardiac valve thickening, bicuspid aortic valve, and mitral valve prolapse. Despite the loss of function nature of TGFβ2 mutations in these LDS patients, patient-derived aortic tissues show evidence of increased TGFβ1 and SMAD2 signaling. Thus, our goal is to determine underlying mechanisms that govern the formation and progression of aortic aneurysm in vitro and in vivo loss of TGFβ2 function that mimics Loeys-Dietz syndrome patients. We observed that treatment with TGFβ1 could induce TGFβ canonical and non-canonical pathways in aortic smooth muscle cells (SMC). Our in vitro studies also suggested that aortic SMCs isolated from TGFβ2 het mouse showed reduced proliferation and migration abilities compared to wild type cells. Our study with constitutively active TGFβ2 conditional (stop-flox) transgenic Myh11-CreERT2+/-;Tgfb1TG mice showed induction of both canonical and non-canonical TGFβ2 pathway with inhibition of MLCK expression in the aorta and heart of Tg/Tg mice. Elevated TGFβ2 signaling leads to decrease in myosin light chain kinase (MLCK) expression in mice and human patients resulting aortic dissection and aneurysm. Collectively, all our immunohistochemistry, western blotting and qRT-PCR studies indicate that SMC-specific loss of TGFβ2 results in increased TGFβ1 signaling and decreased MLCK expression that have been associated with dysfunction, aneurysm and aortic rupture in humans.
Chitrała, Kumaraswamy Naidu  
Mentor(s): Mitzi Nagarkatti  
**Molecular modeling and dynamic simulations of AhR ligand binding domain involved in interactions with ligands affecting T cell responsiveness**

Aryl hydrocarbon receptor (AhR) plays a predominant role in the CD4+ helper T cell-mediated inflammation. AhR is known to be activated by ligands such as 2,3,7,8-tetrachlorodibenzo-p-dioxin (TCDD), 3,3′-diindolylmethane (DIM), indole-3-carbinol (I3C) and resveratrol (RES), thereby promoting the differentiation of CD4+Foxp3+ regulatory T cells (Tregs) and inhibiting the T helper (Th)-17 cells. In contrast 6-Formylindolo[3,2-b]carbazole (FICZ) produces the opposite effect by inducing Th17 cells and down regulating Foxp3+ Tregs. In order to address these contrasting effects, we examined the nature of AhR ligand:AhR interactions. To date, the three-dimensional structure of AhR ligand binding domain (LBD) has not been elucidated, thereby limiting the understanding of the exact mechanism underlying receptor conformational changes following the binding of these AhR ligands. To that end, in the present study, we have generated the three-dimensional structure of AhR ligand binding domain and analysed the mechanism underlying receptor conformational changes following binding of TCDD, FICZ, I3C, DIM and RES using molecular modeling and molecular dynamic simulation (MDS) studies. Results from the molecular docking studies showed that AhR LBD interacts with a binding energy of -7.17 kcal/mol for TCDD, -8.18 kcal/mol for FICZ, -5.48 kcal/mol for I3C, -7.18 kcal/mol for DIM and -7.84 kcal/mol for RES. Six independent MDS revealed key interactions and major secondary structural changes in the AhRLBD-ligand complexes, specifically at the residues in α-helices for AhRLBD-TCDD complex, residues in the α-helices and turn for AhRLBD-FICZ complex, residues in the α-helices and β-sheets for AhRLBD-I3C complex, residues in the coils for AhRLBD-DIM complex and residues in the α-helices and β-sheets for AhRLBD-RES complex. In conclusion, this study defines the binding mode and relative affinity of TCDD, FICZ, I3C, DIM and RES, and establishes the structural basis for the AhRLBD-ligand interactions as well as reveals the conformational changes at the onset of the ligand binding that may play a role in T cell immunomodulation.  
(Supported by NIH grants P01AT003961, R01AT006888, R01ES019313, R01MH094755 and P20GM103641)

Cunningham, Brady  
Mentor(s): Tammi Richardson  
**Pigments, pigments everywhere, but how did they evolve? An investigation into the phylogenetic history and physiological diversity of cryptophytes**

Cryptophytes are an understudied group of eukaryotic algae found in ponds, lakes, estuaries and oceans. They are important primary producers, and thus serve as a valuable food source for a variety of aquatic organisms. In addition, cryptophytes play a key role in studies of endosymbiosis and chloroplast evolution as they originated via secondary endosymbiosis. Cryptophytes are thus complex with respect to their genetic and cellular structure, and unique with respect to their pigmentation and the organization of these pigments within the plastids. Visually, cryptophyte species differ markedly in pigmentation, ranging from red to olive to brown to blue-green. We are testing the hypothesis that cryptophyte pigmentation is related to the spectral quality of the light environment in which they evolved. Here, we will present data that describes relationships among molecular phylogeny, physiological and ecological functional diversity, and the genetic diversity that supports this functional variation. We will also present results of preliminary experiments that examine how the growth dynamics of cryptophytes adjusts to changing spectral irradiance (blue, red, green, and white light environments). So far, we have found that cryptophyte sub-groups may be even more diverse than previously described, with respect to both genotype and phenotypic responses.
DeMello, Madison  
Mentor(s): Dr. Bernardine Pinto  
Reciprocal Relationship between Sedentary Behavior and Mood in Young Adults.

Introduction: With the increasing development of technology, a variety of leisure activities are spent in sedentary or seated behavior. Numerous associations between sedentary behavior and mental health outcomes such as mood have been reported, however none have looked at the reciprocal relationship between mood and sedentary time. The purpose of this study is to examine the relationship of sedentary behavior with mood among young adults.

Methods: A sample of 430 adults (49.3% male) between the ages of 21-35 provided valid objective activity data in addition to an assessment of their wellbeing in a year-long observational study. For the purpose of this study, sedentary behavior is defined as less than 1.5 METS and was measured using a SenseWear mini-armband. The armband was worn for a period of 10 days (compliance of 7 days), with at least 21 hours of verifiable wear time per day. In addition, participants’ mood status and quality of life were assessed by the Profile of Mood State (POMS). Specifically, this study used the Total Mood Disturbance (TMD) score from the POMS questionnaire to assess mood. Assessments of sedentary behavior were conducted at baseline and then quarterly for one year duration, while assessments of mood and health status were conducted at baseline and one year.

Results: A cross-lagged, autoregressive clustered model was used to examine simultaneous changes over time in both mood and sedentary behavior allowing for both clustering and adjustment of covariates over time. Data suggests that TMD score decreased significantly over one year, suggesting improvement in mood (p=0.01). Furthermore, there were positive associations between sedentary time and TMD; this association increased over time (p=0.001). Specifically, higher sedentary time was associated with more distress and this association intensified over time. Mean sedentary time remained stable over the course of the study (p=0.29). However, higher TMD scores (more distress) were associated with greater mean sedentary time (p=.03), and this association remained stable over the study period (p=0.51). Taken together, results suggest significant reciprocal associations (cross-lagged effects) between mood and sedentary time, with the stronger predictive associations of mood on sedentary time.

Discussion: These results indicate a reciprocal relationship between mood and sedentary time, that is a decrease in sedentary time should improve mood status, likewise, an improved mood may decrease time spent sedentary. However, the stronger association is mood status predicting time spent sedentary in young adults. By identifying predictors of seated behavior, researchers can better understand ways to reduce time spent sedentary.
Gandy, Alexa  
**Mentor(s):** Mitzi Nagarkatti  
**The role of gut microbiota in shaping the immune response in relapse-remitting and chronic-progressive mouse models of multiple sclerosis**

In this study, we used a mouse model of multiple sclerosis (MS), experimental autoimmune encephalitis (EAE), to evaluate the role of gut microbiota in modulating T helper cell function in chronic-progressive (CP) versus relapse-remitting (RR) forms of the disease. We hypothesized that encephalitogenic T cell function in RR-EAE and CP-EAE is differentially shaped by gut microbiota. Metagenomic sequencing of the variable V4 region of the prokaryotic 16S ribosomal RNA gene present in feces derived from naïve mice and mice exhibiting CP-EAE or RR-EAE revealed significantly diverse microbial populations, which may be responsible for differing disease courses. Specifically, the order Bacteroidales was dominantly represented by RR-EAE mice, with very little or no detection in naïve or CP-EAE mice, suggesting a potential role for bacteria in this order in shaping tolerant or remittance-favoring conditions. Additionally, Akkermansia and _rc4-4_, of phyla Verrucomicrobia and Firmicutes, respectively, were identified specifically in CP-EAE, suggesting a potential pathogenic or pro-inflammatory role for bacteria belonging to these taxa, at least in the context of EAE. We performed qRT-PCR in order to test the validity of the sequencing findings, as well as used a gas chromatograph configured with flame-ionization detectors to evaluate short chain fatty acids from cecal flushes. The current study implies a role for gut microbiota in differentially shaping the immune response in models of RRMS and CPMS. Information regarding tolerance–promoting or –inhibiting conditions shaped by gut bacteria can be harnessed for the potential development of therapies for diseases possessing important inflammatory components.  

Supported in part by NIH grants P01AT003961, R01AT006888, R01AI123947, R01AI129788, R01MH094755, P20GM103641 and F32AT008539

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Ghate, Pankaj  
**Mentor(s):** Sofia B. Lizarraga, Ph.D.  
**Identifying Novel Interactors of RAB3GAP1 to understand mechanisms behind Warburg Micro Syndrome**

Warburg micro syndrome is a rare autosomal recessive genetic disorder associated with severe intellectual disability, postnatal microcephaly, agenesis of the corpus callosum, and microphthalmia. Over 40% of the WARBM cases are associated with mutations in RAB3GAP1 (RAB3 GTPase activating protein 1). RAB3GAP1 is the catalytic subunit of the heterodimeric RAB3GAP complex of RAB3 protein. Previous work has reported a role for RAB3GAP1 in synaptic transmission and plasticity. However, in vivo murine models deficient for RAB3GAP1 do not recapitulate the anatomical brain or eye phenotypes associated with human Warburg micro syndrome. We hypothesize that in humans the deleterious effect of RAB3GAP1 mutations might result from species-specific differential functions of RAB3GAP1 and/or its interacting partners. To begin to test this hypothesis, we first used a mass spectrometry approach to identify novel interactors of RAB3GAP1 in human cells. Candidate proteins identified by mass spectroscopy were further analyzed using coimmunoprecipitation approaches in human embryonic stem cell (hESC) derived cortical neurons. We present here the identification and characterization of two novel interacting partners of RAB3GAP1 in hESC derived cortical neurons. Pathway analysis of RAB3GAP1 interacting proteins highlight membrane trafficking, axon formation and neuronal morphogenesis as major biological processes represented. These preliminary studies suggest that in humans RAB3GAP1 might also regulate neurite formation during human brain development.
Gibbs, Bobby  
Mentor(s): Dan Fogerty  
Acoustic and Phonetic Measures in the Analysis of Fragmented Speech

Listeners with normal hearing are adept at recognizing speech under adverse listening conditions. Normal hearing listeners typically have better speech recognition when noise fluctuates on and off, compared to continuous (steady-state) noise presented at a comparable level. This benefit likely arises due to momentary amplitude dips in the noise which provide glimpses of speech. What features of the glimpsed speech signal need to be preserved to achieve successful recognition? This experiment isolated the glimpsed portion of sentences presented in fluctuating noise by only retaining speech fragments that occurred above the noise level. Fluctuating noise was created to model the natural amplitude modulations of speech, but presented at various temporal rates. Sentences were then fragmented based on the temporal fluctuations of the noise. Final stimuli were presented in quiet with silent interruptions between speech fragments. In a perceptual experiment, the recognition of this fragmented speech was assessed. Listeners scored best when speech was fragmented based on noise that had a lower noise level and a faster fluctuation rate. Ongoing acoustic and phonetic analyses are documenting how speech information is distributed across these different fragmented speech conditions in order to understand how performance may be related to the distribution of speech information. These measures include analyses of the preserved amplitude modulation and periodicity of speech, as well as the preserved proportion of vowel and consonant segments. This analysis will help determine what speech features best predict speech recognition in fluctuating noise backgrounds.

Harrison, Sayward  
Mentor(s): Dr. Xiaoming Li  
First Line of Defense: An Evaluation of the Role of Primary Care in the Prevention of Childhood Obesity in South Carolina

Childhood obesity places children at risk for multiple negative health and psychosocial outcomes; therefore, identifying effective prevention strategies is critical. Primary care has been suggested as an opportune setting for prevention, and clear clinical guidelines exist for the prevention, screening, and treatment of childhood obesity by primary care providers (PCPs). However, few studies have yet examined the extent to which PCPs are complying with current guidelines or explored the feasibility or acceptability of integrating childhood obesity prevention into primary care. Thus the current project engaged in three key activities: 1) a systematic literature review of the role of PCPs in the prevention of childhood obesity, 2) quantitative analysis of electronic medical record data for over 40,000 children and adolescents from South Carolina to examine a number of obesity-related medical codes, and 3) qualitative analysis of data gathered through focus groups with 22 pediatric PCPs from South Carolina to assess training and current practices related to obesity prevention. Mixed method analysis indicated that despite the high prevalence of childhood obesity, significant gaps continue to exist in incorporating prevention into primary care. Data suggested limited adherence to clinical guidelines including universal screening of children's Body Mass Index and the provision of diet/nutrition and physical activity counseling to all children and families. Though childhood obesity was recognized as a grave public health concern, pediatric PCPs cited numerous barriers to integrating prevention into their daily practice, including limited time, lack of parental buy-in, and poor reimbursement for preventive services. Opportunities for improved clinical care are discussed.

Hoang, Thi Thao Phuong  
Mentor(s): Lili Ju  
Localized Exponential Time Differencing Methods For The Heat Equation

Different overlapping domain decomposition algorithms are proposed for the one-dimensional heat problem discretized by the cell-centered finite difference method in space and exponential time differencing methods in time. Convergence of iterative methods and discrete conservation of mass of the converged solution is proved. Numerical results are presented to illustrate and compare the performance of the proposed methods in terms of accuracy and convergence speed.
Previous studies have shown that the cognitive states linked to different tasks that participants engage in can be identified from neuroimaging data. However, different stimulus features can potentially confound classification results. In this study fMRI data were collected on twenty participants while they made either affective or semantic judgements on music or silent video clips. Cognitive states were identifiable within each modality across individuals from BOLD data, and separately, functional connectivity data. Thus, we were able to identify whether participant made affective or semantic judgment while perceiving a pair of identical stimuli, based on the data from other participants. Middle frontal gyrus, inferior parietal gyrus, mid-cingulate cortex, and superior temporal sulcus were found to be key regions distinguishing the two cognitive states associated with the two tasks. Thus we have shown that cognitive states that participants engage in can be identified from neuroimaging data controlling for stimulus features.

Abnormal accumulation and deposition of calcium in the tissue causes calcification diseases, of which calcific aortic valve disease (CAVD) affects the hemodynamic of circulation and leads to heart hypertrophy and eventually, heart failure. Increased transforming growth factor beta1 (TGFβ1) protein, an anti-inflammatory and pro-fibrotic growth factor cytokine, is found in human CAVD, and TGFβ1 stimulates osteoblastic transformation in culture porcine and ovine valve interstitial cells (VIC). Despite the strong association between increased TGFβ1 and aortic valve calcification, the role of TGFβ1 and its downstream signaling mechanisms in the development and progression of CAVD in vivo remain unknown. Here we present a conditional overexpression of Tgfβ1 in mouse VICs resulted in calcification of peri-aortic and aortic valve hinge-region demonstrated by Alizarin Red and von Kossa staining. CAVD occurred as early as 4-week-old of age, and persisted at least 10 months. Decreased heart fractional shortening (FS) and ejection fraction (EF) was observed at 10-month-old time point in this CAVD model. Upregulated TGFβ1 and BMP signaling was found in the region of the calcification, however, heploinsufficiency of TGFβ receptor 2 (TGFβR2), which mediated the function of TGFβ1, did not rescue or attenuate the formation of calcification. Currently we are looking for the mechanisms that mediate the development of CAVD in this model, including cell proliferation, apoptosis, fibrosis, BMP signaling and wnt-catenin signaling. We expect this CAVD model will provide a novel perspective to designing safer drugable targets for the calcific aortic valve disease.
Axonal localization of alternatively-spliced Cdc42 mRNA supports axon growth.

Localization of mRNAs into axons and their subsequent translation into proteins contributes to axon growth during development and after axon injury. Systematic approaches to identify axonal transcriptomes have shown functionally related cohorts of mRNAs present in axons and growth cones of different neuronal subtypes. CDC42 is a small GTPase that promotes actin filament polymerization, and hence has been linked to axon growth. Here, we show alternatively spliced isoforms of CDC42 show differential subcellular localization in sensory neurons. These CDC42 isoforms have two different C-termini, which undergo distinct post-translational modifications, and different 3’ untranslated regions (3’UTR). The mRNA encoding the prenylated CDC42 isoform (prenyl-CDC42, also known as the ‘placental isoform’) localizes into axons, while that for the palmitoylated CDC42 isoform (palm-CDC42, also known as the ‘brain isoform’) remains in the neuronal cell body. The 3’UTR of the prenyl-CDC42 mRNA drives its localization into axons. Previous overall knockdown of CDC42 isoforms was shown to decrease axon growth. Using isoform-specific CDC42 knockdowns, we show that only the prenyl-CDC42 is needed for axon growth. To determine if axon targeting of CDC42 or the specific post-translational modifications of the two isoforms drives the growth-promoting effects of CDC42, we performed an isoform-specific siRNA rescue where the prenyl-Cdc42 or palm-CDC42 mRNAs were selectively targeted to axons using 3’UTR swapping. Only the axonally-targeted prenyl-Cdc42 mRNA countered the axon growth deficit seen with CDC42 knockdown. This indicates that the growth-promoting effects of CDC42 in sensory neurons depends on both axonal mRNA localization and the uniquely modified C-terminus of the prenyl-CDC42 protein. Interestingly, intra-axonal translation of the prenyl-CDC42 mRNA is increased by treatment with neurotrophins. Neurotrophins are well recognized neurotropic agents for the sensory as well as other neuron types, and neurotrophin-dependent increase in axonal CDC42 translation may indeed contribute to their growth-promoting activities.

Activation of IL1α signaling by HER2 overexpression promotes breast cancer stem cells

Breast cancer is a heterogeneous disease and only a small proportion of cells known as cancer stem cells (CSCs) have the ability to generate tumor. Recently, it has been reported that HER2 overexpression increases breast cancer stem cells (BCSCs). However, the underlying mechanism is not clearly known. In this study, we explored the molecular mechanism how HER2 upregulates BCSCs. Our data has demonstrated human epidermal growth factor receptor 2 (HER2) induces BCSCs by indirectly activating NF-κB and STAT3 signaling. To figure out the direct target of HER2, we did microarray and found that HER2 upregulates the expressions of interleukin 1 alpha (IL1a) and interleukin 6 (IL6), two major cytokines which directly activates NF-κB and STAT3, respectively. Interestingly, we found that IL1a also indirectly activates STAT3. IL1a-induced STAT3 was blocked when IL6 was knocked out from cells. We found that HER2 enhances IL1a transcription by activating PU.1, a known transcription factor of IL1a. Finally, we studied the effect of IL1a on tumorigenesis, and found that IL1a knockout dramatically attenuates the tumor growth in NOD/SCID mice. Taken together, we found that HER2 induces BCSCs by upregulating IL1a and IL6 expression. We for the first time demonstrated that IL1a plays a critical role in HER2-induced expansion of BCSCs population and may be a potential therapeutic target for HER2 positive breast cancer.
Monroe, Courtney  
Mentor(s): Dr. Delia West  
Harnessing Social Networks Via Technology for Weight Loss in Adults: A Pilot Randomized Controlled Trial

Engaging social support and giving individuals tangible resources are methods that have been found to improve weight loss outcomes. This study examined the effect of leveraging existing social networks through the provision of advanced technologies for increasing weight losses over current best practices. Adults were randomized to a 16-week, evidence-based, standard behavioral weight loss treatment (SBT; n=18) or SBT plus social support resources for weight loss (Enhanced; n=18). Both groups received weekly, in-person group counseling sessions targeting dietary and physical activity (PA) behavior change, a Fitbit Zip PA tracker, digital body weight scale, and access to a study website. The Enhanced group also received additional Fitbit Zips and digital scales which they were asked to share with up to two people of their choice within their social circle. Repeated measures ANOVA was used to compare baseline and 16-week measured weight, social support for diet and PA (measured on a 5-point Likert scale with higher scores indicating greater support), and reported number of appropriate weight control practices. Chi-square analysis was used to measure the group difference in the proportion of participants who lost >5% of their initial weight. Participants averaged 45±8.9 years, had a BMI of 36.1±7.3 kg/m2 and were 94% female and 39% African-American. Intent-to-treat analyses showed significant weight decreases (p < .001) in both SBT (-3.0±3.2 kg) and Enhanced (-3.9±5.2 kg), with no difference between groups (p=.51). The proportion losing >5% of initial weight was greater in Enhanced (50%) vs SBT (33%), but this difference was not statistically significant (p=.31). In SBT and Enhanced, respectively, the increases (p < .05) in social support from pre (3.0±0.6 and 3.3±0.4 for diet; 2.9±0.9 and 2.9±0.6 for PA) to post (3.4±0.7 and 3.6±0.6 for diet; 3.2±0.9 and 3.4±0.7 for PA) were not different (p>-.05). At 4 months, SBT reported using 14.9±3.0 appropriate weight control practices (out of 23) versus 13.9±3.7 for Enhanced, an increase from baseline (p < .001), with no between group difference (p=.60). Providing advanced technologies to participant-selected support partners did not enhance weight losses beyond current best practices. A similar but less minimalistic approach (e.g., providing resources and support partner guidance) may be more effective. Future research should continue to explore how to best capitalize on the joint influence of technologies and social support to increase weight losses in larger samples.

Park, Seo Yeon  
Mentor(s): Jennifer Reynolds, Theophile Ouedraogo, Mosetta Ragin  
Plant the seeds of inclusion on college campus

This presentation is about the experiences of refugee adults in Columbia who have been participated in a few cultural integration programs, and their interactions with the students and staff at USC college campus. For a therapeutic purpose, Refugee Garden program started at the Carolina Community Garden as a collaborative project by graduate students, university staff and a faculty member of USC. The team later incorporated cultural integration programs such as English tutoring, cooking and potluck dining to enhance the level of interactions between people in college and the refugee people in town. Although there are some old challenges in the provision of services, the project has seen the growth of trust and relationship building among the participants. Considering the small number of refugee settlement and scarcity of available resources for them, this can be a good example of an outreach activity by a college community in an attempt to be more inclusive and integrative in a small city of the South.
Seth, Ratanesh  
Mentor(s): Dr. Saurabh Chatterjee  
TRPV4 attenuates M1 polarization and subsequent NASH progression by stalling CYP2E1-mediated redox toxicity via eNOS.

M1 macrophage polarization in nonalcoholic steatohepatitis (NASH) liver has been impacted by several endogenous or exogenous factors including inflammatory stimuli, oxidative stress and cytokines. In the absence of an active endogenous defense mechanism the M1 polarization bias potentiate NASH progression by intensified inflammation and intermittent fibrosis in rodent model of liver injury. We introduce an endogenous defense mechanism in the liver that is mediated by TRPV4, a transient receptor potential calcium-permeable ion channel that responds to the cytotoxic liver environment and negatively regulates CYP2E1, a cytochrome p450 enzyme. We hypothesized that CYP2E1-mediated oxidative stress causes M1 polarization in experimental NASH and active TRPV4 inhibits CYP2E1 mediated inflammation with concomitant attenuation of M1 polarization. Since CYP2E1 takes center stage in redox toxicity we use a toxin model of NASH which uses pyrazole, a ligand and a substrate of CYP2E1 for inducing NASH. Using both cyp2e1-/- and trpv4-/- mice, we show that in the absence of active TRPV4, CYP2E1 induced oxidative stress causes M1 polarization bias, that includes a significant increase in IL-1β, IL-12, IL-6 and IL-23 while CYP2E1 null or diallyl sulfide treated mice prevent it. Recently, we discovered that the TRPV4 modulates eNOS activation and nitric oxide release from Kupffer cell during early stage of liver injury. Based on the adaptive NO increase in trpv4+/+ mice, NO donor administration in trpv4-/- mice abrogated CYP2E1-induced oxidative stress, M1 polarization and NASH progression. Thus, a novel endogenous defense molecule trpv4 can be a promising therapeutical approach against NASH.

Shakal, Emily  
Mentor(s): Adam Pazda, Emma Nettles, Adam Pazda  
Does ostracizing political out-group members incur psychological costs?

Research has shown that being ostracized has negative consequences for psychological health, even if the ostracizer is a member of a despised outgroup. Additional empirical evidence suggests that negative emotions are not only experienced by the victim of ostracism, but are also experienced by the person doing the ostracizing. We are investigating if the negative psychological consequences of ostracizing another person are different depending on whether that person belongs to a despised outgroup. In our experiment, participants play a computerized ball-tossing game with random strangers or members of a despised outgroup (Republicans/Democrats, depending on the participant’s own political affiliation). Participants are randomly assigned with instructions to ostracize a member of the despised outgroup or not. Psychological need satisfaction and negative emotions are assessed following the game. This project is ongoing.
Post-traumatic stress disorder (PTSD) is a severe anxiety disorder that can develop after experiencing a life-threatening trauma, such as combat service, assault, or a natural disaster. Not everyone who experiences these types of traumas develops PTSD, suggesting that some neurobiological factors may confer resiliency, or risk, to the long-term negative effects of traumatic stressors. Our laboratory has demonstrated that outbred Long-Evans rats show individual differences in conditioned behaviors, with significant variability in extinction of freezing behavior following fear conditioning, suggesting that this strain may serve as a useful model for characterizing the neurobiological mechanisms that underlie differential sensitivity to traumatic stress. The basal forebrain cholinergic system may be of particular importance for stress-related disorders as it mediates attention to environmental cues and provides major neuromodulatory input to the brain areas associated with fear extinction, including the basolateral amygdala and prefrontal cortex. Activation of the cholinergic system enhances conditioned fear behaviors, while inhibition reduces the acquisition of conditioned fear.

Using dual label immunohistochemistry, Fos expression in cholinergic neurons of the basal forebrain was assessed to identify differential patterns of activation in these neuronal populations associated with individual differences in the extinction of fear-conditioned freezing behaviors. Rats were exposed to three tone-shock pairings, followed by extinction training in a novel environment with twenty cue (tone) presentations. Rats were divided into high or low extinction groups based on freezing behavior during the last ten minutes of this extinction trial. Extinction learning was assessed and tissue was collected for immunohistochemical analysis. Rats showing resistance to fear extinction (high freezers) had significantly lower percentage of activated cholinergic neurons in the substantia innominata than low freezers, suggesting that differential activation of cholinergic neurons may contribute to individual differences in extinction of fear responses. Additional approaches using in vivo microdialysis during repeated presentation of the conditioned cue (tone) suggest that high freezers may have increased acetylcholine release in the basolateral amygdala during extinction learning. Pharmacological experiments using the muscarinic antagonist scopolamine also suggest that differences in the cholinergic system may contribute to the observed individual differences in fear extinction, and may be a novel target for treating conditions associated with altered fear extinction such as PTSD.

Support: USC ASPIRE I (ACS) and ASPIRE II (MAW) funding, and VA Merit Awards 1I01BX001374, BX002085 and 1101BX001804 (support to MAW and JRF).
Tsai, Meng-Han  
Mentor(s): Sudha Xirasagar

Persisting Racial Disparities in Colonoscopy Screening of Persons with a Family History of Colorectal Cancer: What are the Barriers?

Background: Colorectal cancer (CRC) screening guidelines recommend that higher risk individuals with a family history of CRC should undergo colonoscopy screening every five years beginning at 40 years of age. Colonoscopy is preferred over other screening methods for this group, due to potentially more aggressive disease that may elude early detection by other screening methods. Colonoscopy screening rates are lower among African Americans, despite 23% and 47% higher CRC incidence and mortality, respectively, than Whites. African Americans first-degree relatives (FDR) of a CRC patient are at the intersection of two elevated risk populations, race and FDR status. Therefore, exploring screening disparities among FDRs by race may enable policy interventions to reduce CRC disparities.

Methods: We studied colonoscopy screening among Whites and African Americans with a self-reported family history of CRC, using pooled 2005, 2010, and 2015 National Health Interview Survey data.

Results: Despite higher colonoscopy rates in 2015 than 2010 among FDRs (72.3% and 62.2% among Whites and African Americans, respectively), the large screening disparity among the 40-49 age group observed in 2010 was sustained in 2015. In this age group, African Americans had 35.3% lower colonoscopy rates than Whites (29.2% vs. 45.1%), similar to 2010 (31.7% lower than Whites). White and African American FDRs aged over 65 years had similar rates. Adjusted analysis of the pooled sample (4,135 respondents aged over 40 years, 3,220 Whites, 466 African Americans), showed that, the age group of 40-49 years had one third the colonoscopy likelihood of the age group of 50-plus. African Americans without a college education were 40-60% less likely than Whites of any educational level to have a colonoscopy (Adjusted Odds Ratios (AOR) 0.6 and 0.4, respectively, relative to Whites with and without college education, both p<0.01). Among Whites, college education was associated with higher colonoscopy likelihood. There is a widening of the racial disparity among the younger age group since 2005, concurrent with the much increased screening rate in 2015 relative to 2005 (AOR for 2015, 10.9). Interactions of race with age, gender, and insurance were not significant.

Conclusion: Despite increasing colonoscopy screening rates among the FDR population to date, our study highlights the importance of education and age in the racial disparity in colonoscopy screening. Targeted patient navigation may increase screening rates among less educated and younger Americans with a CRC family history.

Zhang, Yao  
Mentor(s): Xiaoming Li

What makes information strategic? An examination of access to information resources for entrepreneurs and business performance

The purpose of this study is to explore the nature of the relationship between the access to and use of information resources of entrepreneurs and their business performance. The survival and competence of organizations relies heavily on their recognition of information as important strategic resource. Entrepreneurs, specifically, face a constantly changing environment and are in a disadvantaged competitive position in finance and experience compared with large companies. Access to, and use of information resources, will help them improve their business performance.

This study collects both qualitative and quantitative data, investigating the entrepreneurs’ business performance and their behaviour in accessing and using information resources. The qualitative data is applied to explore the technology incubator consultants’ understanding of business performance indicators for entrepreneurial businesses. For the quantitative data collection, entrepreneurs are selected from technology incubators in the U. S to participate in a questionnaire survey. Structural Equation Modeling (SEM) is used to process and analyze the data reflecting the business performance, access to information resources, and use of information resources.

A preliminary Access-Performance model and a Use-Performance model are presented. The results indicate that the use of information resources has a positive influence on the performance of entrepreneurial businesses. No strong relationship is revealed between the access to information resources and business performance. However, there is a high probability that the entrepreneurs have other information resource accesses options than those covered in the original model.
Knowledge buffers negative side effects on medication adherence

Despite the medical advancements in HIV treatment, realities of side effects are faced by people living with HIV (PLWH) who receive antiretroviral therapy (ART). Mixed findings have been reported on the association between side effects and ART adherence. However, few studies have explored the combined side effects and behavior-related information on medication adherence. The aim of the current study is to examine moderator role of ART-related knowledge between side effects and ART adherence. A cross-sectional survey was conducted among 2987 PLWH from October 2012 to August 2013 in China. Of the total sample, 2095 patients had received ART and provided ART adherence. Side effects, ART-related knowledge, and ART adherence, as well as potential covariates were assessed. The results revealed that there was a negative relationship of side effects and ART adherence existed among low and medium levels of ART-related knowledge, but not among high level of knowledge. Future interventions to promote HIV medication adherence should focus on providing behavior-related information education among PLWH.
Medical Scholars presentations
Introduction:
Emergency Department (ED) Overutilization has been a growing problem in the United States of America. The National Quality Forum cited this as a $38 billion problem in 2010, and the burden has continued to increase nationwide. A study as far back at 2003 showed that the median cost of a visit to the ED was five times that of an outpatient visit at a primary care office. This is a quality improvement project looking to identify solutions that both the Family Medicine Center and the Richland Emergency Department can use jointly or as individual entities, to provide greater access to primary care to our patient population. The goal is that this information will be used to better our mechanisms for providing primary care, which in turn, may lead to reduction in overutilization of the Emergency Department for primary care purposes.

Methods:
Patients were selected from the low-acuity zone of the Emergency Department. Those who met the inclusion criteria were interviewed with 8 survey questions, four demographic, four related to primary care access. The proportion, with 95% confidence interval, of those having a primary care physician, was computed.

Results:
47 (forty-seven) subjects were surveyed. Ages ranged from 20 to 92 years. Incomes levels ranged from < $10,000/year to > $90,000 / year. Education levels ranged from “Some high school or less” up to “Graduate degree or higher”. Approximately 75% of subjects reported that they have a primary care provider, while 25% of them did not. Of those without a PCP, 8.6% reported that their PCP is located too far away from their home, or out of state; 40% stated that they felt it was an emergency that their PCP could not handle in the office; 17% stated they went to the ED because they did not have an appointment at their doctor's office that day; 5.7% stated that the office was closed; and 25.7% stated that they were sent by their PCP.
Askew, Christian  
Mentor(s): Dr. J. Benjamin Jackson III, Dr. Kevin Williams  
Supplemental Vitamin D for Prevention of Bone Stress Injuries in Collegiate Athletes

Introduction:
Vitamin D functions to regulate serum calcium concentrations via several cellular pathways. It has also been demonstrated to affect bone mineralization and turnover, thus making it essential for skeletal strength and adaptation to mechanical stress. Stress fractures are common athletic injuries that develop due to repetitive skeletal loading, causing physical breakdown of the bone’s microstructure. Excessive running or jumping, as well as malnutrition or decreased sun exposure, may elevate an athlete’s risk for sustaining this overuse injury. Serum 25(OH)D is used as a clinical marker for vitamin D status. Previous research suggests adequate vitamin D status is important for prevention of skeletal injuries.

Hypothesis:
Supplemental vitamin D will normalize athletes’ vitamin D status and will reduce stress fracture injury incidence rates for elite division 1 athletes.

Methods:
245 subjects were recruited from 17 sports teams at the university. All subjects were over 18 years of age. No subjects were excluded. Subject 25(OH)D status was determined once in August 2016 and again in February 2017. Following each testing cycle, subjects with 25(OH)D levels below 70 ng/ml were supplemented with cholecalciferol (50,000 IU) once a week for 8 weeks. Subjects were monitored throughout their sporting seasons for stress fractures. Subjects initially completed an anthropometric questionnaire, and two compliance questionnaires were to be completed following each 8-week supplementation period.

Athlete injury reports from respective teams will be used to determine the incidence of stress fractures during the 2011-2015 seasons among non-supplemented athletes.

Results:
245 subjects had 25(OH)D levels tested in August (40.41-44.3 ng/ml) with 18% being insufficient or deficient (<30 ng/ml). 191 subjects were tested in February (27.78-85 ng/ml) with 65% being insufficient or deficient, a significant increase (p<0.05). All but three teams had significantly lower 25(OH)D levels in February compared to August. No significant differences were found between males and females, or between indoor and outdoor sports. Injury reports, anthropometrics, and compliance are still being evaluated.

Conclusion:
Several factors have been shown to influence vitamin D status, including nutrition and sun exposure. Serum 25(OH)D status is expected to decline naturally in winter months due to lack of sun exposure. Preliminary results indicate a substantial decline in serum 25(OH)D from August to February in our cohort. This supports the notion that continued supplementation may be necessary to maintain appropriate vitamin D levels. Remaining analyses may provide insight on vitamin D’s protective effects on bone health and injury prevention among elite collegiate athletes.
Augustine, Matthew  
Mentor(s): Dr. Sonal Mehta  
The Importance of External to Internal Carotid Anastamoses in Recurrent TIA with Complete Internal Carotid Occlusion

Complete carotid artery occlusion has been associated with a higher yearly risk of both ischemic stroke and TIA. While there are clear guidelines regarding the medical versus surgical management of carotid stenosis and partial occlusion of the carotid arteries in the secondary prevention of stroke, the benefit to risk ratio of medical versus surgical management of complete occlusion is much less well defined. 

A 48-year-old Caucasian male with a history of hypertension and stroke involving the left hemi-body with no residual weakness, multiple TIsAs, and left carotid endarterectomy presented to the emergency department for acute onset headache and left-sided body weakness. CT and MRI of the head revealed no acute infarct. CTA of the head and neck revealed complete occlusion of the cervical right internal carotid artery. The patient was started on maintenance IV fluids, an aspirin and a statin, and was scheduled for a diagnostic angiogram to evaluate the presence and nature of collateral flow. 

A catheter angiogram revealed chronic occlusion of the right internal carotid artery with collateral flow from the ipsilateral external carotid branches, resulting in poor blood flow in the anterior circulation, more specifically the MCA distribution of the right hemisphere. It was found that he did have reconstitution of his right ICA in the petrous segment due to collateral flow through the vidian artery, a branch of the internal maxillary artery. He was also receiving intracranial blood flow via retrograde flow through the right ophthalmic artery, which receives collateral flow through the ethmoidal branches of the right ECA. Other collaterals from the extracranial to intracranial circulation in the cervical and pharyngeal regions were not visualized on angiography, resulting in a large portion of his right hemispheric MCA distribution to rely on these two small anastomoses, leading to collateral failure in times of demand, which was likely the cause of his recurrent TIsAs. A CT Perfusion scan was repeated when he was neurologically stable and this showed a marked improvement in the right hemispheric cerebral blood flow, with a persistently elevated mean transit time, again suggesting that it was hypoperfusion that had led to his TIA. Further surgical and medical management will be planned as an outpatient. Given the relatively high risks, and still unproven benefits of EC-IC bypass surgery, medical management might be chosen. However, with his recurrent TIsAs and high risk for disabling stroke, surgery will be considered.

Bacharach, Rebecca  
Mentor(s): Dr. C. Scott Lamar  
Review of Readmissions on Family Medicine Accountable Care Unit focused on discharge disposition and rate of readmissions, a retrospective review

Introduction: In 2015, the USC Family Medicine Residency were asked to start an Accountable Care Unit (ACU) for their inpatient service. One of the goals of this was to improve discharge planning. Medicare spent about $17.4 billion in 2004 on unplanned readmissions. In 2014, a journal discussed post-acute care (PAC) facilities and found in 2006, nearly 25% of Medicare beneficiaries were readmitted. Factors affecting these rates include: more function/cognitive deficits, increased illness severity, and require higher level of care. This study looks at readmission rates in comparison to the national average and the impact of PACs versus self care home discharges. 

Methods: Data obtained from Palmetto Health Richland ACU by using Cerner EMR and STAR Database of live discharges between June 2015 and October 2016. If index readmission itself was a readmission within 30 days, these patients were excluded from the study. 

Results: A total of 312 patients were admitted and 42 were readmitted. The total readmission rate was 13.5%. Home health services, skilled nursing facilities, and self care discharges were readmitted at a rate of 15.9%, 15.2%, and 13.6% respectively. G-test was done for analysis and the p-value was 0.3.

The relative risk of readmission from home was 14%. The relative risk of readmission from another facility was 11%. Risk ratio yielded p-value of 0.59.

Conclusions: The overall readmission rate of the Family Medicine ACU is 13.5% versus the national average of 15.6%. There was no association found between discharge disposition and readmission rates. The relative risk of readmission is not statistically different whether patient was discharged to home or not. Further studies could be done to look at differences based on age, diagnosis, and social support.
Unilateral Facial Paralysis - A Case Report

Acute unilateral facial paralysis is a relatively common disorder that can be caused by a number of different factors. It has an estimated yearly incidence of 13 to 34 cases per 100,000 and affects all ages. Due to the startling nature of this usually benign condition, many of these patients will seek care in the Emergency Department. For these patients, the clinician must distinguish whether the weakness is due to a central or peripheral lesion. Many times, differentiating between these can be done during the physical exam of the head and neck and confirmed with MRI if needed. Acute onset peripheral facial paralysis is most commonly an infectious or idiopathic cause, known as Bell's palsy. Bell's palsy can then be further divided into complete and incomplete depending on the extent of facial nerve involvement. Bell's palsy generally has a good prognosis, with the majority of patients having full recovery. Some patients maintain signs of slight weakness and rarely may have recurrent attacks. Acute onset, central facial paralysis is much less common and often caused by a stroke or an UMN lesion of the facial nerve or facial motor nucleus located in the pontine tegmentum. In this case, we report about a patient with a remote history of Bell's palsy who presented with left sided facial paralysis due to a cavernous malformation in the left side of the pons.

The Epidemiology of Cervical Spine injuries in 25 NCAA Sports from 2004-2009 Academic Years

Introduction
Sports injuries are the second most common cause of spine injuries in the first 30 years of life. To our knowledge, no study has been conducted to determine the incidence of cervical spine injuries (CSI) in a large sample of National Collegiate Athletic Association (NCAA) athletes. The objective of our study is to evaluate the incidence of CSI's in the athlete population of 25 NCAA sports.

Methods
This will be a retrospective study of injury surveillance data collected via the NCAA Injury Surveillance Program (ISP) from 2004-2009. Using exposure and injury information supplied by Datalys, inferences were made on the total number of NCAA CSI's by year, including 95% confidence intervals. R statistical software version 3.2.5 was used for the analyses. National Estimates were produced by the survey package in R using the weights supplied by Datalys.

Results
CSI's are defined as. During the 2004-2009 academic years, 11,683 CSI's were estimated to occur with 6877 being football-related, 1196 being men's wrestling-related and 3610 being non-football or wrestling related. For the 2004-2009 academic years, the rate of cervical spine injuries for all sports was 1.15 per 10,000 athlete exposures. Men's wrestling had the highest rate per individual sports with a rate of 4.26 per 10,000 exposures. Severity of injuries was also measured and recorded as time loss from competition.

Discussion and Conclusion
CSI's can have devastating results for athletes. Rule changes such as the “targeting rule” have been put into place recently to combat head and neck injuries in NCAA men's football. An understanding of the sports which have the highest rate and most severe of injuries will allow us to ensure proper protocols are in place as well as have appropriately trained medical staff at events to ensure the safety of participating student-athletes.
Beland, Brittany
Supervisor(s): Kevin Mays, Elise Maggioncalda, Parker Freels
Mentor(s): Dr. Tariq Horani, Dr. Floyd Bell
Expanding the Differential: Bilateral lesions of the Globus Pallidus in a patient with suspected carbon monoxide poisoning versus Tramadol overdose

The basal ganglia lie deep within the gray matter of the brain and receive widespread projections from the cerebral cortex. As part of the extrapyramidal motor system, these structures work synergistically to regulate movement and consequently have a high energy requirement. Therefore, these nuclei are highly susceptible to anoxic-ischemic injury that leads to alterations in cerebral metabolism, with the globus pallidus being one of the more vulnerable structures within the basal ganglia. The pathogenesis of bilateral globus pallidus necrosis is not well understood, but it is known to be characteristically present in the setting of acute carbon monoxide (CO) poisoning. It is also the most common lethal poison worldwide and presents with nonspecific symptoms, making it difficult to diagnose.

We present the case of a 37 year-old Caucasian male who was brought to the hospital after being found unresponsive at home. He presented with confusion, bilateral hearing loss, lower extremity weakness, and urinary incontinence. Labs were significant for FHgbCO of 1.6 % on ABG and a morphine level of 81,430 ng/mL on urine drug testing. MRI obtained 2 days after admission revealed bilateral water diffusivity restriction in the area of the globus pallidus on Diffusion Weighted Imaging (DWI) and Apparent Diffusion Coefficient (ADC) due to cytotoxic edema from acute tissue necrosis. FLAIR and T2-weighted imaging showed high signal intensity in the corresponding regions. These MR findings have historically been consistent with CO poisoning, but given his history and laboratory findings, there was concern the globus pallidus injury may have been secondary to tramadol overdose instead.

The objective of this case report is to discuss possible medication overdose masking as CO poisoning. It will aid in providing further evidence for expanding the differential diagnosis to include medication overdose when globus pallidus necrosis is seen on imaging. We will also discuss the utility of these imaging findings as a prognostic indicator of long term deficits.

Bibbee, Charlotte
Mentor(s): Dr. Kathryn Stephenson
Identifying barriers to care via parent questionnaire during follow up visits at the Children’s Hospital Outpatient Center after Emergency Department visit

Background and Objectives: CDC data from 2011 reported that there were over 24 million emergency department (ED) visits for children <15 years, 39% of which took place during business hours. 2012 CDC data showed that children with Medicaid are more likely to go to the ED. This project set out to study the utilization of past quality improvement intervention to decrease ED visits in our patients and then to ask the families directly why they present to ED and what we could do to be more helpful for them at those times in hopes to identify barriers to primary care.

Methods: Handouts including information on afterhours physician on call and tips on when to go to the emergency department were given out to patients. Questionnaires were then administered at ED follow up visits to assess time and reason for ED visits and suggestions for how the clinic could have helped the patient at that time. Retrospective chart review was conducted alongside analysis of questionnaires for each patient.

Results: After the first intervention, 60% of parents reported having the ED handout. After the more extensive questionnaire, 37% of the parents who reported having the handout called prior to ED presentation. Our findings aligned with previous data in that 29% of ED visits took place during business hours and the seriousness of the problem was not often given as a reason for presentation in our population. Barriers reported were varied.

Conclusions: Using a parent questionnaire takes to heart the current drive in healthcare to make primary care “patient-centered,” however findings were varied which makes it difficult to make an action plan to address barriers. With the majority of visits occurring outside of clinic business hours, it is reasonable that encouragement to utilize the on call physician number could have an impact on addressing concerns. Further investigations need to be explored such as more specific barriers within specific populations and implementing strategies for improving access to primary care.
Introduction: Prediabetes (Pre-DM) diagnosis is made by impaired glucose tolerance, impaired fasting glucose or abnormal glycosylated hemoglobin (HbA1c), with levels of 5.7-6.4% recognized as pre-DM. Further understanding of factors seen in individuals with pre-DM in South Carolina, as well as initial evaluation of the individual rate of progression from pre-DM to type 2 diabetes (T2DM), was sought in this retrospective study.

Methods: The study sample included 88,444 patients in the Health Sciences South Carolina (HSSC) Clinical Data Warehouse from 2013 through 2015, with at least one HbA1c value in either the normal range or the pre-DM range. Patients were described in terms of demographic characteristics including gender, race/ethnicity, age, urban/rural status, body mass index (BMI) classification, and diabetic conversion. The time for prediabetic patients to convert to diabetes was displayed using a Kaplan-Meier survival curve.

Results: A total of 33,649 patients (38.0%) were noted to have at least one pre-DM HbA1c level (57.2% female). Of those with Pre-DM HbA1c levels, 19,448 (57.8%) were non-Hispanic White, 11,867 (35.3%) were non-Hispanic African American (AA), 921 (2.7%) were Hispanic or Latino, and 1,413 (4.2%) other, as compared to those with normal HbA1c levels with 37,152 (67.8%) White, 13,176 (24.1%) AA, 2,060 (3.8%) Hispanic or Latino, and 2,407 (4.4%) other. Individuals with age > 45 (26,666) were 79% of the pre-DM group. Small differences in pre-DM and normal result individuals were seen by geographic location only for the micropolitan group, although numbers in this category were small. For the subgroup of individuals on whom a BMI was available (n=29,344), pre-DM results were more frequently seen in obese patients of all classes (Class 1 Obesity [pre-DM] 21.9% vs. [normal] 18.8%, Class 2 [pre-DM] 13.2% vs. [normal] 10.4%, Class 3 [pre-DM] 15.4% vs. [normal] 11.3%).

A total of 1,656 of the individuals with pre-DM HbA1c were subsequently measured to have a T2DM HbA1c level over the 3 year period (4.9%). Median days for time to convert is 211.0 days.

Conclusion: Demographic analysis provides insights into factors associated with pre-DM in this population. AA individuals were over-represented in the pre-DM range of HbA1c. As expected due to the progressive nature of T2DM, advancing age and BMI were associated with pre-DM results. The median time to convert of 211 days for those that progress is an important finding, and further subgroup analysis of this time to convert is needed.
Introduction: Prediabetes (Pre-DM) is a growing epidemic that is defined as levels of glycosylated hemoglobin in the red blood cell (HbA1c) between 5.7 – 6.4%. The differences of insulin-resistance and glycemic variations are thought to influence the stratification among races and ethnicities. As diabetes is a progressive disease, adults 65 and older are the most at-risk for developing type 2 diabetes (T2DM). This retrospective study aims to evaluate this rate of progression from pre-DM to T2DM using the HbA1c levels and associated factors.

Methods: The study sample included 1,656 patients in the Health Sciences South Carolina (HSSC) Clinical Data Warehouse (CDW) with at least one HbA1c value in the prediabetic range (5.7 – 6.4%) from 2013 through 2015, and who later converted to T2DM based on an HbAlc value ≈ 6.5%. Patients were described in terms of demographic characteristics including gender, age, urban/rural status, body mass index (BMI) classification, and were stratified by race/ethnicity. Multivariate linear regression was used to examine the association between patient characteristics and the time to convert to T2DM in days. An initial model including gender, race/ethnicity, age, and urban/rural classification, as well as a secondary model adding BMI, were analyzed. The time for prediabetic patients to convert to T2DM, in days, was displayed using a Kaplan-Meier survival curve.

Results: Pre-DM non-Hispanic African American (AA) patients converted to T2DM approximately 36 days faster than non-Hispanic White patients. Pre-DM Hispanic or Latino patients converted to T2DM approximately 77 days faster than White patients. Pre-DM patients between the ages of 20-44 and 45-64 converted to T2DM slower than patients that are 65+ years old. The average days to convert from pre-DM to T2DM was 289.6 days.

Conclusion: Race and age were found to be significant factors in patients who converted from pre-DM to T2DM. AA and Hispanic or Latino patients had a faster time to convert to T2DM versus Whites. When studied with BMI included, Hispanic or Latino patients and patients of other races had a faster time to convert than AA or Whites. Patients between the ages of 20-44 and 45-64 also had a faster time to convert than patients between the ages of 1-19. The difference in progression could be a result of progressive loss of pancreatic beta cell function as patients with uncontrolled hyperglycemia age. Understanding of the underlying factors that contribute to the findings with race and ethnicity bear closer evaluation.
Tendinopathy of the foot and ankle is common and can progress to become incapacitating. The most frequently affected tendons in the foot and ankle are the posterior tibial, peroneal, and Achilles. Studies have found a lifetime incidence of 5.9% in sedentary people and as high as 52% in athletes for Achilles tendinopathy. Previous studies demonstrated that ultrasound (US) of the soft tissues of the foot and ankle is a highly effective tool that can evaluate nearly every anatomical structure. Its lack of ionizing radiation, low cost, and painless nature make it a viable tool for foot and ankle evaluation.

We sought to utilize US to determine normal values for the Achilles, peroneal, and posterior tibial tendons in patients presenting to the foot and ankle clinic.

Patients were evaluated prospectively via a standardized US examination protocol from 2015-2016. Subjects who agreed to participate received a bilateral lower extremity ultrasound performed by a musculoskeletal ultrasonographer of the posterior tibial, peroneus longus, peroneus brevis, and Achilles tendons. Images were obtained in both the transverse and longitudinal axes above and below the malleoli and saved for analysis and measurement calculations. When indicated, color flow Doppler was utilized to assess for hyperemia and recorded. The imaging for each tendon was acquired with the patients in standardized positions on the examining table.

A total of 200 patients with 400 extremities were identified, consented, and participated in the study. Measurements for each patient were recorded above and below the malleoli for each tendon. Most tendons demonstrated a normal distribution as illustrated in the representative Figure 1 of the peroneus brevis above the lateral malleolus. Values and distributions curves were similarly calculated for each tendon at each point of measurement. Patients with suspected tendinopathy frequently had an increase of two standard deviations above the mean.

This is one of the biggest studies to characterize the measurements of the posterior tibial tendon, Achilles, and peroneal tendons of patients that present to a foot and ankle clinic. This baseline data can assist clinicians in their diagnostic ability with US. Given its low cost, lack of ionizing radiation and dynamic ability along with an improved understanding of normative data it will likely become an increasingly utilized diagnostic modality.
Clark, Abbye  
**Mentor(s):** Dr. Kamla Sanasi-Bhola, Dr. Sharon Weissman, Dr. Majdi Al-Hasan, Dr. Caroline Derrick  
**Vertebral Osteomyelitis: A predictive model for oral antibiotics**

Background: Vertebral osteomyelitis (VO) is an infection of the vertebral column and surrounding structures. In up to 1/3 of cases a causative organism is not identified, forcing the use of broad spectrum empiric intravenous therapy. Research continues for oral empiric therapy, specifically for gram negative (GN) organisms. The objective was to identify predictors of resistant pathogens causing VO, examine the oral options for GN infections, and formulate a Palmetto Health-specific antibiotic protocol for culture negative VO using a predictive tool.

Methods: This is a retrospective medical chart review of adults (≥18 years) diagnosed with VO from 08/01/2010-08/31/2015 at Palmetto Health. Inclusion criteria were based on radiography findings, microbiologic results, and clinical symptoms. Data collection included comorbidities, location, microorganisms with susceptibilities, surgical inventions, presence of hardware, and antibiotic history. Descriptive statistical methods were used for preliminary analysis.

Results: 150 subjects were identified. The mean age was 61 years with a male predominance (61%, 91/150) and an average BMI of 29. Comorbid conditions included diabetes mellitus (46%, 69/150), hemodialysis use (13%, 20/150) and tobacco use (22%, 33/150).

Recent bacteremia was found in 32/150 (21%) subjects; methicillin resistant Staphylococcus aureus (MRSA) predominated (13/32, 41%), followed by methicillin susceptible Staphylococcus aureus (8/32, 25%) and Streptococcus spp. (16%). Thirty-seven subjects had recent related injury or vertebral surgery, and 14/150 had prior hardware placement.

Bone, disc, or adjacent tissue cultures were done in 86% of subjects (129/150) with 40% (52/129) of those having >1 sample taken. Lumbar (92/150, 61%) and thoracic (47/150, 31%) regions were the most common sites. An adjacent abscess was found in 75% of subjects (113/150). 43% (4/14) of subjects with prior hardware required device removal.

Only 24% (36/150) of subjects had culture negative VO. 132 organisms were cultured. 84% (111/132) were gram positive (GP) with the majority being Staphylococcus (44 methicillin-susceptible and 40 methicillin resistant) and Streptococcus spp. Of the 13 Enterobacteriaceae, none were carbapenem resistant, 10/13 were ceftriaxone susceptible, and 8/13 were ciprofloxacin susceptible. Of the subjects with hardware, 6/14 (43%) developed infection with methicillin resistant Staphylococcus spp.

Conclusion: The majority of the VO subjects had GP bacteria isolated with a high incidence of methicillin resistance. Vancomycin and a narrow spectrum GN antibiotic (such as ceftriaxone) may be the most appropriate empiric therapy for culture negative VO. There were too few GN isolates to make a conclusion on their resistance predictors or safe oral therapy. Data collection is ongoing.

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Coleman, Caitlyn  
**Mentor(s):** Dr. Kathryn Stephenson  
**Why Asking is Important: Improving Chlamydia Testing in the Outpatient Setting**

Chlamydia is a sexually transmitted infection that is actually the most common reportable communicable disease in the USA. It is most reported in females age 20-24yo followed by females age 15-19 yo (our clinic population). This infection is five times more prevalent in non-hispanic African American women then non-hispanic White women; and ten times more prevalent in non-hispanic African American males than White males. Unfortunately, this infection is often asymptomatic and thus can go undetected for years, leading to increased rates of spread and increased complications. Persistent infection can lead to PID, tubal factor infertility, ectopic pregnancy, increased HIV transmission, chronic pelvic pain, adverse pregnancy outcomes, neonatal infections, epididymitis, and reactive arthritis. USPSTF, AAP, and AAFP recommend annual screening on all sexually active women younger than age 25yo and all high risk males. Nucleic Acid Amplification Tests are the best means of testing for Chlamydia. These can be obtained by vaginal, cervical, urethral or urine swabs/ specimens. Per baseline data collected, the % of teens seen in CHOC (resident clinic) for well child checks tested for chlamydia is roughly 57% and thus has room for improvement. This baseline data was collected from 3/1/15-3/31/15 retrospectively from CHOC well child teenage visits (all children 13 yo and older). Over the course of 3 PDSA cycles, which consisted of speaking with resident physicians in CHOC concerning the importance of STI testing as well as the current recommendations, the % of teens who admitted to sexual activity tested increased from 57% to 100%. The number of teens actually asked about sexual activity did not change however, staying roughly 90% throughout the course of this project. The implementation of AAP guidelines concerning Chlamydial testing could lead to increased testing in our clinic and thus lead to decreased rates of transmission and possibly decreased long term negative outcomes of infection.
Coval, Lindsey  
**Mentor(s):** Dr. Erin Creech, Dr. Joseph Kohn  
**Perioperative antibiotics versus extended duration antibiotics for prophylaxis in patients with ventriculostomy and external ventricular drains.**

Background: Monitoring and controlling increased intracranial pressure (ICP) for various neurological indications is often accomplished with ventriculostomy and subsequent placement of an external ventricular drain (EVD). Ventriculostomy-related infections (VRIs) are a major concern in patients with EVDs and generally have an incidence of less than 10%, but their high mortality makes prevention imperative. The American Society of Health System Pharmacists (ASHP) and the Neurocritical Care Society both recommend one dose of antibiotics for patients receiving an EVD. Despite these recommendations, practice still varies. Thus, the purpose of this study is to compute the proportion of VRI between patients who received only perioperative antimicrobial prophylaxis and those who received antimicrobials for the duration of EVD placement.

Methods: This study is approved by the Palmetto Health Richland Institutional Review Board. This is a retrospective, observational study for which data will be collected from January 1, 2015 – January 31, 2017. Patients will be identified for inclusion by documentation in the ‘ICP CSF Drainage’ or ‘Neuro Device Type’ fields in the electronic medical record. The proportion of patients who acquire VRI will be computed for patients receiving prophylactic antibiotics in the perioperative period and the entire duration of EVD placement. Antibiotic consumption, antibiotic-related adverse events such as Clostridium difficile infection and acute kidney injury, and factors associated with VRI will also be computed for each group as secondary objectives.

Results: To be determined.

Conclusions: To be determined.

Cross, Magen  
**Mentor(s):** Dr. Robert Daniels, Dr. Shannon DeRienzo  
**Antimicrobial consumption in a children’s hospital following implementation of a neutropenic fever guideline**

Background/Purpose: Febrile neutropenia (FN) is a frequent complication in pediatric cancer patients receiving chemotherapy. Episodes of FN are associated with increased mortality and often require admission to the hospital for empiric treatment with broad spectrum antibiotics. According to the American Society of Clinical Oncology guidelines for the management of FN in pediatric cancer patients, treatment should be based upon patient stratification into a low or high-risk group by adopting a risk stratification strategy into current clinical practice. A pediatric FN institutional treatment guideline was recently implemented at Palmetto Health Children’s Hospital (PHCH) recommending therapy based on risk stratification of FN patients. The primary objective of this study is to compare antimicrobial consumption prior to and following implementation of this institutional guideline.

Methodology: This is a single-center, observational, retrospective/prospective cohort study approved by the Palmetto Health institutional review board. Patients 18 years or less, admitted to PHCH from October 1, 2015 to March 1, 2016 and October 1, 2016 to March 1, 2017, who were diagnosed with fever and neutropenia (via ICD-10 codes) and received at least 48 hours of antimicrobials have been included. The primary endpoint is time to successfully stopping antimicrobial therapy prior to and following implementation of the approved guideline. Time to successfully stopping therapy will be measured in total days of therapy. Secondary endpoints include in-hospital mortality, hospital length of stay, duration of neutropenia, compliance with treatment guideline, time to defervescence, and antimicrobial complications.

Results: A total of 142 patient admissions were screened for study inclusion and 50 patient admissions were included for analysis. Analyses are currently ongoing.
Culy, Daniel  
Supervisor(s): Chet Patel, Redding Kingery  
Mentor(s): Dr. Thomas Cook, Dr. Heather Brown  
Global Health Experience Among Applicants to Emergency Medicine Residency Programs

BACKGROUND

Global Health (GH) activity among residents training in the United States (US) has increased significantly in the past decade. To date there have been no attempts to quantify participation in GH among applicants to Emergency Medicine (EM) programs.

OBJECTIVES

Quantify GH participation for US medical students applying to two EM residency programs, and compare GH participation to other common activities listed on applications for EM residency training.

METHODS

Electronic Residency Application Service (ERAS) applications for US medical students applying to two EM residency programs during the 2016 match were analyzed for participation in the following activities prior to and/or during medical school: GH, EM research, GH research, emergency medical services (EMS), and working as an EM scribe.

RESULTS

A total of 1080 applications were reviewed. Thirty-seven percent of all applicants participated in at least one of the activities. Participation in global health (31%) was more than twice as common as the next highest activity, EM research (15%). EMS (11%), work as a scribe (7%), and GH research (4%) were less prevalent. Female applicants were more likely to participate in GH prior to applying for EM residency training than males (39% to 28%). There were only small gender differences with regard to participation in the other activities. Comparisons of applicants by program site were unremarkable. Applicants that interviewed had modestly higher levels of participation in all activities compared to those applicants that were not interviewed.

CONCLUSION

Medical school applicants to EM training programs commonly participate in GH activities. Participation in GH is more than twice as prevalent as EMS, research, or work as an EM scribe.
The benefits of exclusive breastfeeding for the first six months of life for infants and their mothers have been well-documented. One of the maternal concerns identified as a barrier to breastfeeding is the concern that the infant is not exhibiting adequate growth or maintaining sufficient nutrition, despite that the average breastfed infant loses approximately 7% of the birth weight in the days following birth. Flaherman, et al developed a weight loss nomogram in order to identify how an exclusively breastfed term infant compares to a large sample of exclusively breastfed newborns. Our goal was to utilize this nomogram to help alleviate maternal concerns regarding infant growth while breastfeeding. In the month prior to our study, 37.3% of mothers in our Pediatrix Couplet Care population who were initially exclusively breastfeeding introduced formula into their newborns’ diets prior to discharge from the hospital. In our project, we aimed to decrease the percentage of mothers who switched from exclusive breastfeeding to formula supplementation. Over two PDSA cycles, we plotted the newborns on the weight loss curves and presented this information to the mothers in an attempt to educate them on normal newborn weight loss patterns and to encourage continued exclusive breastfeeding. We then reviewed whether the mother provided formula supplementation to the infant at any point in the postpartum stay. The percentages of subjects who introduced formula after initially exclusively breastfeeding in Cycles 1 and 2 were 15% and 13.3%, respectively. Thus, for the period during which our project was implemented, the percentage of breastfeeding mothers who introduced formula in Cycles 1 and 2 decreased by 22.3 and 24, respectively. In addition, 100% of women in the second PDSA cycle reported that the information helped them feel more comfortable with breastfeeding. While additional studies would be useful in helping to establish causation or application to a larger population, this project introduces the idea of educating mothers on normal weight loss patterns of breastfed infants in order to alleviate concerns about infant growth and encourage exclusive breastfeeding.
Daum, Carrye  
Mentor(s): Dr. Courtney Brooks  
**Triage Trends: Examining patterns amongst patient education**

Background and significance: Overutilization of emergency departments, including specialized obstetrical triage units, is a common problem in the United States. Although many patients who present to emergency facilities also have a primary healthcare provider, that source of care is not always felt to be readily available or accessible to them. Demographic disparities, including age and race, have also been discovered in the setting of reproductive health-related emergency department visits. This study aimed to identify additional factors that contribute to frequent obstetrical triage visits at Palmetto Health Richland in an attempt to ultimately decrease nonemergent use of triage facilities.

Methods: This study was conducted via a prospective anonymous patient survey, distributed to eligible Labor & Delivery triage patients at Palmetto Health Richland Hospital between September 2015 and May 2016. Patients provided basic demographic information, as well as information regarding prenatal care, chief complaint, number of previous triage visits, and education received prior to the triage visit.

Results: A total of 201 survey responses were obtained. Sixty seven percent of patients who presented to triage reported having Medicaid/Medicare, while 22% reported private insurance and 5% reported themselves to be self-pay. The majority of patients (58%) reported that they had not spoken with a healthcare provider on the telephone prior to arrival. Significant associations were found between several variables (insurance coverage, age, and education level) and whether or not the patient had utilized the phone triage system prior to presentation to L&D. Of patients with private insurance, 69% had utilized the phone triage system prior to presentation, compared to only 38% of patients with Medicaid/Medicare. Of patients age 30 or greater, 61% had utilized the phone triage system prior to presentation, compared to only 35% of patients aged 16-29. Finally, of patients with a college or graduate degree, 76% had utilized the phone triage system prior to presentation, compared to only 35% of patients with a high school degree or less.

Discussion: The goal of this study was to help identify demographic and educational trends amongst triage patients in an attempt to decrease nonemergent hospital visits. Based on the significant associations found between patient use of the triage phone system prior to presentation and the aforementioned demographic parameters, perhaps increasing awareness of the phone triage system to patients with Medicaid, patients younger than age 30, and patients with a high school degree or less may decrease overall Labor & Delivery triage visits.

DeGennaro, Carter  
**Supervisor(s): Collin Homer-Bouthiette**  
**Mentor(s): Dr. Michael Wagner**  
**Reducing Heart Failure Readmission in SC Using Bedside Ultrasound**

Hospital readmission has become a significant detriment to the healthcare system in the United States. This is very commonly seen in heart failure patients and becomes a growing concern as rate of cardiovascular disease continue to rise. In 2013, Gheorghiade et al. discovered that unplanned heart failure readmissions cost Medicare alone $17.4 billion annually. Another study from the Medicare Payment Advisory Commission estimated that 75% of these readmissions were avoidable given proper screening. Our study aims to demonstrate the efficacy of using hand-held bed side ultrasound techniques to identify patients at risk of readmission in hopes of improving patient outcomes and decreasing systemic costs. The study will focus on patients that were admitted to the hospital initially with Heart Failure with a preserved Ejection Fraction (HFpEF). The ultrasound guidelines followed in this study include measuring IVC diameter and collapsibility to assess vascular fluid load. We will also obtain six views of the lungs; three (anterior chest, lateral chest, and costophrenic angle) on each side to determine the amount of extravascular lung water. All measurements will be taken within 72 hours of discharge and overall score for fluid load will be given to each patient. This initial study will enroll 50 patients and they will be followed for 6 months to observe if they were readmitted for cardiac symptoms. Other studies have shown the validity of these ultrasound techniques in estimating readmission rates in other cardiac patient populations. This study will assess the validity of this bedside ultrasound protocol as a predictor for hospital readmission in patients with HFpEF.
DeMarsh, Madeline  
Mentor(s): Dr. Brandon Bookstaver, Dr. Majdi Al-Hasan  
Prediction of Sulfamethoxazole/Trimethoprim Resistance in Community Acquired Urinary Tract Infections

Background/Purpose: The guidelines for treatment of acute uncomplicated cystitis and pyelonephritis published by the Infectious Diseases Society of America suggest to avoid sulfamethoxazole/trimethoprim if resistance prevalence is known to exceed 20% or if used for UTI in the previous 3 months. The objective of this study is to develop a model for predicting resistance to sulfamethoxazole/trimethoprim (SMX/TMP-R) in patients with community acquired urinary tract infections in order to reduce inappropriate prescribing of antibiotics.

Methodology: This study is an Institutional Review Board (IRB) approved, retrospective, non-interventional, observational cohort study conducted at Palmetto Health System in Columbia, South Carolina. Eligible participants are those at least 18 years old who have a positive urine culture within 48 hours upon presentation to the emergency department from April 1, 2015 to February 29, 2016. Key variables collected for this study include patient demographics, urinary culture results and susceptibilities, prior antibiotic use within one year, and previous colonization with SMX/TMP-R bacteria. Multivariate logistic regression was used to identify independent risk factors for SMX/TMP-R.

Results: Pending.

Dixon, Scott  
Mentor(s): Dr. Mary Beth Poston  
A common presentation with a rare etiology

Fibrolamellar hepatocellular carcinoma is a very rare malignant liver tumor that is thought to be a variant of hepatocellular carcinoma. Unlike the traditional presentation of hepatocellular carcinoma in the chronically inflamed liver disease processes of alcohol abuse or the infectious hepatitides, fibrolamellar has a distinctly different epidemiology. Its rarity is estimated at only 1% to 5% of cases of classic hepatocellular carcinoma.

A 22 year old Caucasian female without significant past medical history presented to the Emergency Department with complaints of leg swelling and pain for one week preceded by a two week duration of decreased exercise tolerance due to sharp substernal chest pain. Initial evaluation of the leg revealed significant femoral and common femoral vein thrombosis. With concern for pulmonary embolism a computed tomography angiogram of the chest was performed which was negative for embolism, but discovered significant hypodense lesion involvement of the visible parenchyma of the left lobe of the liver, concerning for malignancy. Additionally noted were multiple noncalcified nodules of both lungs, as well as, large anterior or epicardial lymphadenopathy. Further computed tomography(CT) and ultrasound imaging of the abdomen confirmed diffuse metastatic disease of the liver with an estimated 6-7cm left lobe lesion, significant thrombotic burden involving the left common iliac, internal iliac, external iliac, and common femoral veins, as well as left portal vein thrombus. CT guided biopsy revealed fibrolamellar hepatocellular carcinoma. Due to the significant progression of the disease, patient was transferred to a tertiary cancer institution for treatment options. The significance of this case is two part, identifying fibrolamellar hepatocellular carcinoma, a rare variant of hepatocellular carcinoma with distinct epidemiologic differences, as well as presenting a rare etiology of an otherwise common clinical appearance of venous thromboembolism.
Ebinger, Jessica  
**Mentor(s): Dr. Lauren Castleberry**  
**Is ‘Baby-Friendly’ Actually ‘Mommy-Friendly?’ The Baby-Friendly Initiative and Effect on Patient Satisfaction**

**Background and Significance:**
The Baby-Friendly Hospital Initiative was launched by the World Health Organization in 1991. Baby-Friendly USA was created in 1997 and has specific criteria that hospitals must meet to become “Baby-Friendly.” No studies have been reported in the literature about patient satisfaction with this initiative. In this study, an anonymous survey was conducted of patients at our Baby-Friendly designated hospital to determine patient experience and satisfaction.

**Methods:** Patients ages 16 and older who delivered living infants at Palmetto Health Richland during the 4 month study period were given anonymous surveys during postpartum clinic visits.

**Results:** A total of 170 surveys were collected; 145 surveys were analyzed. Of these, 28% delivered via Cesarean section; 72% delivered vaginally. 28.5% of patients responded “neutral or disagree” when asked if they were able to recover on postpartum. Those who underwent a Cesarean section were more likely to respond negatively when asked if they felt like they could safely take care of their infant (P<.05). Of the 103 patients who planned on breastfeeding exclusively at admission, 26.2% switched to formula feeding and 24.3% switched to breastfeeding with formula supplementation at discharge. Of those using formula, 35.7% felt they were inadequately informed about formula feeding, and 26% felt they were made to feel guilty about formula feeding.

**Conclusion:** Baby-Friendly policies can have an impact on postpartum patient wellbeing. This study demonstrates many patients need additional support caring for their newborn postpartum. Half of patients who planned on breastfeeding switched to a form of formula feeding upon discharge; many of these patients felt shamed regarding their decision or inadequately educated on formula feeding. More support and education should be given to the formula-feeding population.

Eldridge, Melissa  
**Mentor(s): Dr. Kathryn Stephenson**  
**5-2-1-0 Approach to Address Childhood Obesity**

The project aims to provide the ability to identify children over the age of 3 years old with a BMI in the 95th percentile or greater by using an obesity questionnaire at each well child check, then document specific goal focused healthy lifestyle modification and provide counseling with a specific handout by 2016 for CHOC patients. We compared the 5 different areas (documentation of BMI, questionnaire, goal setting, scheduled follow up and counseling with handouts) pre and post intervention. Documentation of BMI and healthy lifestyle questionnaire with goals improved to 100 percent. Scheduling follow up improved to 80 percent and counseling with handouts improved to 77 percent. In conclusion, the obesity questionnaire serves as an aid in screening for pediatric obesity, engaging children and their family in setting goal and education on how implement those goals into their lifestyles.
Epps, Jimmy  
Mentor(s): Dr. Ken Walsh  
Using ion-sensitive field-effect transistors (ISFETs) to measure K+ efflux from human glioma cells

Field effect transistors (FETs) are devices that use an applied voltage as a mechanism for electrical switching and amplification. Ion-sensitive FETs (ISFETs) were developed with the goal of measuring ion concentrations in small fluid volumes. Little work has been done to observe the utility of ISFETs in the measurement of ion fluxes from living cells. Traditional methods of measuring K+ channel activity, though reliable, are both time consuming and invasive. With previous work in our lab, we were able to demonstrate the efficacy of K+ sensitive ISFETs in rapidly and noninvasively measuring K+ efflux via activation of Ca2+-activated K+ channels in human glioma cells (U251-MG). The purpose of this study was to further evaluate the utility of ISFETs by measuring inhibition of the Ca2+-activated K+ channels inherent to U251 cells via the Ca2+-activated K+ channel blocker, charybdotoxin (CHX). We placed the ISFET probe and reference electrode in a recording chamber along with the U251-MG cells. Addition of the Ca2+ ionophore A23187 (1µM), by increasing intracellular Ca2+ levels, elicited a K+ efflux measureable by the ISFET probe. We then performed the same experiment, but with the addition of CHX (100nM) in the recording chamber with the U251 cells. We observed a large decrease in K+ efflux with CHX compared to controls, indicative of Ca2+-activated K+ channel block. Additionally, some K+ efflux was observed even in the presence of CHX. These results suggest that ISFETs can be a valuable tool to rapidly measure inhibition of K+ channels. These experiments set the ground work for the development of ISFET arrays for the high throughput toxicological analysis of cell K+ channels.

Fallin, James  
Mentor(s): Dr. Jeter Taylor  
Rapunzel Syndrome - A Grimm Case of the Pediatric Hairball

Introduction  
Complaints of abdominal pain and vomiting are a common presentation in pediatric emergency medicine. Although most cases represent fairly benign conditions, one must always be on guard for the occasional serious surgical problem. Pediatric patients represent a unique population where a thorough history must be obtained from multiple sources.  
Case Presentation  
A 9 year old female child with a history of beta-thalassemia presented to the Emergency Department with complaints of intermittent abdominal pain. Over the past month these symptoms had increased in frequency with accompanied nausea and vomiting. The week prior she had been diagnosed with gastroenteritis, but she continued to be symptomatic despite ondansetron therapy. Because of her lingering symptoms abdominal radiographs were obtained revealing a potential mass in the left upper quadrant of her abdomen. Follow-up radiographic studies with contrast revealed evidence of a gastric bezoar. Pediatric surgery was consulted and she underwent an emergent laparotomy.  
Outcome  
Intraoperatively the patient had successful removal of a large trichobezoar (22.7 cm x 3.8 cm x 3.5 cm) from the stomach and duodenum. Interviews of extended family members revealed a remote history of trichophagia prior to age five with the observation of hair in her stools. Even after psychiatric intervention the patient never acknowledged eating her hair.  
Discussion  
This case represents an extremely rare intestinal condition called Rapunzel syndrome named after the long-haired girl in the fairy tale by the Brothers Grimm. This trichobezoar (hairball) is the result of trichophagia (Ingesting hair) due to trichotillomania (hair-pulling disorder). Rapunzel syndrome actually involves extension of the bezoar into the duodenum. It is an uncommon diagnosis in children with less than 40 cases reported. Because the human GI tract is unable to digest human hair, the trichobezoar usually has to be treated surgically. Also these patients should undergo psychiatric treatment. Undiagnosed, this can lead to severe complications including intussusception, ulceration, perforation, and even pancreatitis. Although trichobezoars are rare, this case demonstrates the importance of thorough history taking, and the need to pursue any abnormalities that do not mesh with a more common diagnoses.
Adult acquired flatfoot (AAFF) is a common condition evaluated and treated by foot and ankle surgeons. Despite how commonly this disease presents, the disease incidence and economic impact have yet to be defined. Discussions of AAFF in the literate date back to the late 19th century, however, a study of the impact of this disease on society has not been performed. Prior studies consisted of small scale cohort and observational studies among military recruits. Our hypothesis was that the surgical incidence of AAFF and its economic burden would increase given the aging population and improvements in surgical treatment options.

The South Carolina database compiles billing data from acute care and ambulatory surgery centers. This data includes: demographics, diagnosis, procedural codes, admission type, length of stay, age, gender, race, Diagnostic Related Group, discharge status, primary expected payer, total charges, and physician specialty code. Bivariate descriptive statistics were utilized to analyze the data. Surgical incidence was calculated and the demographics and medical comorbidities of patients who progressed to surgical treatment for AAFF were analyzed. Costs associated with surgical care episodes were calculated to determine the economic burden of disease. A regression analysis with multiple dependent variables was utilized to look for trends that could be analyzed in a larger cohort or prospective fashion.

In total, 2,596 patients underwent AAFF corrective surgery between 2004 and 2014. Patients who underwent surgery for AAFF were more likely to be white, female, and in their 4th, 5th or 6th decade of life. Surgical incidence for AAFF rose from 2.85% in 2004 to 6.37% in 2014 with a peak in 2013 at 7.59%. Patients were most likely to undergo a combination of soft tissue and fusion procedures, followed by soft tissue procedures alone and then fusion procedures in isolation. The total healthcare costs associated with patients who underwent surgery for AAFF rose significantly from $1,889,527.00 in 2004 to $14,123,905.00 in 2014.

Our data demonstrates an increasing burden of disease for AAFF on society. This new data shows that there has been an increase in patients undergoing surgery for AAFF and the incidence rates and population most at risk confirm what previous studies of smaller scale have shown. The increase in incidence and burden parallel the rising rates of diabetes and obesity in the state, known risk factors for AAFF. We hope that this data will lead to increased patient education, clinical awareness and resource allocation for AAFF.
Numerous studies have been published on the treatment of adult acquired flatfoot deformity (AAFF). However, there has been little focus on its incidence, and economic burden in the general US population. This study updates and examines surgical incidence rates, demographic factors, and economic burden compared to our previous study that used data from South Carolina. Additionally, we evaluated the number and type(s) of surgeries performed for patients who underwent surgery. Our hypothesis was that the surgical incidence of AAFF and its economic burden would increase given the aging population and improvements in surgical treatment options.

The Nationwide Inpatient Sample (NIS) compiles patient data representing a 20% stratified sample of all hospital discharges nationwide. Along with demographic, diagnosis and procedural codes the NIS includes: admission type, length of stay, age, gender, race, Diagnostic Related Group, discharge status, primary expected payer, total charges, and physician specialty code. Bivariate descriptive statistics were utilized to analyze the data. Surgical incidence was calculated and the demographics and comorbidities of patients who progressed to surgical intervention were analyzed. Costs associated with the surgical care episodes were calculated to determine the economic burden. A regression analysis with multiple dependent variables was utilized to look for trends that could be analyzed in a larger cohort or prospective fashion.

In total, 160,795 patients underwent AAFF corrective surgery between 2004 and 2014. Patients who underwent surgery for AAFF were more likely to be white, female and in their 5th decade of life. Average surgical incidence during this time period was 5.12%. Patients were most likely to undergo a combination of soft tissue and fusion procedures, followed by soft tissue procedures alone and then fusion procedures in isolation. The total nationwide healthcare costs associated with patients who underwent surgery for AAFF exceeded $4 billion dollars in this 10 year time period.

Our data demonstrates that there has been an increasing burden of disease for AAFF on society over the past 10 years. Patients undergoing surgery for AAFF contributed more than 4 billion dollars to national healthcare costs between 1994-2014. Our study confirmed prior small scale studies of the population most at risk and demonstrated an increasing surgical incidence. The increase in incidence and burden parallel rising rates of diabetes and obesity seen nationwide, known risk factors for AAFF. We hope that this data will lead to increased patient education, clinical awareness and resource allocation for future study of AAFF disease prevention.
Gould, Alyssa  
Mentor(s): Dr. Brandon Bookstaver, Dr. Majdi Al-Hasan  
Empirical Fluoroquinolone vs. Beta-Lactam Monotherapy for Gram-Negative Bloodstream Infections

Fluoroquinolones are broad-spectrum antimicrobials that should be reserved for treatment of potentially life-threatening infections, such as bloodstream infections (BSI). Unfortunately, increasing rates of antimicrobial resistance have limited the utility of fluoroquinolones in empirical therapy for serious infections.

However, clinical prediction models have recently demonstrated low fluoroquinolone resistance rates in patients without major risk factors of antimicrobial resistance such as prior antimicrobial use, nursing home residence, and recent outpatient gastrointestinal or genitourinary procedures. Recent data also suggest favorable clinical response in patients with BSI due to fluoroquinolone-susceptible bacteria receiving empirical therapy with fluoroquinolones compared to beta-lactams. The purpose of this study is to examine clinical outcomes in patients receiving empirical fluoroquinolone or beta-lactam monotherapy for gram-negative BSI after stratification by major risk factors for antimicrobial resistance.

In this retrospective matched cohort study, all hospitalized patients with BSI due to gram-negative bacilli between January 1, 2010 to December 31, 2013 at Palmetto Health Richland and Baptist Hospitals were identified. Exclusion criteria were patients <18 years, recurrent BSI during study period, polymicrobial infection, and patients receiving antimicrobial therapy other than fluoroquinolone or beta-lactam monotherapy during the first 48 hours from index BSI. The primary outcome was early treatment failure, defined as mortality by 96 hours, or by presence of ≥2 of the following criteria within 72-96 hours from index BSI: temperature >38.0 or <36.0 degrees C, systolic blood pressure <100 mmHg or vasopressor use, respiratory rate ≥22/min or mechanical ventilation, altered mental status, or white blood cell count of >12.0 or <4.0 cells/mm³. Patients were matched by age, gender, year of diagnosis, bloodstream infection mortality risk score, and site of infection acquisition. Multiple logistic regression was used to examine the rates of early treatment failure in patients receiving empiric fluoroquinolone or beta-lactam monotherapy.
Hall, Michael
Supervisor(s): Lee Day
Mentor(s): Dr. Joseph Horvath

The Invisible Gorilla: Cases of AIDS in the Elderly

Cases:
A 70-year-old man presented to the emergency department for altered mental status. Labs, imaging, and vitals were unremarkable. A plan for discharge was halted after he developed a fever of 100.4°F. Chest imaging revealed a fluid-filled lesion. He was discharged with antibiotics and follow-up with pulmonology but was admitted the following day due to further confusion. He was re-evaluated, the lung lesion was biopsied, and he was discharged with additional antibiotics. He followed-up with his PCP who noted his WBC count had fallen to 2.6K/L. An HIV screen was ordered and positive. Serum and CSF Cryptococcal antigens were positive, and he was started on treatment for Cryptococcal meningitis.

A 69-year-old female presented to the emergency department with left knee septic arthritis. She had a years-long history of recurrent infections in her left knee with multiple replacements. During inpatient course, she complained of throat pain with swallowing. Examination revealed white plaques consistent with oral thrush. On further questioning, she reported oral thrush for several years. An HIV screen was ordered and was positive, and CD4 count returned at 65 cells/L. She was started on PJP prophylaxis during inpatient stay and scheduled to follow-up with Infectious Diseases once treatment for the septic joint was completed.

Discussion:
The CDC reported that more than 1.2 million people in the United States are living with HIV (CDC HIV in the United States: At a Glance 2016). In 2014, the CDC estimated 44,073 new diagnoses of HIV were made, and people aged 65 and older accounted for 914 of these (CDC HIV Surveillance Report 2015). In 2015, the University of South Carolina Department of Infectious Diseases followed 2112 HIV positive patients, and 136 of those were 65 years or older (Rao 2015). Despite increased screening for HIV, it remains likely that HIV is under-diagnosed in those aged 65 and older. Delayed diagnosis is at least partly to blame for the increased likelihood that elderly people have more advanced disease states compared with younger age groups at the time of diagnosis (Ruiz et al 2010). Reasons for late diagnosis of HIV in the elderly include less routine screening and failure of providers to consider the disease (Geriatrics 2008). For these reasons, HIV should be considered in all elderly individuals when appropriate.

Ham, Jared
Mentor(s): Dr. Erin Creech, Dr. Cortney Dodson

Timing of thromboprophylactic therapy after repair of subarachnoid hemorrhage

Purpose/Background: With an overall incidence of approximately 33,000 cases annually in the United States, and as high as a 50% mortality rate, subarachnoid hemorrhage (SAH) is a major medical problem. Following surgical management of SAH via either clipping or coiling, patients often remain immobile and have an increased risk of developing a venous thromboembolism (VTE). However, the use of chemical anticoagulation to prevent VTE is controversial as it may increase the risk of intracranial bleeding. The use and timing of chemical anticoagulants (CA) is a delicate balance and there is no definitive timeline identified by the Society of Critical Care Medicine or the Neurocritical Care Society. Thus, the practices regarding CA and the timing of their initiation in this population are highly variable among institutions. The purpose of this study is to evaluate the safety of early versus late initiation of thromboprophylactic therapy (TPT) defined as within 72 hours or greater than 72 hours after SAH repair, respectively.

Methodology: This is a single center, retrospective, observational cohort study. Subjects meeting inclusion criteria admitted to the institution between June 1, 2012 and October 1, 2016 will be included. As a primary objective of the study, patients will be evaluated for rebleeding or increase in the size of SAH after initiation of either early or late TPT. Secondary objectives include development of VTE, death, discharge disposition, length of stay, length of ICU stay, development of heparin-induced thrombocytopenia, and need to discontinue TPT. Primary objectives will be analyzed via logistic regression and secondary objectives will be analyzed via logistic regression or Wilcoxon rank-sum tests as appropriate.

Results: to be determined
Conclusions: to be determined
Hill, Brandon  
**Mentor(s): Dr. Brandon Bookstaver, Dr. Kamla Sanasi-Bhola, Dr. Joseph Kohn, Dr. Julie Justo**  
**Assessment of an adult open fracture antibiotic prophylaxis protocol**

Background/Purpose: Recent studies at our institution demonstrated an infection rate of 26% after open fractures. Based on local microbiology and concerns regarding antibiotic adverse events (AEs), a modified adult open fracture antibiotic prophylaxis protocol (AOFP) was introduced November 2015 to include weight-based cefazolin or ciprofloxacin plus vancomycin depending on fracture grade.

Methodology: This retrospective study conducted at Palmetto Health Richland has been approved by the Institutional Review Board. Adult patients with open fractures admitted to Palmetto Health Richland from November 2013 to December 2016 and identified by corresponding ICD-9/10 codes will be screened for study inclusion. The primary endpoint is adherence to the modified AOFP. Secondary endpoints include a pre- (November 2013 – April 2015) and post-AOFP (November 2015 – December 2016) comparison of infection rate and antibiotic-associated AEs. Patients will be excluded for any of the following: receipt of antibiotics for any reason other than open fracture, death prior to wound closure, or time of admission to our institution >48 hours after time of injury.

Results: n/a

Conclusion: n/a

Hobensack, Michael  
**Mentor(s): Dr. Carole Oskeritzian**  
**Angiogenesis and mast cells in precancerous prostate**

Prostate cancer (PCa) is an adenocarcinoma that constitutes the second main cause of death due to cancer among men in the USA. Almost half of men display Prostatic Intraepithelial Neoplasia (PIN) by the age of 50. High grade-PIN (HPIN) is considered a precancerous stage, although most cases will not advance to cancer. Angiogenesis or the generation of new blood vessels from pre-existing ones, is a hallmark of solid tumors, as they need blood supply to grow. Vasculature formation is promoted by vascular endothelial growth factor (VEGF). Mast cells (MC) are prostate resident cells, with cytoplasmic granules harboring many mediators, including VEGF and trypase protease. Thus, we hypothesized that MC-mediated angiogenesis drives prostate transformation. We used a transgenic mouse model C3(1)/SV40Tag that mimics the human disease progression to PCa with age. We developed a computer-assisted quantitative imaging method to measure morphometrics to quantify the number and activation of MC in microscopy sections. A similar approach was optimized for angiogenesis through quantification of CD31, an endothelial cell marker. Our preliminary data indicated that Low (L)PIN/C3 prostate sections showed higher numbers of total and activated MC than normal/C3 (N/C3) mice (63.6 vs. 27 MC/mm2 and 44.2 in LPIN vs. 10.7 MC/mm2, respectively). Microvasculature analysis revealed higher density of new capillaries in LPIN/C3 than in N/C3 or WT mice, scoring 0.03 vs. 0.01 for CD31-IOD/total image area ratios, respectfully. In conclusion, increased angiogenesis and MC activation could serve as a predictor for prostatic transformation. Supported by NIH/NIAID R01 AI095494, NIH/NIAMS R21 AR067996 and NIH/NIGMS P30 GM103336 (Pilot Project) to CAO.
Lipid Parameters in College Students [at Furman University, a private U.S. liberal arts college]

Purpose: Research indicates that minority and/or low socioeconomic status (SES) are risk factors while exercise is protective against cardiovascular disease. However, relating this to CVD/lipid screening protocols remains challenging as few studies relate demographic data to lipid values in young adult populations.

Methods: Associations between ethnicity, financial need, athletic participation, and gender on lipids were analyzed in approximately 4000 students between 18-24 from 2003-2015 at Furman University. Lipid values for VLDL-C, total cholesterol (TC), triglycerides (TG), LDL-C and HDL-C were tabulated as mean and 95% CI. ANOVA test and generalized linear model were used to determine independent association of race, financial need status, athletic participation, and gender on lipid parameters and mean values, respectively. P-values <0.05 were considered statistically significant.

Results: African-Americans demonstrated higher athletic involvement and significantly healthier lipid values for VLDL, TG, and HDL (independent of athletic participation). TC, LDL, and HDL values were significantly healthier in males versus females, and HDL values were healthier in athletes. No significant relationship existed between financial need and lipids except where medium need students had higher TC values.

Conclusion: Significantly better cholesterol health existed in athletes due to increased HDL values. This indicates that athletic participation may play a protective role in preventing future cardiovascular disease by helping to stimulate an increase in HDL levels independent of race, gender, and SES. Cholesterol health was also improved in several categories [which were statistically significant] for male and also for African-American college students, indicating that gender and ethnicity play a role in determining risk factors for future CVD. Furthermore, the identification of several students with poor cholesterol health suggests the continued need for broad screening and early intervention via lifestyle modification including diet and exercise in at-risk individuals.
Jenkins, Patrick  
**Mentor(s): Dr. Mark Humphrey**  
**Door-to-Door in Tola: Identifying the Healthcare Needs of a Rural Nicaraguan Town**

**Background:**
Tola is located in the department of Rivas in Nicaragua. There is one Ministry of Health (MOH)-sponsored clinic staffed with physicians. This serves a population of 27,000. OneWorld Health’s (OWH) mission is to empower communities to achieve long-term improvement in health and quality of life. They have done this with a fee-for-service model in Uganda and Nicaragua. Two clinics have been established in Nicaragua and OWH was planning a third in Tola. Our team of one attending, three residents, four fourth year medical students, a fourth year pharmacy student, two OWH employees, and five interpreters completed a healthcare needs assessment to assist OWH in determining gaps in care so they could better serve the population.

**Project Aims:**
- To compare the healthcare needs as discussed in published literature, PAHO and WHO reports, versus the needs of the people of Tola.
- To determine the barriers to healthcare experienced by the people of Tola.
- To better understand the demographics of the population of Tola, the town we intend to serve.
- To better understand the most common disease processes/chief reasons for healthcare visits.
- To determine what services are needed in Tola.
- To establish goodwill and good rapport with the healthcare providers already in the area.

**Methods:**
The group was split into five groups of three. An interpreter was in each group. One served as a scribe while the other asked questions in English while the interpreter translated. A two-stage cluster sampling technique was utilized where eight communities of forty-seven were selected and every other house was surveyed. In total, 12 questions were asked and answers recorded. One hundred and fifty-two households were surveyed. Comparisons were made between our findings and those published by WHO, 2005 Tola Census and PAHO.

**Conclusions/Take Home Points:**
Our data was similar to 2005 Tola Census data in regards to age of patients in the households surveyed. Our data was similar in regards to common chronic diseases, such as hypertension and diabetes. A similar percentage of families had healthcare needs go unmet and were unsatisfied with their care. There is a need for healthcare services that OWH can provide and the population would be willing and able to pay for these services. OWH will be able to bridge the gap between socialized care and unaffordable, private care. This will help take pressure off of the MoH-sponsored institutions so that better care can be delivered to the people of Tola.
Velamentous Cord Insertion into the Dividing Membrane of Dichorionic Diamniotic Twins

Background: Twin gestation and assisted reproductive technology are two well-described risk factors for abnormal placentation and anomalous cord insertion. Velamentous umbilical cord insertion has been associated with adverse perinatal outcomes, particularly when not diagnosed prenatally.

Case: We present the case of a dichorionic diamniotic twin gestation with velamentous cord insertion of twin B into the dividing membrane. This pregnancy was the result of a frozen embryo transfer of two embryos. Ultrasound evaluation at 17 weeks gestation revealed the cord insertion of twin B into the intervening membrane with insertion at the posterior interface of the twin membrane coursing to the anterior interface and then inserting into the placenta of twin B. Twin A was found to have a single umbilical artery with normal cord insertion. Maternal Fetal Medicine followed this patient with serial growth ultrasound examinations and antenatal testing with umbilical artery Doppler twice weekly starting at 28 weeks gestation. Delivery was by repeat cesarean section at 35 weeks after PPROM of twin A, which was well tolerated by both twins.

Discussion: This case confirms the increased risk of velamentous cord insertion in twins conceived by assisted reproductive technology and describes a unique cord insertion, with the cord traversing the dividing membrane prior to insertion. It highlights the importance of screening high-risk populations for abnormal placentation and anomalous cord insertion.

Should the ED be Your Final Destination? - An Evaluation of Emergency Department Utilization and Identification of Methods to Decrease Over Utilization

Introduction: Emergency department (ED) utilization as a substitute for primary care, especially for minor episodic care, has been an ongoing topic of interest in healthcare. According to 2007 data, the overuse of U.S. EDs is responsible for $38 billion in wasteful spending each year. It is estimated that 13-27% of ED visits in the United States could be managed in physician offices, clinics and urgent care centers.

Research Design: We examined the overutilization of our emergency departments within our healthcare system specifically looking at patients that have an established relationship with our outpatient office and who have used the ED during clinic hours. We conducted a telephone survey of patients that have been identified as having established care and followed up (at least two office visits) with our outpatient office and have utilized the emergency departments within our healthcare system on at least one occasion during normal office business hours. The survey assessed whether the patient was aware that we have same-day appointments available, whether or not the patient attempted to obtain an appointment with our office, if the patient was referred to the ED by our office and if cost and/or transportation were factors. Major primary aim was to create an intervention in order to have patients visit the office instead of the ED for non-emergent complaints.

Results: A total of 54 patients were contacted to complete the survey and of those, 30 surveys were completed. From the 30 completed surveys, 63% did not know about same-day appointments, 90% did not call into the office prior to going to the ED and only 16% were advised to go to the ED after speaking with a nurse/physician. The reasons the other 24 patients did not complete the survey include patient was deceased, wrong number listed in chart, patient never seen at our practice, patient never answered the phone and patient did not recall going to the ED.

Intervention: Increase patient access by increasing awareness of same-day appointment availability. This can be achieved with flyers posted in exam rooms and in the waiting room and by handing out refrigerator magnets. The call center staff may need to be re-trained in placing patients in appropriate access care slots on physicians schedule.
Introduction: Advances in pharmacotherapy have transformed HIV from a fatal disease to a chronic disease. Among patients with well-controlled HIV, atherosclerotic cardiovascular disease (ASCVD) is a leading cause of death. HIV positive patients have a high prevalence of ASCVD risk factors, including hypertension, hyperlipidemia, diabetes, overweight and obesity, and lifestyle factors such as smoking, physical inactivity, and poor diet. HIV positive patients have higher rates of myocardial infarction than patients of similar age with comparable risk factors.

Objective: To determine the prevalence of ASCVD risk factors as well as pharmacologic and other interventions among patients without known ASCVD at the USC Immunology Center (USC IC), a Ryan White-funded clinic that provides care to approximately 2200 HIV positive patients in Columbia, South Carolina.

Methods: We conducted a retrospective chart review on a random sample of USC IC patients aged 40 years and older with HIV. Pregnant patients and those with known ASCVD were excluded. Eligible persons were required to have had at least 3 visits in the prior 3 years, including 1 visit in the past year. Using a standardized tool for chart abstraction, data regarding demographics (age, gender, race/ethnicity), comorbidities (hypertension, overweight and obesity, and diabetes), lab values (hemoglobin A1, fasting cholesterol), medications (for hypertension, diabetes, cholesterol), and recent blood pressures were abstracted. In addition, assessment of and intervention for smoking, weight loss, physical inactivity, and poor diet were determined as appropriate.

Results: Of 1509 eligible patients, 187 charts were reviewed, of which 45 were excluded based on above criteria, leaving 142 that were reviewed and 100 had lipid data available within the specified timeframe. Approximately one third of patients were obese and another third were overweight based on the last BMI. Fifty-six percent had a diagnosis of hypertension, and 60% of these were controlled based on the last blood pressure. Prevalence of diabetes was low at 6%. While nurses assessed smoking status for 100% of patients, not all of the approximately 30% of patients who smoked received an intervention. Diet and exercise were assessed for less than 25% of eligible patients and less than 25% received interventions for diet, exercise, or weight loss. Based on current guidelines, less than 25% of eligible patients were receiving statin therapy, including those with LDL ≥190 mg/dL or a diagnosis of diabetes.

Conclusions: Significant opportunities for primary prevention of cardiovascular disease were found including smoking cessation counseling and medication, nutrition and physical activity counseling, and statin therapy.
Keller, Dan  
**Mentor(s): Dr. Troy Privette, Dr. Peyton Hassinger**  
**Complete Recovery from Ventricular Fibrillation in a Patient Diagnosed with Takotsubo Cardiomyopathy: A Case Report**

Takotsubo cardiomyopathy is a rare diagnosis with increasing exposure in the literature. Frequently triggered by profound physical or emotional stress, the cardiomyopathy is characterized by akinesia of the apex and hyperkinesia of the base of the heart. Patients commonly present with symptoms and electrocardiogram abnormalities suggesting an acute coronary syndrome. However, angiography shows no significant coronary artery occlusion. This case describes a 49-year-old female who presented to the emergency department with three hours of chest pain radiating to her left shoulder and mild dyspnea. Her history and physical exam showed no cardiac risk factors or significant abnormalities. Though stable on initial evaluation, the patient's cardiac rhythm suddenly converted to ventricular fibrillation. She was successfully defibrillated and immediately awoke alert and coherent. Cardiac catheterization and echocardiogram showed severe apical akinesis and compensatory basal hyperkinesia consistent with Takotsubo cardiomyopathy. She underwent placement of an implantable cardioverter defibrillator (ICD) and was discharged to home on hospital day 4. The patient returned in three months for a follow up transthoracic echocardiogram which showed that the myocardial function had returned to normal. The present case serves to add to the growing base of literature describing Takotsubo cardiomyopathy. Failure to recognize this syndrome can lead to fatal arrhythmias and other life-threatening consequences in patients. Given its reversibility, Takotsubo cardiomyopathy deserves further attention so that increased recognition may continue to positively influence outcomes of the disease.

Kozik, Michael  
**Co-Presenter(s): Brooks Lane**  
**Mentor(s): Dr. John Eberth**  
**The Role of Calcification in Aneurysmal Progression**

Aneurysms are focal dilatations of a blood vessel wall normally accompanied by increased stiffness and loss of structural integrity. Aneurysm pathophysiology includes calcification and proteolysis often leading to further expansion and rupture. Contemporary research has presented many in vivo methods for inducing aortic aneurysms. One such method is periarterial application of calcium chloride (CaCl₂). While this model is robust, and widely used in the literature, the mechanistic link between calcification and aneurysmal formation is not completely understood. In particular, the role calcified elastin plays on proteases secreted by non-inflammatory cells cannot be delineated from the immune response. Moreover, investigations of therapeutic agents using an in vivo model are hindered by challenges in delivery vehicles. These limitations can be addressed by an in vitro system, where candidate therapeutics can be rapidly screened without the need for complex drug delivery approaches. However, to date, no in vitro models of CaCl₂ mediated injury have been reported.

We seek to further characterize the role of calcification in aneurysmal progression using both the established in vivo and, for the first time, an in vitro CaCl₂ model. In both models, we hypothesize that periarterial CaCl₂ application will initiate true aneurysm formation with altered vascular mechanics and histology. For preliminary in vivo experiments, we’ve isolated the infrarenal abdominal aorta, wrapped it with a sterile gauze soaked in 0.5M CaCl₂ solution for 15 minutes, and then observed these mice for 2 weeks post-operatively. At the termination of these experiments, blood vessels were frozen in OCT, sectioned, and fixed in acetone or 4% paraformaldehyde. Analysis demonstrated medial elastin calcification after only 1 week post-operative. The in vitro model utilizes elastic arteries mounted to a pulsatile perfusion bioreactor and exposed to a 0.5 M CaCl₂ soaked gauze for 15 minutes (n=6). Vessels and controls were then cultured at physiological pressure and flow for up to 3 weeks. Diameter changes were tracked and histology performed. We found an increase in both inner (58.1%) and outer (23.0%) diameter following CaCl₂ application (p=0.02) with no expansion of cultured controls. Histological analysis revealed elastic network disruption, while gelatin zymography revealed unique upregulation of matrix metalloproteinase (MMP) -2, but not MMP-9. Therefore, we conclude a similar pathophysiology to aneurysm disease has been initiated, comparable to established in vivo models for the same time span.
INTRODUCTION Chronic pain management is a challenging issue for clinicians and patients alike. Opiates are a mainstay of chronic pain management despite clear associated risks and little evidence for long term benefit or pain relief. While evidence for nonpharmacologic pain management strategies are limited, there are associated benefits without significant harms. Based on current guidelines, nonpharmacologic pain management strategies are recommended as first line therapy for chronic pain and are to be continued in conjunction with pharmacologic pain management strategies. Despite this nonpharmacologic strategies for chronic pain management are often underutilized.

METHODS We will implement a series of structured group visits consisting of 15 minutes of physician administered education on pain management topics, followed by 45 minutes of cognitive and dialectical behavior therapy led by a clinical psychologist. Each group will have 5 to 9 patients for effective psychotherapeutic counseling. Group visits will be conducted every 2 weeks for a total of 6 sessions. Education topics will come from an outlined curriculum which will cycle every 6 sessions with each new patient group. Participants will complete questionnaires related to pain, anxiety and depression, PEG, GAD 7, PHQ 9 respectively, following each session. Additionally, daily use of milliequivalents of morphine and activity levels will be tracked by patient logs.

RESULTS Our initial inclusion criteria are patients with pain that is at least a 4 on a 10 point scale, and have activity limitations at least 3 on a 10 point pain interference scale. Our primary end-point will be a measurement of pain and activity limitation. Secondary endpoints will measure anxiety, depression and daily use of milliequivalents of morphine.

DISCUSSION Many barriers exist against the implementation of alternative forms of chronic pain management. The unyielding nature of chronic pain is perceived as having minimal to no improvement despite intervention, thus the required time and effort for behavioral therapy is often deemed an unworthy investment for patients and clinicians alike. Reimbursement for counseling is also relatively low when compared to the time given by clinicians. The group visit structure promotes efficiency in conducting behavioral therapy and in creating a support network for patients, however, insurance coverage for this practice is not universal.
Introduction
Toxicity from intravascular injection of local anesthetics can result in significant cardiovascular and neurologic complications including seizures and cardiac arrest. The use of lipid emulsion in addition to standard cardiac resuscitation efforts has shown promise in reversing clinical toxicity. Relative scarcity of such cases has limited the ability to perform prospective trials, but case studies such as this have demonstrated that lipid emulsion is a potentially lifesaving treatment.

Case Description
A 61-year-old woman arrived via ambulance to the emergency department (ED) from an outpatient surgery center with CPR in progress following a seizure and cardiac arrest. The patient was undergoing an interscalene block with 30 ml of 0.5% ropivacaine for regional anesthesia during an outpatient orthopedic procedure, when she developed generalized tonic-clonic activity. The patient became precipitously bradycardic and subsequently pulseless. She was found to be in PEA, and ACLS protocol was initiated with immediate transport to the ED.

The patient received 2 mg of epinephrine prior to ED presentation, and remained in PEA arrest on arrival to the ED. ACLS was continued with an additional 1 mg of epinephrine given and subsequent return of spontaneous circulation (ROSC). Given concern for likely intravascular injection of ropivacaine and resulting toxicity, the patient was given a 100 ml bolus of 20% intravenous lipid emulsion solution. During another episode of PEA, 1 mg epinephrine was administered with ROSC. A continuous infusion of epinephrine was started, and a 20% lipid emulsion infusion was initiated at a rate of 1,000 ml per hour (0.25ml/kg/min). The lipid emulsion drip was paused approximately 30 minutes later to determine whether it was providing hemodynamic benefit. This resulted in a precipitous drop in blood pressure, and the lipid emulsion infusion was restarted, continuing for several hours before cessation.

Discussion
Intravenous lipid emulsion was used in this case with positive hemodynamic effects during cardiovascular collapse in the setting of ropivacaine toxicity. Its primary mechanism of action is thought to be related to sequestration of the offending lipophilic agent within the lipid emulsion, thus preventing the drug from entering body tissues and causing toxicity.

Conclusion
Lipid emulsion therapy is a novel method for treating a variety of lipophilic medication toxicities, and has been established as an effective treatment for systemic toxicity due to local anesthetics. Case studies such as this continue to demonstrate beneficial hemodynamic effects of lipid emulsion in managing cardiac toxicity caused by local anesthetics.
Mathews, Candler
Mentor(s): Dr. Benjamin Jackson

The Epidemiology of Achilles Tendon Injuries in 25 NCAA Sports from 2004-05 to 2013-14 Academic Years

Candler G Mathews III, USC School of Medicine-Columbia, Medical Student; J Benjamin Jackson III, MD, University of South Carolina Department of Orthopedic Surgery; Allen J Barnes Jr., USC School of Medicine-Columbia, Medical Student

Background
In athletes, the Achilles tendon is the most commonly injured tendon of the lower extremity. Achilles tendon injury epidemiology has been documented for several different populations. However, to our knowledge, no previous studies have described the epidemiology in a large sample of National Collegiate Athletic Association (NCAA) student athletes. The purpose of the study is to describe the epidemiology of Achilles tendon injuries across all 25 NCAA sports.

Study Design: Descriptive epidemiology study

Methods
The Datalys Center for Sports Injury Research and Prevention provided Achilles tendon injury surveillance data of 25 NCAA sports for the 2004-05 to 2013-14 academic years from the NCAA Injury Surveillance Program (ISP). R statistical software version 3.2.5 was used for the analysis. The 2004-09 and 2009-13 time periods were analyzed separately. The surveillance data set is a convenience sample, so it was weighted to reflect the entire NCAA population appropriately.

Results
Of the 25 NCAA sports examined during the 2004-2009 academic years, there were an estimated 12,168 Achilles tendon injuries. Achilles tendon injuries were most commonly seen in men's football (37%), followed by women's basketball (8%), and then men's basketball (8%). The highest rates of Achilles tendon injuries were seen in women's gymnastics, men's cross-country, and women's cross-country at 2.67, 2.22, and 1.78 per 10,000 athlete exposures respectively. Of all the Achilles tendon injuries, 82% resulted in time loss of less than or equal to 21 days. The most common Achilles tendon injuries during this time are as follows: Achilles tendinitis (55%), Achilles tendon partial tear/rupture (30%), Achilles tendon complete tear/rupture (11%) and Achilles bursitis (4%). Men's and women's cross-country had the highest rates of Achilles tendinitis, 1.78/10,000 AEs and 1.67/10,000 AEs respectively, while women's gymnastics had the highest rates of complete tears 0.89/10,000 AEs. The years of 2009-2014 are still to be analyzed to compare trends.

Conclusions
Achilles Tendon Injuries are common in NCAA athletes, with Achilles tendonitis being the most common. With an improved understanding of the most common sports for injury we hope that efforts toward prevention of these injuries, especially in football, cross country, and gymnastics can decrease athlete injury and risk.
Mbaka, Maryann  
Co-Presenter(s): Megan Parrott  
Mentor(s): Dr. Jeremy Reeves  
Cervical spine fractures and swallowing dysfunction in trauma patients treated with semi-rigid collars: our institutional experience

Background: The decision to feed patients with suspected cervical spine injury necessitating cervical spine immobilization is something that each provider must decide. In this study, we set out to investigate the rate of dysphagia in the presence of cervical spine semi-rigid collars. We hypothesize that the presence of cervical collars will increase the incidence of dysphagia and aspiration in patients with cervical spine injuries.

Methods: Trauma patients at a level 1 trauma center from January 1, 2013 – December 31, 2015 were analyzed retrospectively via the trauma registry. We included patients with isolated cervical spine injuries treated with semi-rigid cervical collar and evaluated by speech-language pathologist for dysphagia and aspiration. This resulted in 319 patients. We excluded head injuries, those less than 18 years old, penetrating trauma, and gravid patients.

Results: Of the 319 patients with cervical spine fracture who met the inclusion criteria, 268 (84%) were evaluated by SLP prior to collar removal. 158 (62%) of patients meeting the inclusion criteria and who are evaluated by SLP prior to collar removal were found to have dysphagia on evaluation. 37% of patients meeting the inclusion criteria and who are evaluated by SLP prior to collar removal were found to have aspiration during evaluation. There were no significant differences in age and gender of patients.

Conclusion: Patients with cervical spine fractures treated with semi-rigid cervical collars show increasing signs of clinical dysphagia and aspiration. Dysphagia is common in trauma patients with cervical spine fractures but maybe resources should be geared toward those patients with increased injury severity scores, increased ICU length of stay, low Glasgow coma score or higher c-spine fracture as to mitigate cost to patient and facility.

Key Words: Dysphagia, Aspiration, Cervical spine fractures, Semi-rigid Collars, Swallowing dysfunction

McCurry, Andrew  
Supervisor(s): Blair Ryland  
Mentor(s): Dr. Floyd Bell  
Congenital Morgagni Hernia With Aortic Coarctation: A Rare Association Confirmed Via Ultrasound

Congenital diaphragmatic hernias (CDH) occur at a rate of 1 in every 2,500 live births. Of all CDH, congenital Morgagni hernia is the rarest, accounting for 2-4% of all congenital diaphragmatic defects. Interestingly, certain cardiovascular malformations have been noted to occur in 11-15% of all CDH, with the majority of these being septal, conotruncal, and left ventricular outflow tract defects. However, rarely have CDH been associated with coarctation of the aorta.

We present a case of a 2-month-old male who presented with difficulty feeding, poor weight gain, and cough for 1 week. Upon admission, he had a left brachial blood pressure of 142/88 mmHg, a left popliteal blood pressure of 77/50 mmHg, and decreased femoral pulses bilaterally. Initial diagnostic workup was extensive, and included a chest x-ray that demonstrated a soft tissue mass along the right cardiophrenic angle. The mass was reassessed with ultrasound, which depicted a segment of liver traveling through the anterior portion of the diaphragm into the thorax consistent with a congenital Morgagni hernia. An echocardiogram obtained hours later confirmed coarctation of the aorta. Due to the urgent need for coarctation repair, the patient consequently underwent pediatric cardiovascular surgical management.

Although commonly associated with cardiovascular malformations, we report an infrequently encountered case of congenital Morgagni hernia with aortic coarctation. This case demonstrates the significance of quickly identifying a congenital Morgagni hernia and the need to investigate beyond the commonly associated malformations. It also serves to validate ultrasound as a valuable diagnostic tool when assessing for congenital diaphragmatic hernia.
Meade, Courtney  
**Mentor(s): Dr. Christina Cox, Dr. Bryan Love**  
**Evaluation of cysteine intake in very low birth weight (VLBW) neonates and the development of necrotizing enterocolitis**

**Introduction:**  
Necrotizing enterocolitis (NEC) is a leading cause of mortality in preterm VLBW infants. Risk factors have been identified in the development of NEC, including metabolic acidosis. Secondary to increased parenteral calcium and phosphate needs of VLBW infants, cysteine, a hydrochloride salt, is added to parenteral nutrition. Intermittent cysteine shortages have led to variation in the amount of added cysteine. This study will evaluate the use of cysteine during periods of abundance and shortage and the impact on the development of NEC in VLBW infants.

**Methods:**  
This retrospective, cohort study includes neonates admitted to a level 3 NICU from January 1, 2010 to December 31, 2015 with a birth weight of less than 1500 g (VLBW) and having received TPN in the first 45 days of life. Patients were identified through hospital admission records. Electronic medication records were utilized to collect data points.

The primary endpoint is incidence of NEC and amount of cysteine received, reported as patients having received < 30 mg/g or ≥30 mg/g protein per day. Total cysteine was calculated until TPN discontinuation, 45 days of life, NICU discharge or death, whichever occurred first. Secondary endpoints include growth trajectory, overall mortality, incidence of metabolic acidosis, and detailed regression analysis.

Baseline patient characteristics will be compared using t-tests, chi-square, or Fisher's Exact, as appropriate. Multivariate competing risk Cox regression models will be used to examine the difference between NEC and No NEC groups.

**Results:**  
900 patients are eligible for inclusion. Preliminary analysis includes 339 patients. NEC occurred in 38 of 339 patients (11.2%). The average birth-weight in the no NEC (noNEC) and NEC groups was 1,030 g [SD = 302.55] and 974 g [SD = 315.26], respectively (p = 0.28). The average gestational age of the noNEC and NEC groups was 28.84 [SD = 2.72] and 27.89 [SD = 2.87] weeks (p = 0.0448), respectively. In patients without NEC (noNEC), the mean total amount of cysteine received was 1851.77 mg/kg [SD = 1277.11] compared to 2477.47 mg/kg [SD = 1105.82] in patients with NEC (p = 0.0042). The mean amount of protein received in the noNEC group was 52.26 g/kg [SD = 31.08] and 64.57 g/kg [SD = 25.63] in the NEC group (p = 0.0197). Preliminary analysis revealed several factors associated with the NEC cohort including: metabolic acidosis (p = 0.001), maternal cocaine use (p = 0.013), longer TPN duration (p = < 0.0001), mechanical ventilation (p = < 0.0001), and receipt of RBC (p = < 0.0001), but logistic regression is needed to confirm results.

**Conclusion:**  
Preliminary analysis indicates possible association with the development of NEC and increased cysteine exposure. NEC patients also received more protein than non-NEC patients. Additional data analysis is needed to confirm results.
Melton, William  
Mentor(s): Dr. Guillaume Dumont  
**Anterior Inferior Iliac Spine Morphologic Classification: Are Plain Radiographs Enough?**

**Introduction**
Hip pain in the young healthy population historically has presented providers with diagnostic challenge. In recent years, increased knowledge and understanding of the concept of femoroacetabular impingement (FAI) has improved. Until recently femoroacetabular impingement has almost exclusively been classified as cam or pincer type impingement, with many patients having a combined cam and pincer morphology. Extra-articular sources of impingement such as anterior inferior iliac spine (AIIS) impingement have become a recognized clinical problem. With this the preoperative planning and evaluation for patients has continued to evolve. To date the morphology of the AIIS has only been described based on 3D reconstruction images. We set out to see if X-ray images could accurately assess the morphology of the AIIS.

**Methods**
A single surgeon's hip arthroscopy case series were retrospectively reviewed from 11/1/2014 to 12/23/2016 using a self-collected database. After inclusion criteria were evaluated we were left with a population of 82 patients. Two series of images were created for each patient. The first set of images was obtained from preoperative x-ray images while the second was based on 3D reconstruction images from pelvis CT scans as previously outlined. Six reviewers, three attending level and three resident level orthopaedic surgeons, reviewed each series of images. Image series were viewed twice by each reviewer on nonconsecutive days. The resulting data will be analyzed using Gwet’s AC1 coefficient.

**Results**
The age range of the 82 patients was from 15 to 62 years old. The overall range of percent agreement on XR was 35.4% to 60.1% with a mean of 47.83%. The overall percent agreement increased from 56.7% in the first session to 59.5% in the second. The overall range of percent agreement on CT was 65.8% to 84.1% with a mean of 74.18%. The percent agreement between the two sessions was consistent at 58.9% and 64.2% respectively. Further analysis using AC1 coefficient is pending.

**Discussion**
XR demonstrated poor intra-observer reliability with a slight increase in percent agreement between sessions. However, CT demonstrated higher intra-observer reliability with a greater increase in agreement between sessions. These findings suggest that CT should be included in the pre-operative workup of femoral acetabular impingement to improve the understanding of the subtleties of AIIS morphology. Given the most common cause for repeat hip arthroscopy is residual impingement, a pre-operative CT scan will provide a more accurate diagnosis that could potentially reduce re-operation rates. Further analysis of the results is still pending.

Mitchell, Michael  
Mentor(s): Dr. Kathryn Stephenson  
**Increasing Access to Tobacco Cessation Services in a Pediatric Practice: A Prospective Study**

Secondhand smoke exposure is a problem which affects tens of millions of American children. This contributes to decreased lung function and increased infections in children exposed to smoke, as well as an association with increased rates of Sudden Infant Death Syndrome. Telephone-based tobacco cessation programs have proven successful to many individuals who receive services through these programs. Contact information for the South Carolina DHEC Quitline has been available for patients and their family members at Palmetto Health Children's Hospital Outpatient Center for several years, however there has been no data regarding how many individuals are given this information, nor the number of people who then utilize quitline services. Baseline data was collected on subjects who were given quitline information. The process of tobacco cessation referral was changed and subsequent participants were followed to assess the rate of enrollment into quitline services. Ultimately, the number of persons successfully enrolled into tobacco cessation services increased by 200% from baseline data, following two major interventions. A referral process which places more initial responsibility on the part of the medical provider and/or cessation service provider may result in an increased number of enrollments into tobacco cessation services.
Introduction: The benefits of Palliative Care to patients, families, and the economics of health care have been shown in the adult population. Palliative Care is a growing field in the pediatric population. With slightly more than half of childhood deaths occurring in infancy, there is a need for Palliative Care in the NICU. Recent studies and institutions are looking at the benefits of establishing criteria for Palliative Care consults in the NICU. The question this project poses is if establishing Palliative Care criteria in our NICU will increase, the number of Palliative Care consults.

Methods: Palliative Care consult criteria for this study were created based on different studies and reviewed by the staff. Data was collected prior to establishing criteria, and after criteria. A mid-point intervention during the study was to determine if emailing the criteria to the residents prior to their assignment to the NICU would increase consults. The data was analyzed using a Quasi-poisson Regression Model Summary. A short survey was given to the residents after the completion of this project to discuss barriers they may have encountered.

Results: The Incidence rate ratio (IRR) with 95% CI for palliative care consults in the NICU is 1.41 (0.61, 3.23). The palliative care consult rate is 41% higher after the intervention than before. This IRR is not significantly different from 1.00 (the value of no effect) at the 0.05 level (p = .504). There was no significant difference in the number of Palliative Care consults in the pre-criteria group when compared to the post-criteria group. There was a slight increase in consults when the criteria were emailed to the residents just prior to starting a NICU rotation.

Conclusion: This quality improvement project showed that making criteria for NICU Palliative Care did not statistically increase consults. However, the study was successful in highlighting areas of improvement for further study.
Money, Adam  
Co-Presenter(s): JD Spearman  
Mentor(s): Dr. Benjamin Jackson  

A Prospective Analysis of the Utility of ABI Measurements in Trauma Patients

Background
Arterial injury in the setting of a traumatized patient can have significant consequences leading increased morbidity and mortality. Previous studies have supported ankle brachial index (ABI) measurement cutoff of <0.9. They noted increased sensitivity and specificity, 87% and 97%, respectively, to justify evaluation for lower extremity arterial injury in a traumatized patient. The gold standard for assessing these patients has historically been arteriography. However, this is not without risk. High financial costs and complications such as contrast induced nephropathy, anaphylactic reactions, arterial dissection, thrombus formation, neurologic injuries, and worsening ischemia can be attributed to arteriography. CT Angiography is an effective, less expensive, and less invasive alternative to arteriography. However, this method of arterial evaluation also has associated costs and risks. We sought to evaluate the sensitivity and specificity of ABI <.9 as a marker for arterial injury.

Hypothesis:
An Ankle Brachial Index of <0.9 is both sensitive and specific for an arterial injury in a traumatic lower extremity as determined by CT angiography

Methods
We prospectively evaluated traumatically injured patients that were evaluated in the at Palmetto Richland Hospital and found to have injuries below the lesser trochanter and above the medial malleolus and received ABI as part of their initial evaluation. The clinical course was then followed including analysis of: CT angiography, arteriography, intra-operative clinical findings, and other notations of a vascular defect in the clinical records to determine the final lower extremity arterial status of the patient.

Results
Our study has evaluated approximately 1500 trauma patients over the past year. There are 64 patients who have received ABIs as part of their evaluation. We are evaluating the current data to determine the sensitivity and specificity of the ABI for evaluation of vascular injury. We will evaluate type of injury sustained and then subsequent presence or lack of a vascular injury. Data analysis is still on-going

Conclusion
We hope that with our results we will be able to evaluate the sensitivity and specificity of ABI as a screening tool for arterial injury in the traumatically injured patient. We will also use our data to evaluate the types of injuries most commonly associated with a vascular injury.
**Natrajan, Nithya**  
**Co-Presenter(s): Feneisha Franklin**  
**Mentor(s): Dr. Rachelle Gajadhar**  
**Vitamin D Replacement in Geriatric Fracture Pathway Patients**

Injuries related to falls are a major contributor to morbidity and mortality in the elderly population, with hip fractures being the leading cause of hospitalization in elderly persons. Vitamin D replacement has been shown to decrease the risk of falling in this population. The Geriatric Fracture Pathway (GFP) at Palmetto Health Richland is a co-management program between Geriatrics and Orthopedics to improve outcomes in Geriatric fracture patients in the perioperative period. This study evaluated current Vitamin D assessment and treatment practices for patients on the GFP and intervened with provider education and distribution of badge cards and work room signs to help improve uniformity in assessment of Vitamin D levels and management of these results.

Initial results showed 17% (14/83) of patients received appropriate Vitamin D replacement based on their pretreatment levels. 48% (40/83) of patients were not given adequate doses of Vitamin D for their level or did not receive replacement or supplementation as recommended. 22% (18/83) were given Vitamin D replacement at higher than recommended doses. 13% (11/83) of patients did not have a Vitamin D level checked and 4 out of the 11 patients were started on replacement therapy despite not having a level. Post-intervention data are still being collected. Initially, patients were not appropriately being evaluated for Vitamin D deficiency or being treated appropriately. Interventions have been completed and follow-up data is being collected with preliminary data being collected through the end of March.

**Nelson, Avery**  
**Mentor(s): Dr. Majdi Al-Hasan**  
**Optimal Duration of Antimicrobial Therapy for Gram-Negative Bloodstream Infections**

**Background:** Appropriate antimicrobial therapy is associated with improved outcomes of patients with gram-negative bloodstream infections (BSI). However, optimal treatment duration with appropriate antimicrobial agents remains unclear based on currently available evidence-based data. This retrospective cohort study examined effectiveness of short (7-10 days) and long (>10 days) courses of appropriate antimicrobial therapy in patients with uncomplicated gram-negative BSI.

**Methods:** Patients who survived hospitalization for gram-negative BSI without complications at Palmetto Health Richland and Baptist Hospitals in Columbia SC, USA from January 1, 2010 to December 31, 2013 were included in the study. Multivariate Cox proportional hazards regression with propensity score adjustment was used to examine treatment failure, defined as mortality or recurrence within 90 days of BSI.

**Results:** During the study period, 117 and 294 patients received short and long courses of antimicrobial therapy for uncomplicated gram-negative BSI. Overall, the median age was 67 years, 258 (63%) were women, 282 (69%) had urinary source of infection, and 271 (66%) had BSI due to Escherichia coli. The median treatment duration with appropriate antimicrobial agents was 8.5 and 13.3 days in the short and long course groups, respectively. Patients in both groups received nearly 5 days of intravenous antimicrobial therapy. After adjustment for the propensity to use a short course of antimicrobial therapy, risk of treatment failure was higher in patients receiving short compared to long courses of antimicrobial agents (hazard ration [HR] 2.6, 95% confidence intervals [CI]: 1.2-5.5, p=0.02). Other risk factors for treatment failure included liver cirrhosis (HR 5.8, 95% CI: 1.9-15.0, p=0.004) and immune compromised status (HR 4.3, 95% CI: 1.6-10.8, p=0.006). Definitive antimicrobial therapy with intravenous or highly bioavailable oral agents was associated with reduced risk of treatment failure (HR 0.3, 95% CI: 0.1-0.7, p=0.006).

**Conclusions:** The current results support common clinical practice of nearly 2 weeks of antimicrobial therapy for gram-negative BSI.
Nichols, Brady  
Mentor(s): Dr. Adam Hartstone-Rose  
Utility of Portable Ultrasound for Characterizing Specific Temporomandibular Dysfunction

Temporomandibular disorders (TMDs) are a multifactorial class of disorders involving the temporomandibular joint (TMJ) and associated masticatory anatomy. While TMDs are common in the general population, the current lack of an empirically validated and practical diagnostic imaging technique, remains a significant barrier to care. The current study aims to investigate the efficacy of dynamic ultrasound in characterizing specific TMDs through the use of 6 quantifiable pathophysiologic markers, previously documented in the literature. 81 participants, 43% of which reported experiencing at least one TMD symptom, were surveyed for TMD related symptomology and subsequently underwent scanning of the TMJ in coronal and transverse axis views. Each participant was then photographed in order to determine maximal oral aperture, and lateral mandibular displacement. Imaging data was processed and analyzed using standardized protocols and Image J software. Through determining strength of association between pathophysiologic markers on imaging and symptomology along with external assessment of joint function, we hope to elucidate the utility of dynamic ultrasound in distinguishing between specific TMDs.

Norton, Duncan  
Mentor(s): Dr. James Stallworth  
Oral Case Presentation Rating Tool Increases the Amount of Formal Feedback Given to Third Year Medical Students

Providing feedback to medical students is important to their education during their clinical years. Oral presentations play an integral role in medical education but can be difficult to effectively formulate for medical students when they encounter more sophisticated patients. This study used an anonymous survey clerkship to evaluate if there was a lack of formal feedback to third year medical students during their pediatric clerkship and if the introduction of a validated oral case presentation rating tool would increase the amount of feedback given in an inpatient setting. The survey showed only 14.3% of students received formal feedback on their oral case presentations in the inpatient setting. The post intervention group revealed that 50% of students received formal feedback after the introduction of the rating tool. The survey also revealed the distribution of providers (intern, senior resident, attending) giving feedback did not change with the introduction of the rating tool. Results also show that third year medical students believe formal feedback is beneficial to their medical education. In conclusion, this study shows that a validated oral case presentation rating tool is effective in increasing the amount of formal feedback given in the inpatient setting, but suggests that the rating tool may need to be expanded to all clinical settings to maximize the amount of formal feedback interactions for medical students during their pediatric clerkship.
Abstract
Sarcoidosis is a chronic, multisystem inflammatory disorder of unknown etiology that is characterized by non-caseating granulomas. Pleural involvement may manifest as a pleural effusion, pneumothorax, pleural thickening and nodules, hydropneumothorax, hemothorax, or chylothorax. Pleural sarcoidosis is exceedingly rare.

A 60-year-old man with a past medical history of hypertension and diabetes presented to our hospital with a six-week history of progressively worsening shortness of breath, and a fifteen-pound weight loss. He was found to have bilateral chylous effusions. He had no prior trauma, travel history, or history of tuberculosis contact. He underwent multiple thoracentesis on both sides of the chest and subsequently had a medical thoracoscopy that showed the presence of tiny nodules and opaque white patches. His upper and lower lobes were fixed to the parietal pleura with thick vessel filled adhesions. Biopsy of these nodular lesions showed areas of dense infiltration by chronic inflammation with an admixture of benign-appearing lymphocytes, plasma cells, and non-necrotizing granulomas. Reactive mesothelial cells were seen, and a portion of less inflamed tissue in the biopsy exhibited a slight fibroblastic reaction. Stains for acid fast bacilli, amyloid and fungal infection were negative. A lymphangiogram was also done and was negative. Work up for infectious etiology, HIV, and autoimmune disease was negative as well. Based on review of prior reported cases, we made a diagnosis of pleural sarcoidosis. He was started on oral prednisone, and an indwelling pleural catheter was placed. He now follows in our clinic where his chronic effusions are being managed.

The diagnosis of pleural sarcoidosis tends to be challenging, as in our case, particularly since our patient had no prior diagnosis of sarcoidosis and did not exhibit any extra thoracic features. This diagnosis is essentially one of exclusion after other causes of granulomatous pleural involvement have been excluded especially infectious and malignant etiologies. Corticosteroid therapy is recommended for symptomatic patients, and the response is usually favorable, but self-limited or recurrent cases have been also reported. Our patient has not had a dramatic response, but the time course for response in the earlier reported cases has been variable. The pathogenesis of chylothorax in sarcoid pleural disease is not clear, although, some authors have thought it to be as a result of the adenopathy of sarcoidosis leading to destruction and obstruction of the thoracic duct. Our case aims to highlight the presence of this rare manifestation of a common disease.
Onabanjo, Babafemi  
Co-Presenter(s): Don Gibson  
Mentor(s): Dr. Mark Humphrey  
Hepatitis C: Improving screening rates at the family medicine center

Introduction:  
Hepatitis C is the most common cause of chronic liver disease in US. Over 3 million Americans are chronically infected with HCV. Median total healthcare cost for HCV-infected patients: $4600 per year. Treatment response is associated with clinical improvement and stabilization of disease. CDC recommends patient who are born between the years 1945 and 1965 should be screened at least once.

Objective:  
Purpose of this project is to increase screening rates in the FMC for Hepatitis C for patients born between 1945-1965

Methods:  
Design, setting, participants: Screening was done at the Family Medicine Center on Colonial Drive in Columbia, SC. Patients that were screened presented for routine clinic visit and met the appropriate exclusion criteria. The exclusion criteria were used because this was intended to be for screening purposes and not diagnosing. Patients who met the criteria during the annual or routine clinical visit were consented appropriately using IRB protocol. Exclusion criteria included patients who presented with symptoms of possible hepatitis (abdominal pain, nausea, fatigue, jaundice) and patients with history of positive Hepatitis C antibody. For the intervention, we placed an objective screening protocol at physician workstations on the east and west sides of the Palmetto Health USC FMC clinic. Again, the intent was to increase screening rates for Hepatitis C for patients born from 1945-1965. The ICD code used to monitor for hepatitis C screening was (Z11.59).

Results:  
Since our intervention was implemented in December our results are as follows. People seen at FMC 3601 and of those 268 were screened. These made our percentage here at FMC go from 6.0% to 7.4%. A comparison proportion was used between our recent data and compared to the data from before December. The difference was 1.4%, 95% CI 0.019-2.73, P=0.04. We are continuing with our current method in hopes of increasing our screening rates.

Conclusions:  
Next Steps include, looking at our data for the next few months to see if our intervention improved screening rates at FMC. After collecting this initial data, we will perform PDSA cycle to see if more improvements or critiques could be made to our intervention. In regards to the screened patients who are tested positive, they will most likely need treatment if they have not cleared the infection themselves. Those individuals will need to be referred to Gastroenterology or Infectious Disease colleagues for treatments and potential cure.

Papadea, Nicholas  
Co-Presenter(s): Parth Thakker  
Mentor(s): Dr. Matthew Cantrell  
Thromboembolic Serratia marcescens endocarditis, with delayed surgical management

Serratia marcescens is a gram-negative rod implicated in a range of nosocomial infections, but is rarely implicated in infective endocarditis. Herein, we describe a 30-year-old male with a history of intravenous drug use that presented with five days of fever and right-sided neurological deficits. On physical exam a holosystolic murmur was appreciated and computerized tomography of the head demonstrated multiple infarcts with hemorrhagic conversion in the territory of the left posterior cerebral artery. Transesophageal echocardiography following presentation revealed a mass on the anterior leaflet of the mitral valve and serial blood cultures grew Serratia marcescens. Surgical intervention for mitral valve replacement was deferred for due to risk of hemorrhage and prophylactic, total dental extraction was performed in anticipation of surgery. His clinical course was complicated by evidence of multiple ring-enhancing brain abscesses on MRI and enlargement of the mitral valve vegetation.
Cancers that originate in the breast and other paired organs show an unusual feature, which is that tumor formation is not left-right (L-R) equivalent. For breast cancer, more tumors develop in the left breast. However, despite the elevated left side incidence, there is emerging evidence suggesting that right breast tumors are more aggressive. To determine the basis for this L-R asymmetry, we have used a breast cancer mouse model to investigate whether left and right mammary tumors contain differences in cancer stem cells, a cell population that drives metastatic activity and therapeutic resistance. To quantify cancer stem cells, we used an in vitro tumorsphere assay in which dissociated tumor cells are placed in suspension culture, a condition under which only stem/progenitor cells are capable of surviving and proliferating. Two endpoints can be measured in this assay: sphere forming efficiency, which estimates the size of the stem/progenitor cell population, and self-renewal, which estimates the ability of stem cells to undergo cell division. Our results indicate higher sphere forming efficiency associated with left tumors, whereas higher self renewal is associated with right sided tumors. To determine if these L-R differences reflect L-R differences in growth regulatory pathways, we used a TGF-beta inhibitor, SB505124, and lapatinib, an ERB1/2 inhibitor, to assess effects on tumorsphere formation and growth. SB505124 had a greater inhibition of the self renewal capabilities of the left sided CSCs, while lapatinib had a greater effect on inhibiting the sphere forming efficiency of the right sided CSCs. Together, these findings indicate that there are differences between right and left sided tumors, supporting previous data about tumor incidence and mortality, and suggest that we need more studies to find specific drug therapies targeted for each breast.

Background: Epicardial fat is adipose tissue found in all individuals, layering the atrioventricular and intraventricular grooves of the heart. Not surprisingly, it is found more extensively in obese patients. (1) Epicardial fat necrosis has been reported in the literature only 25 times since it was first described in 1957. (2) Although the cause is unknown some proposed mechanisms include torsion of the epicardial fat leading to ischemic necrosis or increased thoracic pressure leading to hemorrhagic necrosis. (3) Trauma and obesity are suggested as predisposing factors. (4) The majority of patients seem to present with left sided chest pain in a previously healthy individual that was relatively sudden and severe in onset. (5) Although initially identified and described after surgical exploration, today diagnosis has been described in several cases based on CT findings. The CT will show an encapsulated fatty lesion with inflammatory changes such as fat stranding or pericardial wall thickening. (5) Treatment is conservative management, often with NSAIDS for pain control, but may ultimately require surgical intervention.
Cost Effectiveness Analysis of Early vs. Late Diagnosis of HIV-Infected Patients in South Carolina

Background:
Early HIV diagnosis, and engagement in care leads to improved survival, decreased morbidity and fewer HIV transmissions. This would be expected to lead to a reduction in the lifetime cost of care. Yet, previous studies in South Carolina (SC) have shown that >40% of HIV diagnoses occur late (CD4 <200 at diagnosis). The aim of this study is to determine the impact of early vs. late diagnosis on the lifetime cost of care.

Methods:
SC HIV reporting system (eHARS) data were used for this analysis. This analysis includes individuals with a new diagnosis of HIV in SC from 2013-2015. The first CD4 reported to eHARS was used to categorize early versus late diagnosis. Late HIV diagnosis was defined as an initial CD4 count ≤ 200, early as an initial CD4 >500. A previously validated simulation model was used to determine the lifetime cost of care (LCC) and quality adjusted life-years (QALYs). Comparisons were made between late and early HIV diagnosis. The Incremental Cost Effectiveness Ratio (ICER) which is a measure of cost effectiveness based on QALYs saved was also determined. Previous studies suggest that an intervention is cost effective if the ICER is < $100 000.

Results:
From 2013 - 2015, 1,958 persons were diagnosed with HIV in SC. The overall LCC was $569,633,352.75 ($290,926/person). CD4 ≤200 at diagnosis was associated with 7.95 lost QALYs versus 4.45 lost QALYs with initial CD4 >500. Additional life expectancy was 30.7 years for those with initial CD4 ≤200 versus 38.1 years with initial CD4 >500. The ICER was calculated to be $44 112 which indicates that early diagnosis was cost effective.

Conclusion:
Although individuals with higher initial CD4 counts had a higher LCC the ICER showed that early diagnosis was cost effective based on QALYs gained. This should be further augmented by the lower lifetime HIV transmission and higher life expectancy. Increased efforts to increase early testing will improve overall QALY and decrease HIV transmission leading to downstream cost savings.

Natural Killer Cell Lymphoma

ABSTRACT: Natural Killer Cell lymphoma

Presenter: Tam Ramsey - MS3
Mentors: Brandon Menke, MD; Shawn Iverson, DO; Rakesh Patel, MD

Natural killer (NK)/T-cell lymphoma is a rare malignancy accounting for less than 1 percent of all lymphomas in North America and Europe. The nasal type involves the nose and sinuses with possible orbital extension. Ocular manifestations are infrequently reported. However, if orbital extension does occur, it may be the first sign of disease and presented as orbital cellulitis that does not improve with adequate antibiotics. Imaging are nonspecific. Histologically, NKTL shows polymorphic inflammatory infiltrate with angiodestruction. However, in early stage, atypical cells are scarce and obscured by inflammatory cells recruited from tumor secreting cytokines, which can lead to misdiagnosis of inflammatory process and infection. We report a case of NK/T cell lymphoma with rare ocular manifestation that was initially confused with orbital cellulitis and chronic sinusitis due to multiple negative biopsies.

A 92-year-old female presented with right eye vision loss, and ipsilateral orbital swelling for four weeks. MRI demonstrated right intra-orbital extension to the orbital apex causing optic nerve and medial rectus muscle impingement. Workups for infection and vasculitis were negative. Multiple biopsies with histopathology and flow cytology were unrevealing for malignancy. Patient failed to improve on antibiotics and steroids. Five months after the initial presentation, patient presented with the same complaint; however, the orbital mass had grown in size and involved the maxillary sinus and contralateral side. Re-biopsy revealed positive CD 56 for NK lymphoma.
Ramsey, Tam  
**Mentor(s): Dr. Fernando Navarro**  

**Renal myxoma**

Myxomas are rare mesenchymal tumors that are most commonly found in the heart and skin. Renal myxomas are extremely rare, having only been documented in medical literature 14 times. Our case is a 55 year old woman who presented to our clinic after a 1.7 cm right renal mass was incidentally found on abdominal CT. Further evaluation with contrast enhanced MRI showed a 1.8 x 1.1 cm mass that appeared to arise from the medial cortex of the superior pole of the right kidney. As the imaging was concerning for renal cell carcinoma, the patient underwent a partial nephrectomy. Microscopic examination showed fragments of well circumscribed tumor arising from the renal capsule. The tumor demonstrated polygonal to spindle shaped cells in a granular eosinophilic cytoplasm. Immunohistochemical staining for CD-10, Desmin, HMB-45, and Pan-keratin were all negative.

Presenter: Tam Ramsey  
Mentor: Fernando Navarro

Rashid, Shahnaz  
**Mentor(s): Ms. Kristin Healy**  

**My year of service for AmeriCorps VISTA: The development of Coastal Connections a non-profit resources linking program that connects low income patients to local community resources.**

Health is impacted by many facets of daily living, such as food, clothing, income, education, and ability to work. What if someone doesn’t have some of the basic necessities in life, such as a place to live? Coastal Connections is a non-profit organization based out of the Medical University of South Carolina that links patients to resources throughout the community to address these social needs. The program is volunteer run and utilizes college students to identify patients throughout the MUSC system without health insurance, and are of lower socioeconomic status. They work with these patients in a case management capacity and connect them to local community resources, such as clothing vouchers, job training programs, and most importantly access to health care. It begins with referral from a care team member, or a simple survey in the emergency department. Then, a Coastal Connections patient advocate meets with the patient and utilizes a large database of resources to best match and meet the patient’s identified needs. A follow up is scheduled between the patient advocate and patient, and subsequently the patient is called one week after follow up. To date Coastal Connections has serviced 2,227 patients since beginning operations in 2014. As an AmeriCorps VISTA alumni, I had the privilege in developing the program the year before I started medical school.

Riddle, Philip  
**Mentor(s): Dr. Daping Fan**  

**Quantification of tumor-associated macrophage proliferation using BrdU**

Breast cancer is the most prevalent cancer and the second leading cause of cancer-related mortality among women with 246,660 new cases and 40,450 deaths in 2016. This disease represents a great challenge to clinicians due to its multiple subtypes with varying etiologies, pathologies, prognoses, and treatments. Breast tumors have been shown to have a large population of macrophages, which are the most abundant tumor-infiltrating immune cell. High levels of tumor-associated macrophages (TAMs) have been associated with poor outcomes. The sources of TAMs are currently being debated. Proliferation of resident mammary tissue macrophages and those macrophages recruited from circulation are speculated to be important sources. However, the direct observation of macrophage proliferation in breast tumors is scarce. This study is aimed at directly quantifying the proliferation of TAMs in breast tumors and examining whether a Chinese herb-derived compound, emodin, can inhibit TAM proliferation in breast tumors. In order to quantify TAM proliferation, we used BrdU, a nucleoside analog of thymidine specific for S phase of the cell cycle, to label the proliferating cells. For the in vitro experiment, flow cytometry revealed 5.7% of the TAMs (F4/80 positive) were BrdU positive (proliferating). For the in vivo experiment, wild type C57Bl/6 mice were inoculated with breast cancer cells and then were further treated with emodin or vehicle. Flow cytometry of TAMs revealed 4.0% BrdU positive in wild type vehicle control group tumors, and 3.2% BrdU positive in emodin treated wild type mice tumors. This study suggests that BrdU could be used to measure TAM proliferation in tumors, and that emodin may suppress breast cancer development by inhibiting tumor-associated macrophage proliferation.
Objective: We report four patients with PD treated several years with irregular and progressively higher doses of pramipexole who presented with extensive chronic bilateral lower limb edema and/or skin reactions. The skin reaction and lower extremities edema associated with a high dose of pramipexole is not commonly seen in clinical practice. Recently was published an excellent review regarding skin complications in PD (1) however, pramipexole as cause of skin alterations has not been described before. We documented graphically during one year the recovering of the most severe case.

Methods: This is a descriptive observational study reporting four cases of skin reactions in PD patients treated with pramipexole.

Discussion: Pramipexole is a non-ergot dopamine agonist that is frequently used as a single therapy or in combination for the management of PD and primary restless legs syndrome (2). Distal edema is a recognized complication has been previously described. It occurs with a frequency that ranges from 5.6% to 50% in different reports, but skin involvement with or without edema is not clearly recognized. (3) (4). Several etiologies have been proposed for chronic edema but the pathophysiology remains unclear (5).

Conclusion: Although distal edema is a recognized complication of dopamine agonist (DA) treatment, and has been previously described (7)(8), severe chronic peripheral edema with severe skin reaction after years of treatment with higher doses of pramipexole has not been reported. Physicians need to be aware of this complication in order to avoid unnecessary testing and delay treatment.

Rodgers, Frank
Mentor(s): Dr. Edie Goldsmith
Current Treatment Strategies for Submacular Hemorrhage

ABSTRACT
Introduction: While uncommon, submacular hemorrhage (SMH) is caused by many etiologies and can result in severe vision loss, especially if untreated. Currently there are no accepted guidelines for the treatment of SMH. The current literature was reviewed to provide a better understanding and analyze results of the current treatments for the most common etiologies of SMH.
Areas covered: The authors researched human/animal studies related to SMH treatment, articles describing etiologies of SMH and review articles of the entire subject to compose this manuscript. Literature search was conducted through pubmed using keywords submacular hemorrhage and the corresponding treatments.
Expert commentary: Treating SMH using the most common techniques can result in varying outcomes. In office pneumatic displacement may be convenient however it may not completely displace the hemorrhage. Vitrectomy with tissue plasminogen activator and air-fluid exchange is a more aggressive approach and often results in near complete displacement, however VA may not improve due to macular scarring. Anti-VEGF monotherapy, or the combination of anti-VEGF with vitrectomy and pneumatic displacement, has resulted in very good visual outcomes for patients with SMH associated with choroidal neovascularization. Additional studies are needed to determine the most effective treatment.
INTRODUCTION
Acute agitation and excited delirium are common presentations to the emergency department. The differential diagnosis is broad, and history is sometimes difficult to obtain without information from family, friends, or EMS. We describe a case of severe excited delirium caused by coingestion of alcohol, LSD, cocaine, and amphetamine salts that ultimately required intubation for control after standard treatment failed. Management of agitated delirium often presents significant challenges to physicians and the resources of the emergency department.

CASE PRESENTATION
A 21-year-old male presented to the emergency department (ED) with extreme agitation. He was suspected to have used LSD prior to presentation. He was placed in restraints by EMS in order to safely transport him to the ED. Despite the patient presenting in restraints, he required two paramedics and approximately ten security guards to restrain him in order to transfer him from the ambulance bay into the ED. Upon arrival, the patient was tachycardic, tachypneic, profoundly diaphoretic, and extremely agitated. He was initially given 4 mg of IM lorazepam and 10 mg of IM haloperidol followed by another 4 mg of IM lorazepam. This intervention had little effect on the patient’s agitation so rapid sequence intubation was initiated for the safety of the patient and so further sedation could be given. Etomidate 40 mg and succinylcholine 140 mg were administered. He was then sedated with a propofol infusion and required two doses of non-depolarizing neuromuscular-blocking vecuronium 30 minutes apart. He was then started on midazolam and fentanyl infusions. The patient’s laboratory findings revealed lactic acidosis, acute kidney injury, and rhabdomyolysis.

HOSPITAL COURSE
The patient was admitted to the intensive care unit and had an uneventful hospital course. His labs normalized after IV fluid resuscitation. After extubation on day three of hospital stay, he revealed he had taken LSD, cocaine, and amphetamine salts. He was discharged after a five-day hospital stay with psychiatry follow-up.

DISCUSSION
This is a severe case of substance-induced excited delirium presenting to the ED. The patient failed standard treatment with benzodiazepines and antipsychotics and required airway protection with intubation so additional sedative medications could be administered. Treatment options in the emergency setting include benzodiazepines, typical and atypical antipsychotics, antihistamines, ketamine, and rapid sequence intubation. It is imperative for the emergency provider to recognize and treat this condition promptly, as it is associated with significant morbidity and even death from cardiovascular collapse.
Sharma, Neha
Mentor(s): Dr. Kamla Sanasi
Pelvic Osteomyelitis in the Presence of Decubitus Ulcers: A Predictive Model for Resistant Organisms

Background: Pelvic osteomyelitis secondary to decubitus ulcers (PODU) occurs in 1/3 of patients with stage IV decubitus ulcers. Diagnosis and management is challenging as imaging and cultures may be inconclusive with no defined standard of care. Antibiotics serve as adjuvant therapy and oral options depend on risk factors for resistance and local susceptibility. The objectives of this study were to formulate an institution specific antibiotic protocol, to examine potential oral antibiotics or a vancomycin free regimen, and to identify predictors of resistant pathogens.

Methods: A retrospective medical record review of hospitalized-patients, ≥18 years with PODU from 8/2005-8/2015 at Palmetto Health in Columbia, SC was performed. Evidence of PODU was defined as two of the following: clinical signs, radiographic evidence and positive cultures. Variables collected included: demographics, comorbidities, location of osteomyelitis, microorganisms isolated and susceptibilities, radiographic findings, type of surgical intervention, length of stay, current/past antimicrobial therapy, and prior cultures. Descriptive statistical methods were used for preliminary analysis.

Results: Seventy-five subjects with PODU were included with a mean age of 53 and male predominance (64%). The most common co-morbid condition was diabetes (23, 31%). Risk factors for ulcer were paraplegia (45, 60%), and previous stroke (17, 23%). Most subjects had a grade IV ulcer (59, 79%) with sacral (27, 36%) or ischial (26, 34%) osteomyelitis.

Of the subjects, 17 (23%) had prior positive blood cultures. A prior pseudomonas positive culture was found in 24/75 (32%) and all patients with current pseudomonas were in this group. Forty-nine (65%) had taken antibiotics within a year.

Seventy-three subjects (97%) had superficial cultures, 61 (81%) had blood cultures, and 37 (49%) had bone/deep tissue cultures. There was polymicrobial growth in 25 subjects (33%). Gram positive cocci (GPC) (53/98) were the most common isolates, with 18/53 (34%) coagulase negative staphylococcus (CONS) and 12/35 (33%) methicillin resistant S. aureus (MRSA). The most common gram-negative rods (42/98) were P. aeruginosa, 9/42 (22%) and E. coli, 8/42 (19%). Of the enterobacteriaceae, 74% (17/23) were susceptible to ciprofloxacin, 91% (21/23) to carbapenems, and 91% (21/23) to ceftriaxone. 67% (6/9) of the pseudomonas isolates were susceptible to both ciprofloxacin and carbapenems.

Conclusion: Males with underlying paraplegia or stroke were most frequently encountered. The majority of organisms isolated were CONS, MRSA, P. aeruginosa, and E. coli. Prior positive culture with P. aeruginosa was a predictor of P. aeruginosa PODU. Preliminary data supports vancomycin and anti-pseudomonal agents in addition to anaerobic coverage.

Stewart, Stephanie
Mentor(s): Dr. Jametta Magwood-Golston, Mrs. Krista Vaughan, Mrs. Forrest Fortier
Accountable Care Unit: Patient-centered Care Model Designed for Teamwork and Accountability

Traditional Nursing Medical Units have a fragmented culture care model in which the Physician, Nurse, Nurse Techs, Pharmacists, Case Managers and other health care team members work in silos. Customarily this model has not included the patient in the decision making process when determining the plan of care for their hospital course. The Accountable Care Unit (ACU™) promotes a unified interdisciplinary team where the patient is engaged as an active participant in their care. The ACU™ care model highlights the need for bedside nurses to recognize their ability to impact clinical decision-making. The standardization and accountability promoted by this care model enhanced employee comfort in providing feedback on issues within the unit. The ACU™ model of care transforms traditional fragmented care into an interdisciplinary collaboration.
Stoltz, Lindsey  
Mentor(s): Dr. Kathryn Stephenson  
Technology Talk: Improving resident and nurse communication with electronically updated patient assignment floor lists

Physicians and nurses are arguably the most important health care providers in the inpatient setting. Communication between these two parties is the key to achieving the best patient care possible. An opportunity to improve this communication arose at Palmetto Health USC Medical Group Children's Hospital when it was realized that nurses and residents were having difficulty readily identifying who was taking care of which patients and contacting one another throughout the day. Every morning, a hand written list was provided to each floor’s nurses’ station listing the resident assignments and their pager numbers. However, this list often had inaccuracies and was not updated again until the next morning. This lead to multiple incorrect pages to residents each day because the nurses could not tell who was responsible for the care of which patients. These floor lists were also time consuming for the residents to make each morning. Additionally, residents were not provided with a list of nursing assignments for the day so they had to either call the unit secretaries or go to that particular nurses’ station to find out nursing assignments for the day. Therefore, the floor lists were re-formatted onto a Word document and then placed on a shared computer drive that all nurses and residents had access to (phase 1). Due to difficulty with more than one person accessing the floor lists simultaneously, the lists were then created using Google Docs (phase 2). The aim of this QI project was to allow for more efficient and effective communication between residents and nurses by decreasing incorrect pages to residents and decreasing the amount of time it took for the night team residents to make the floor lists before morning check-out. Each phase showed an improvement in both of these measures. When comparing pre-intervention data with the final post-intervention data from phase 2, the number of incorrect pages received by residents decreased by a total of 68.8% and the length of time the night team spent making the floor lists decreased by a total of 66.4%. Equally as important, the results of the satisfaction surveys showed that 58% of residents, nurses, and nurse managers were very satisfied with the new lists and 34% were satisfied.

Swamy, Nikil  
Mentor(s): Dr. Harley Morgan, Dr. James Parrott, Dr. Anna Mrelashvili  
Anterior Myelitis: The Modern Day Relative of Polio

Introduction:
Acute flaccid myelitis (AFM) related to Enterovirus serotypes has no cure and reflects the same clinical course as noted previously by Polio, which happens to be a species of the same viral family. MRI T2 spinal grey matter hyperintensity spanning >3 vertebral segments is found in 90-100% of cases, with or without lesion enhancement, associated cord edema, nerve root enhancement/thickening, paraspinal muscle edema.

Patients (or Materials) and Methods:
AFM has become an epidemic in the US notably in California, Colorado, and most recently in Philadelphia. The affected population is typically pediatric, presenting with rapidly progressive lateralizing weakness and positive spinal MRI grey matter hyperintensities, spanning more than one vertebral segment. Here we report two pediatric cases, both 17 months of age, the first of their kind in Columbia, SC, with one case having unusual brainstem involvement.

Results:
MRI of the spine is both cases revealed ventral grey matter nonenhancing T2 hyperintensity spanning multiple vertebral levels. MRI of the brain in the first case was without acute findings, however in the other there were FLAIR and T2 hyperintensity in the posterior pons extending into the cerebellar peduncles in a circular fashion around the fourth ventricle. This is quite an unusual presentation on imaging for this condition.

Conclusion:
In the scientific community, it is agreed that more investigation of AFM is needed, especially given the epidemic since 2014. This is because there is no evidence for definitive treatment, outcomes based on presentation, specifically with variations in clinical and imaging variability as presented here.
**Swamy, Nikil**  
**Mentor(s): Dr. Anil Yallapragada**  
**Fibrinogenemia and Ischemic Stroke: A Case Report and Literature Review**

**OBJECTIVE:** Thrombophilia is a rare paradoxical complication in patients with fibrinogenemias, whether due to replacement therapy, comorbid thrombotic risk factors, or idiopathic. Strictly looking at arterial strokes, we present here a case report and comprehensive summary of reported cases of the same, and aim to propose based on the known pathophysiologic research in the field how best these cases should be identified and treated.

**BACKGROUND:** A 53-year-old female with family and personal history of hypofibrinogenemia not on any blood thinners presented with headache, pain down left arm, confusion, and left upper quadrantanopia.

**DESIGN/METHODS:** Multiple mechanisms have been proposed and studies undertaken that may explain the underlying mechanism of thrombosis in these patients. In the absence of fibrinogen, platelet aggregation has been shown to occur by, vWF binding gp1b on platelets, free thrombin activation of platelets in the absence of antithrombin I, fibronectin acting as a ligand for platelets in vivo in the absence of both vWF and thrombin. Mutations and polymorphisms in fibrinogen can alter strength, structure, and stability of fibrin polymerization resulting in thrombotic disease.

**RESULTS:** She was found to have right distal PCA occlusion and accompanying stroke in the same distribution. Fibrinogen level was low at 89 mg/dL. TEG scan was abnormal for increased thrombin activity, decreased fibrin crosslinking, decreased clot strength. Hypercoagulable workup was negative, she had not received any blood products, additional stroke work up with carotid duplex, extremity dopplers, TCD with HIT protocol, TEE with bubble study were negative.

**CONCLUSIONS:** She was initially discharged without blood thinners, after presenting again with headache, neck pain and exacerbated visual impairment, workup was negative for acute findings. No consensus exists for the treatment of these patients but our patient was discharged on aspirin, and remained asymptomatic.

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**Swisher, Joseph**  
**Mentor(s): Dr. Susan Lessner**  
**Initial Characterization of a Mouse Model of Marfan Syndrome using Echocardiogram**

Marfan Syndrome is a relatively common autosomal dominant inherited disorder of connective tissue. The underlying genetic defect is the FBN1 gene which encodes for fibrillin-1 glycoprotein on Chromosome 15(15,q12.1). Aortic dilatation leading to aortic dissection and rupture is the major cause of morbidity and mortality in patients with Marfan syndrome. The most important goal for improving survival in Marfan syndrome is to prevent or delay thoracic aortic aneurysm and dissection. Elastin-targeted Nanoparticle therapy is a novel treatment being developed in the treatment of aortic aneurysm. Elastin-targeted nanoparticles will allow targeted therapy to degraded elastin to stabilize and reverse moderately sized aneurysms. The aim of this study is to measure the thoracic aorta to determine the change in size as a function of age in wild-type and heterogeneous Marfan mutant mice (Fbn1C1039G/+) in order to develop a characterization of the ascending thoracic aorta to compare to a later post-intervention group. Transthoracic echocardiograms (TTE) were performed on anesthetized MFS mutant mice (Fbn1C1039G/+)(n=18) and age-matched wild-type mice (n=12) at ages of 3, 6, 9 and 12 months. All transthoracic echocardiograms were performed using Visual Sonics VEVO 3100 High Resolution In Vivo Imaging System and Vevo® LAB software. The view obtained was the left parasternal long axis view, during systole and diameter measurements were taken at the levels of the Aortic annulus, sinuses of Valsalva, sinotubular junction, tubular ascending aorta and the aortic arch that extends from the innominate artery. Overall the (Fbn1C1039G+) mice had a larger average aortic diameter in all 5 points of measurements and at every age group. The (Fbn1C1039G+) mice also had a more rapid increase in aortic dilatation compared to their WT counterparts. For (Fbn1C1039G+) mice all age groups had significant differences among them except for the 9 and 12-month age groups. The greatest aortic diameters and most significance were measured at the sinus of Valsalva. We confirmed there is an increase aortic size in the heterozygotes compared to the wild-type mice. Once the nanoparticle intervention study is underway there will need to be another set of measurements taken to compare the differences that are seen with the elastin targeted nanoparticle treatment approach.
Taylor, Ross  
Mentor(s): Dr. James Nottingham  
The Impact of Positive Resection Margins on Recurrence of Ipsilateral Breast Cancer

Background: Positive margins have consistently been associated with a greater risk of ipsilateral breast tumor recurrence (IBTR) compared to negative margins in patients with early stage invasive breast cancer. Furthermore, IBTR has been associated with decreased survival. We sought to assess the prevalence of patients with positive margins at our institution and further identify any incidence of IBTR within this subset of the patient population.

Methods and Patients: We analyzed electronic records of breast conserving surgeries (BCS) performed at a Palmetto Health facility from 1999 to 2012: Positive margin cases and incidences of IBTR were confirmed by chart review.

Results: Of the 2262 patients with early stage breast cancer, 612 (27 %) had initial positive margins post-BCS. Re-excisions were performed in 515 cases (84 %): 168 (33 %) undergoing partial breast re-excision and 347 (67 %) ultimately undergoing mastectomy. 91 cases of positive margins were identified as a final margin status in women undergoing breast conserving therapy. With a median follow-up of 83 months, there were 6 cases (6.6 %) of IBTR, 9 cases (9.9 %) of distant recurrence, and 76 cases (83.5 %) with no recurrence.

Conclusions: Prevalence of initial positive margins post-BCS and re-excision rate at our institution are comparable to the current national statistics. The incidence of IBTR in positive margin patients (6.6 %) remains lower than the most recent national data (11 %). Further analysis of the patient baseline characteristics is needed to account for tumor biology, demographics, and institutional practices.

Thakker, Parth  
Co-Presenter(s): Michael Tucker  
Mentor(s): Dr. Lynn Thomas  
What are the most effective study tools for USMLE step 1 and are pre-step 1 academic performances indicative of higher scores?

The United States Medical Licensing Exam Step 1 (USMLE Step 1) exam is a measure of basic science knowledge that students are required to pass before graduating from M.D. programs in United States medical schools. This exam is also used by residency directors to judge applicants. It is the only objective data that is comparable across all medical school programs.

Medical schools in the United States often give their students four to six weeks to prepare for the exam. This is a long, taxing period filled with anxiety and uncertainty. During this time, students use several study resources including review books, question banks, and practice exams. Many students hope to monitor their study progress by using question bank percentages and practice exams scores to predict a USMLE Step 1 score.

This study explores the relationship between the use of particular USMLE Step 1 preparatory resources and their Step 1 scores. This is accomplished by using survey data, which asked medical students who have completed their Step 1 exam what Step 1 study resources were used and what score the participant received on his/her Step 1 exam.
Tjahjadi, Michael  
Mentor(s): Dr. Lisa Knight, Dr. Kathryn Stephenson  
Improving Efficiency and Patient/Provider Satisfaction Through Standardization of School/Work Excuses in a Pediatric Resident Clinic, a Retrospective Chart Review

Given the rise of administrative duties required by physicians in the outpatient care facility setting, a system that allows for optimum efficiency in these duties is key in order to allow for maximal direct patient contact. In the Children’s Hospital Outpatient Center (CHOC) of the Palmetto Health Children’s Hospital, the residents (MDs) are in charge of creating school/work excuses (SWE), which was the process targeted for improvement and standardization. Prior to the project, SWEs were usually requested by the patient/family at their discretion. The implemented change trained the work up room staff to ask all patients/families if they require an SWE or not and to document accordingly on the face sheet to be given to the MD. Implementation of the change did not cause a significant increase in total number of SWEs requested. Over the course of two PDSA cycles, both the rate of SWEs that were failed to be given when requested (17% in PDSA 1, 0% in PDSA 2) and the rate of failing to document a requested SWE on the face sheet (23% in PDSA 1, 10% in PDSA 2) decreased. This project can pave the way for other quality improvement projects, demonstrating how even small changes in efficiency and increases in patient/provider satisfaction can be significant when extrapolated over multiple providers over time.

Tlhabano, Letlhogonolo  
Co-Presenter(s): Chibuzo Odigwe  
Mentor(s): Dr. Peter Loper  
Post traumatic pulmonary pseudocyst following blunt chest trauma

Introduction: Trauma to the chest can result in injuries to the chest wall, diaphragm, mediastinum, trachea and lung parenchyma. Penetrating and non-penetrating trauma have different patterns of thoracic injury. With non-penetrating trauma there is usually contusions, fractures of the trachea and bronchi, hematomas, lacerations of the pulmonary parenchyma and pneumatocele formation. Post traumatic pulmonary pseudocysts (TPP), also called traumatic pneumatoceles or traumatic lung cysts are a rare complication of blunt chest trauma, consisting of cystic lung lesions, usually caused by motor vehicle accidents and falls, and are more common in children and young adults. Given they consist of interlobar interstitial connective tissue and no epithelial lining they are more correctly called traumatic pulmonary pseudocysts. They are seen in 3% of patients with blunt chest trauma and pulmonary parenchymal injuries. Differential diagnoses include other causes of cystic lung processes, such as pneumatoceles, pulmonary Langerhans cell histiocytosis, mycobacteria tuberculosis and cystic bronchiectasis. Symptoms include chest pain, cough, shortness of breath and hemoptysis. Signs may include fever and leukocytosis. 85% of TPPs are seen in patients less than thirty, and most of these patients are men, as they are more likely to be involved in motor vehicle accidents and falls.

Case: A 19-year-old male with no prior medical history was admitted to the surgical ICU after a motor vehicle accident where he was ejected from the vehicle. Chest CT showed multiple right sided rib fractures, hydropneumothorax and areas of cavitation in the right lower lobe. The patient underwent right sided chest tube placement, and gradually improved, and was discharged home. Repeat CT after 4 months showed resolution of the RLL cavity lesion.

Discussion: TPP is a rare complication of blunt chest trauma, with an incidence of 3%. Most TPPs resolve without complications, and as such should be managed conservatively. Rare complications of TPPs include infection of pseudocyst, abscess formation, pneumothorax, hemothorax and increase in the size of the pseudocyst. Treatment of complications include antibiotics and percutaneous drainage for infection and abscess formation, and emergent lobectomy for massive endobronchial bleeding.

Our case serves to highlight this rare clinical finding and discuss its clinical management and benign clinical course.
An Uncommon Cause of Abdominal Pain

Dr. Fernando Navarro, Associate Professor of Clinical Surgery, Division of General Surgery, University of South Carolina School of Medicine, Columbia SC

When someone presents to the ED complaining of abdominal pain, nausea, and vomiting, the list of differential diagnoses is long. A thorough H&P, bloodwork, and imaging usually reveal the cause. Common things being common, it tends to be something frequently encountered in lieu of a “zebra” diagnosis. In this case, however, a comprehensive evaluation led to the eventual surgical extraction of an intra-abdominal lesion that ended up being a very rare pathology.

A 41-year-old male presented to the ED complaining of periumbilical pain for several days. This abdominal pain was associated with intermittent nausea and vomiting, as well as chronic diarrhea. He denied any other symptoms or having experienced this before. His history was significant for hypertension, appendectomy, and posterior spinal fusion. Physical exam showed a man with a BMI of 40 and normal vital signs. Abdominal exam showed tenderness to palpation over the mid abdomen and was negative for hernias, CVA tenderness, and pulsatile abdominal masses. Laboratory studies showed a normal CBC, hypokalemia, hypochloremia, and elevated bicarbonate. CT of the abdomen showed a central mesenteric soft tissue focus of inflammation. He was admitted, and IV fluids and empiric antibiotics were started. Despite some improvement clinically, his abdominal pain never completely resolved and actually started to get worse after meals. He underwent a laparoscopic small bowel/mass resection with primary anastomosis a few days later. He recovered well, and he was discharged home. Upon follow-up in the clinic, the patient reported being pain free and without symptoms. Staining and histological examination of the resected specimens showed spindle cells and signs of coagulation necrosis. Specific stainings for gastrointestinal stromal tumor as well as melanoma and neural tissue were negative. Smooth muscle stains were positive, which indicated the spindle cells were myofibroblasts and was consistent with the mass being a mesothelial cyst that had undergone infarction.

This case demonstrates that although mesenteric cystic masses are uncommon, they are important to keep in mind when evaluating an unknown abdominal mass. They can present with a broad range of symptoms, such as the severe pain, nausea, and vomiting that brought this patient to the ED. The first step when evaluating such an abdominal mass is to determine the organ of origin, and surgery has been seemingly curative.

Improving Newborn Follow-up Rates with Standardized Discharge Discussions: A Quality Improvement Study

Vartanian, Amanda
Mentor(s): Dr. Monica McCutcheon

Abstract:
The American Academy of Pediatrics recommends that all infants discharged from the newborn nursery receive prompt follow-up with their primary care provider within 48 to 72 hours of discharge (1). Despite resident physicians scheduling the appointments for the patients prior to discharge, no-show rates for newborn follow-up to the resident outpatient center were high. This study implemented structured verbal discussions for residents to have with families prior to discharge including basic newborn care, anticipatory guidance, and the importance of the newborn follow-up. In a separate PDSA cycle, a written summary handout was provided to the parents. Results revealed a 31% increase in the newborn follow-up rate with the verbal instruction group, with no significant difference in follow-up rate from baseline with the written instruction group. Overall, this study demonstrates the need for continued standardized verbal discharge discussions between residents and new parents regarding not only the basics of newborn care, but also counseling regarding the necessity of prompt newborn follow-up.
Introduction:
The current healthcare system has placed greater emphasis on improving quality and transitioning to a value based payment model. The National Committee for Quality Assurance has designated breast cancer screening as a HEDIS measure in accordance with the USPSTF recommendation. The USPSTF recommends biennial screening mammography for women aged 50-74 years. In 2015, national mammogram rates ranged from 58.5% to 73.2% depending on insurance plan. Thus, pressure is placed on medical centers to implement strategies to improve their quality measures.

Hypothesis:
I hypothesize that the Family Medicine Center (FMC) mammogram rates do not meet the national benchmark and that implementation of a physician and patient education program will improve mammogram rates at the FMC to meet current HEDIS measures.

Methods:
Baseline rates of mammograms at the FMC were obtained for female patients aged 50-74 years seen between November 1, 2014 and October 31, 2016. Providers were given a lecture on USPSTF recommendations in October 2016. Patients were mailed an educational flyer and outreach letter to their home address during the first week of January 2017. Monthly mammogram rates were then obtained for the same population seen between November 1, 2016 and February 21, 2017. The screening rates were compared using the Chi2 test. Statistical significance was defined as a P value less than 0.05.

Results:
Prior to the interventions, 52.5% of patients had breast cancer screening documented. During the intervention period, this rose to 60% in the final month of February. There was a 7.5% (CI 2.81-12.09) increase in the number of patients screened (p <0.002).

Conclusions:
Based on these results, patient and physician education resulted in a statistically significant increase in mammogram rates, which helped our medical office meet an important HEDIS quality measure used for value based payments. This study showed that practical interventions had a significant impact on meeting quality measures.
Neonatal early-onset sepsis (EOS) is often defined as a blood or cerebrospinal fluid (CSF) culture-proven bacterial infection that occurs within the first week of life. However, it is relatively common for neonates to appear clinically septic without positive cultures. This makes EOS a diagnosis of clinical presentation that varies from practitioner to practitioner. Recently, a clinical risk scoring tool has been developed and validated to aid clinicians in appropriate identification and treatment of EOS in neonates born at 34 weeks gestation or later. However, the majority of neonates in the neonatal intensive care unit (NICU) are born at less than 34 weeks gestation. Therefore, we aim to determine the risk factors with positive predictability for the diagnosis of sepsis in neonates born at less than 34 weeks and use this data to develop a corresponding risk assessment scoring tool.

This study is a single-center, retrospective, observational cohort study. The medical records of all Palmetto Health Richland patients born at <34 weeks gestation from January 1, 2016 to July 31, 2016 will be screened for study inclusion. We predict approximately 200 patients will meet inclusion during this time frame. Patients will be excluded if transferred to our facility at >24 hours of life or suffer from major anomalies (Vermont-Oxford Neonatal Network). The primary endpoint of this study is the diagnosis of neonatal sepsis, with secondary endpoints to include: blood culture results, antibiotics utilized, days of antibiotic therapy, negative outcomes potentially related to antibiotic therapy, and mortality.

Logistic regression analysis will be completed for all data points to determine which of these are positive predictors for the diagnosis of EOS. If we assume that 60% of patients without the predictor of interest have sepsis, then for this study to have 80% power, the risk factor must increase the proportion to 80-85%, depending on the prevalence of the risk factor in the population. The results of the logistic regression model will then be utilized to construct a risk assessment scoring tool that will be validated in a future study.
Walters, Alexander  
Mentor(s): Dr. Brandon Menke, Dr. John Payne  
Paradoxical Response to Topical Carbonic Anhydrase Inhibitor in X-linked Retinoschisis

Introduction:  
Juvenile, or X-linked, retinoschisis is the leading cause of juvenile-onset macular degeneration in males. This condition is caused by mutations in the RS1 gene, resulting in functional loss of the protein retinoschisin. Symptoms result from splitting in the inner retinal layers. The mainstay of treatment in juvenile retinoschisis is carbonic anhydrase inhibitors, but response to therapy is not universal.

Case Description:  
An 11-year-old male presented for evaluation of 6 months of gradual worsening of blurry vision in both eyes, with a longer history of floaters in the right eye. Visual acuity was 20/80 in the right eye and 20/80 in the left eye. Posterior segment examination revealed petalloid striae in the macula of both eyes. Peripheral exam revealed golden sheen of the retina periphery, diaphanous retina inferiorly with few inner holes in both eyes. Lattice degeneration was noted inferiorly in the left eye. Diagnosis of juvenile X-linked retinoschisis was made. The patient began treatment with topical dorzolamide. At 3-month follow up, it was noted on posterior segment exam that the crystalloid macular edema had worsened. Vision remained stable. 1 year after initial presentation, the patient was again noted to have worsening crystalloid macular edema in the left eye, with an overall stable exam.

Discussion:  
Juvenile X-linked retinoschisis affects approximately 5% of all children with inherited retinal dystrophies, having a prevalence of 1 in 15000 to 1 in 30000. Clinically, patients tend to have a decrease in central visual acuity before the first decade of life that remains stable until the fourth or fifth decade, when visual deterioration occurs. Treatment for this disease consists of carbonic anhydrase inhibitors, which improve fluid outflow by inhibiting the retinal pigment epithelium thereby enhancing visual acuity. However, improvement of visual acuity may occur independent of central macular thickness and some patients may worsen after receiving carbonic anhydrase inhibitors. It can be hypothesized that the inverse response to carbonic anhydrase inhibitors may be due to a novel gene mutation that directs a different pathway of retinoschisin dysfunction. The worsening presentation of our patient after standard treatment supports judicious follow up of patients undergoing treatment for juvenile retinoschisis.

Werkheiser, Jaclyn  
Mentor(s): Dr. Jenna Foster, Dr. Cortney Dodson, Dr. Patrick McCann, Dr. Martin Durkin  
Anticoagulation conferred with differing dextrose concentrations of heparin-based purge solutions with Impella® percutaneous ventricular assist devices

Purpose/Background: The Impella® percutaneous ventricular assist device (pVAD) is a type of mechanical circulatory support that can be used for hemodynamic support in patients with refractory cardiogenic shock or who are undergoing high-risk percutaneous coronary intervention. The Impella® pVAD requires a heparin-based purge solution in dextrose to run through the device to prevent thrombosis. Varying concentrations of the dextrose solution have been used, whose differing degrees of viscosity confer altered flow rates within the device. In September 2015, Abiomed, changed their recommendation from using a D20W solution to a D5W solution for the heparin-based purge solution. The primary objective of this study is to compare the percent of patients that become therapeutic initially when using a D5W based purge solution compared to a D20W based purge solution.

Methodology: This is a single center, retrospective study that has IRB approval. Patients will be included in data analysis if they receive an Impella® pVAD with a heparin-based purge solution for greater than 3 hours and had PTT’s drawn within an appropriate time frame from placement. The primary objective (percent of therapeutic patients) will be analyzed with a test of two proportions. The secondary objectives will be analyzed using a logistical regression analysis to determine the association of the dextrose solution used (D5W or D20W) with the patients that become subtherapeutic, therapeutic or supratherapeutic for the following outcomes: weight, gender, age, renal function, indication for Impella® use and co-morbid conditions.

Results/Conclusion: In progress at time of submission.
Objectives: 1) To assess the prevalence of low health literacy among parents of children brought to a pediatric/fetal cardiology outpatient clinic; and 2) to evaluate provider accuracy in predicting which parents have low health literacy.

Methods: English and Spanish speaking parents were prospectively recruited from the pediatric/fetal cardiology outpatient clinics. Consenting parents were administered a brief health literacy test, the Newest Vital Sign tool (NVS) in their fluent language. Their health literacy was scored according to the number of correct answers (6 point scale; 0-1 = very low; 2-3 = low; 4-6 = adequate). Providers were blinded to the results of the test. Following the visit, providers rated parental health literacy on a 3 point scale (1 = very low; 2 = low; 3 = adequate). Our primary outcome variables were 1) NVS score, and 2) agreement between NVS score and health care provider assessment of health literacy.

Results: 154 out of 168 (92%) of approached parents consented to study participation, 115 (75%) of whom were female, and 24 (16%) of whom preferred to speak Spanish. We found that 13 (8%) of parents had very low health literacy (score 0-1), 25 (16%) had low health literacy (score 2-3), and 116 (75%) had adequate health literacy (score 4-6). Low NVS scores (scores 0-3) were significantly associated with health insurance type (no insurance/public insurance), the need for an interpreter, use of the Spanish NVS tool, parent foreign born, and parent race (Hispanic/Black/Other) (p<0.001 for all predictors). Providers accurately predicted health literacy in those parents with adequate literacy 84% of the time; whereas they accurately predicted low health literacy 38% of the time, and very low health literacy 50% of the time.

Conclusions: Rates of low health literacy are similar to previously published U.S. data. Pediatric/fetal cardiology outpatient clinic providers poorly predict which parents are at highest risk for low health literacy, using the NVS tool as a reference standard.