Discovery Day
A forum for student ingenuity

2015
Discovery Day 2015
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The Discovery Day planning committee would like to give special thanks to the following:

Our sponsors who made this event possible:
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USC Connect

the student presenters,
faculty and staff mentors,
judges and volunteers

all for supporting student success
## Schedule of Events

*All events take place in the Russell House-Columbia*

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*For questions, please visit the Registration table (2nd floor lobby) or Information Point (Ballroom)*
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USC Connect is a long term initiative at USC Columbia and the Regional Campuses (Lancaster, Salkehatchie, Sumter, Union) to support all students in making the most of their education. Students are encouraged to connect or integrate their learning from within and beyond the classroom activities, such as those highlighted at Discovery Day. The ultimate goal of USC Connect is for students to be thoroughly and deeply prepared with core knowledge, developed skills, and the dispositions to contribute and lead in home, community, and work settings.

Please visit our USC Connect Showcases throughout the day. While all students presenting at Discovery Day participate in USC Connect, the presentations in the Showcase have been specifically brought together to highlight the variety of activities available to students that contribute to integrative learning.

Look for these designations on each poster to see how our students are involved in USC Connect:

- Community Service (CS)
- Global Learning (GL)
- Professional and Civic Engagement (PC)
- Research (R)
- Fellowships (F)
Oral and Creative Presentations
Morning Session

Discovery Day 2015
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The Currie Inventory: A Few Examples from a Rich Resource

Joseph DuRant, English - Senior
Mentor: Dr. Patrick Scott,
While the Scottish poet Robert Burns (1759-1796) has been long studied, there
has been no collected scholarly edition of the letters people wrote to him. With
a final semester funding from the SCHC Exploration Scholar program my project
with Dr. Patrick Scott, based in USC Libraries’ G. Ross Roy Collection, has created
the first-ever edition of these letters, for print and on-line publication. After a
synopsis of the project work in creating text, comparing variant sources, resolving
discrepant dates, and researching literary and contextual annotations, this paper
will examine one particular source that is rich with unexplored possibilities.
That source is the Currie Inventory, an early 19th century manuscript list of all
the letters written to Burns with a brief excerpt or summary of the letter created
for James Currie, the first biographer of Burns. I will explore several letters that
show Burns’s connections to Jamaica, as well as his correspondence with notable
individuals that is preserved nowhere else.

The Art of Argentinian Tango: A history and exploration of the evolution of
tango music and the cello’s role in the instrumentation and style

Elizabeth Gergel, Music Performance - Senior
Mentor: Dr. David Cutler, Music
I spent two weeks in Buenos Aires, Argentina, experiencing the culture of
milongas (tango night clubs), taking lessons with a premier tango violinist,
learning the dance, and observing the cultural role that Argentine tango has in
society. On a micro level, my goal was to seek out the idiomatic string techniques
that differ from traditional classical music. On a macro level, it was to explore
the ways in which tango music has become its own genre in Buenos Aires. In
order to research these issues, I attended multiple milongas in Buenos Aires. I saw
the tango orchestra El Afronte (or orquesta tipica) perform three times. I also saw
the well-known Orquesta tipica de Fernando Fierro play. These offered contrast
in style and format and allowed me to see two different versions of the typical
modern style of tango music. These offered contrast in style and format and allowed me to see two different versions of the typical modern style of tango music. I took three lessons with one of the violinists in
El Afronte, as well as a few dance lessons. At Discovery Day I will present my
findings regarding the modern tango music culture and compare to the style and
role of tango music in the past. I will support my presentation with video clips
from the milongas. The comparative study of instrumentation and overall style
as compared to more traditional ensemble settings will provide insight and new
knowledge to classical musicians in my community, and will broaden horizons
and expand ideas.

The Black Power Narrative: When Discourse Becomes a Reality

Zakiya Collier, Anthropology - Senior
Mentor: Dr. Sherina Feliciano-Santos, Anthropology
This paper will address perspectives on the development of Black Power in South
Carolina during the broader Civil Rights Movement. Motivated by the belief that
the media has the power to influence its audience, the paper primarily focuses
on media coverage of the Black Power Movement in South Carolina and the
actions or the lack thereof as a result of the coverage. Currently, there is a lack
of studies regarding the discourse of the Black Power movement in general, as
well as discourse of the Black Power movement in South Carolina, primarily,
because there is little known, if any, of South Carolina’s participation in Black
Power demonstrations, and secondly, because the coverage of the movement was
framed in such a way that whites were afraid of it and blacks wanted nothing to
do with it. The Black Power movement in actuality was about empowerment,
self-determination, and self-defense, contrary to the popular narrative of violence,
destruction, and communism. This study seeks to determine if the discourse
used by public figures, recontextualized by the media, and again by citizens in
conversation realized the narrative of violence during the Black Power era by
effectively leading to dissidence and fear for many black South Carolinians who in
turn steered away from the movement. This study provides a new view on both
South Carolina media and the Black Power movement.
Medieval Identity Theft: Using X-ray Polarization to Decipher an Erased Ownership Inscription in USC’s Thirteenth-Century "Breslauer Bible"

Aaron Sanders, History - Senior 
Carl Garris, Baccalaureus Artium et Scientiae - Sophomore 
Mentor: Dr. Scott Gwara, English Language and Literature

Participants in this research deciphered and analyzed an erased ownership inscription in the University of South Carolina's "Breslauer Bible," produced in Oxford around 1240. During its history, an unknown party erased the inscription on its first page by scraping ink from the parchment. The writing could not be read even after resorting to ultraviolet light and multispectral imaging techniques. However, utilizing the polarized X-ray methods that unlocked the secrets of the Archimedes Palimpsest, the erased inscription was fully recovered at Stanford University's research synchrotron. Paleographical analysis of the script dated it to ca. 1300. The medieval owner was found to be a Franciscan friar named Adam of Asford. Its donor was Brother Richard of C, and the place of donation was identified as Samford. Our team uncovered mendicants to whom the book might have belonged. In fact, it was plausibly bestowed by Richard of Conyngton, head of the Franciscan Order in England from 1310. The place-name Samford is likely to be Sandford-on-Thames, a preceptory of Knights Hospitallers just five miles from Oxford. (Samford is a variant spelling of Sandford.) When the order of Knights Templar was dissolved in 1312, the Hospitallers took over Templar properties. We reason that the alleged heresy of the Templars necessitated the presence of a Franciscan to preach orthodoxy at the Sandford preceptory.

“Sweet are the Uses of Adversity:” the University of South Carolina’s Literary Societies during Reconstruction

Aaron Sanders, History - Senior 
Mentor: Dr. Thomas Brown, History

The Euphradian and Clariosophic Literary Societies occupied a privileged place among the extracurricular activities at the 19th century University of South Carolina. Since nearly every undergraduate belonged to one society or the other, their records provide a wealth of information about the intellectual activity of the student body. While excellent work has been done on the societies’ ante-bellum records, this study seeks to expand on prior scholarship by analyzing records from Reconstruction. Using newly transcribed debate resolutions, library catalogs, and orations, a complex portrait of student reactions to social change in post-Civil War Columbia can be developed. The Reconstruction-era societies emerged as both reactionary and reformational voices in the tumultuous political world of Reconstruction South Carolina.

A Scottish Poet in South Carolina: Gavin Turnbull, Allan Ramsay, and the First American Performance of The Gentle Shepherd

Eric Roper, English - Senior 
Mentor: Dr. Patrick Scott, English Language and Literature

The Scottish poet and actor Gavin Turnbull (1765-1816) immigrated to Charleston, S.C. in 1795, and initiated the first American performance of the Scottish play The Gentle Shepherd by Allan Ramsay. Following a brief summary of the larger project to which this research contributes, this presentation reviews recent discoveries about Turnbull's career in South Carolina, discusses the context for theatrical premier, and presents the first critical assessment to Turnbull's specially written prologue to the play.

Plink Rattle Toot: Words Meet Music

Philip Snyder, Music Performance - Senior 
Madelyn LaPrade, Music Performance - Senior 
Mentor: Dr. Rebecca Nagel, Music

Plink Rattle Toot is a partnership between the University of South Carolina School of Music and the Richland Library network. This student-founded initiative organizes performances of classical music as part of Richland Library’s “Story Time” events. Classical works are paired with children’s books and the works are performed by live musicians while the book is being read. In addition to performing standard classical pieces, Plink Rattle Toot has commissioned student composers at the University of South Carolina to write pieces to accompany the reading of some books. Throughout the two years of the program, the initiative has organized four performances and commissioned five new compositions. Each performance has been attended by up to fifty people and all performances are free and open to the public. In the future, the initiative hopes to gain funding to present this kind of event on a larger scale. We hope to use performance spaces at USC to host up to 500 elementary school students on campus. This would make it possible to use large music ensembles, promote the University, and expose a large number of students to classical music in a way that is engaging. Plink Rattle Toot strives to bring relatable classical music performances to all children in Columbia.
Deliberative Democracy and the African-American Experience

Wilyem Cain, Political Science - Senior
Mentor: Dr. Florencia Cornet, English Language and Literature

The African-American population is host to numerous problems. These problems range from educational disadvantages in black communities to crime and gang activity. These problems have persisted for nearly a century, and it is difficult to rectify this. A large part of the reason why is because most of the conversation on how to solve the issues never evolve past who is to blame, along with, difficulties in recruiting people to actually help. In order for progress to be made, there has to be actual conversation about all factors of the issues. Instead of rhetoric being used to push a point, people should be knowledgeable to as much evidence and data as possible from both sides of the argument. This is why I believe deliberative democracy, the theory that authentic deliberation is required for law making, should become a crucial component for these topics. To support my case, I consulted various author’s work on the theory of deliberative democracy, primarily James Fishkin’s theory on deliberative democracy. I analyzed recent efforts of local programs, such as the United Way of the Midlands, in solving issues in black communities in the Midlands and conducted interviews with members of said communities to understand how they see African-American issues on a national scale and locally. As I concluded my research, I found that deliberative democracy can be an effective way in solving long-standing problem in black communities.

Development of the German Standard Language

Kaitlin Carpenter, German - Senior
Mentor: Dr. Kurt Goblirsch, Languages, Literatures, and Cultures

Discussion through the history of the German language with a focus on the Fleischarbeit of the seventeenth and eighteenth century German Grammarians and the role they played in the later literary movements.

The Attitudinal Model as it Pertains to Dissenting Opinions

Nicolas Fowler, Political Science - Sophomore
Gray Ransom, Biological Sciences - Sophomore
Mentor: Prof. Ali Masood, Political Science

Several theories of judicial decision-making process have been conducted and of these studies several prevailing theories have emerged. The respective studies have come to several conclusions of how Supreme Court Justices reach their decisions. Among the most prominent theories is the Attitudinal Model of decision making, which states that the individual political ideologies of the Justices are the defining factor in how Justices reach their decisions. The opposing theory to the Attitudinal Model is that decisions are based entirely on prior precedent and constitutional amendments (Legal Theory). A major piece of evidence towards the proof of the Attitudinal Theory is the existence of dissenting and concurring opinions within the Court. Existence of these opinions show that there are differences in how the Justices feel cases should be decided and what proper legal reasoning should be used in the decision making process of cases. The existence of these opinions run counter to the assumptions of the Legal Theory and help to provide credibility to the Attitudinal Theory. Through existing research, which quantifies the partisan tendencies of the Supreme Court Justices, we can analyze the dissenting opinions to see if their existence does provide empirical support to the Attitudinal theory. Such analysis could shed some light on the political nature of the Court, and substantiate or provide evidence against the effect of personal policy preferences at least in part on the decisions reached by the Court. We theorize that attitudinal considerations do play a major role in the decision to dissent against the majority opinion of the Court. To test our prediction we will analyze the dissenting opinions and will use the quantified partisanship data of individual Justices in conjunction with random sample split-decision cases. We will analyze cases from the liberal Warren Court and the conservative Rehnquist Court. Our preliminary results suggest that when comparing partisanship data with the number of dissents from particular justices there is support for the efficacy of the Attitudinal theory in explaining judicial decision-making behavior in the U.S. Supreme Court.

College Student Engagement with Local News

William Jackson, Advertising - Senior
Mentor: Dr. Glenda Alvarado, Advertising and Public Relations

Raycom Media (one of the nation’s largest broadcasters, which owns and/or provides services for 53 television stations in 18 states) and Nielsen (a leading global information and consumer measurement research company) approached my professor, Glenda Alvarado, to oversee a social media news engagement study. I humbly accepted the offer to work alongside her as part of an independent study. Raycom has invested $12,000 in the project to this point. We have collected survey responses from almost 3300 USC students and more than 25,000 pieces of market-specific data has been mined from social media feeds. The analysis has just begun, but there are clear expectations that presentations and publications can be targeted to academics and professionals. The proprietary methodology applied by Nielsen’s social media monitoring system to a specific local market is the first of its kind. Top executives are watching closely to see what is made of this special report and how it can be leveraged for future endeavors. I believe this project has the ability to have a significant impact in the field of consumer engagement that will appeal to journalists and strategic communications industry.

Kaitlin Carpenter

Mentor: Dr. Kurt Goblirsch

The Fleischarbeit of the seventeenth and eighteenth century German Grammarians and the role they played in the later literary movements.

Nicolas Fowler

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The Lone Woman and Last Indians Digital Archive

Elizabeth Matthews, English - Freshman
Eric Gonzalez, Computer Science - Junior
Allison Kuester, English - Freshman
Tyler Muehl, International Studies - Freshman
Caroline Blount, German - Sophomore
Sydney Cowart, Undeclared - Freshman
Mentor: Dr. Sara Schwebel, English Language and Literature

Under the direction of Professor Sara Schwebel, this project focuses on the construction of a digital archive based on the Lone Woman of San Nicholas Island, a nineteenth-century Nicoleña/Tongva women who was the inspiration for Scott O’Dell’s children’s book Island of the Blue Dolphins (1960). Although the frequently taught novel is based on historical fact, its treatment of some topics, particularly those related to Native Americans, is problematic. This digital archive serves as a repository for primary and secondary resources relating to the Lone Woman and Island of the Blue Dolphins to provide accurate information for those interested in learning more about the history surrounding the book and the real-life Lone Woman. The research team has collected hundreds of print sources relevant to the topic and is preparing them for publication in the database by annotating them and encoding them with TEI. Ideally, the public will use this archive, hosted on the Channel Islands National Park website, to supplement the study of Island of the Blue Dolphins and gain cultural and historical insight into the actual events that inspired O’Dell’s work.

The Effect of Regional Integration on Economic Sanctions

Mariah Miller, International Studies - Senior
Mentor: Dr. Timothy Peterson, Political Science

A large literature examines the factors that lead states to enter into preferential trade agreements (PTAs), noting that states overcoming barriers to cooperation obtain valuable economic gains following from the reduction of trade barriers. However, fewer studies focus on the fact that PTAs are by nature discriminatory agreements, potentially disadvantaging excluded states relative to members. In this paper, we explore how excluded states might retaliate against what is perceived as an economic threat. We contend that a given state is more likely to initiate sanctions against members of a PTA from which it is excluded. To test hypotheses following from this theory, we conduct statistical tests using data on PTA membership and sanction initiation spanning 1957 to 2005.

A Timeline of the Actions and Importance of the Revolutionary Era Pinckney Statesmen

Katherine Saunders, History - Senior
Mentors: Dr. Constance Schulz, History
Mr. Bob Karachuk, History
Mrs. Mary Sherrer, History

The three Revolutionary Era Pinckney statesmen, brothers Charles Cotesworth and Thomas and their cousin Charles, distinguished themselves as soldiers, legislators, governors, and diplomats during long careers in public service to the United States. Each man contributed to the independence of their state, the Revolutionary War, ratifying the United States Constitution, and representing the United States abroad. Somehow, these men’s achievements have been almost forgotten. My project, a piece of the larger Papers of the Revolutionary Era Pinckney Statesmen Project, is to gather information about the men’s activities from letters, newspapers, legislative journals, military order books, etc., and create an easy in-house tool for the editors of the project as well as a timeline for researchers who will be using the digital edition and non-academics who might visit our website. A highly searchable platform that is also visually appealing is our ideal. We found, however, that there are no applications that provide that we want for this project at our very limited budget. After sampling several platforms, we chose Aeon Timeline software, which best fits our needs with the fewest shortcomings. Because this project will presented through both academic and public interfaces, it is essential that our timeline show the importance of these men’s actions and the influence that they had in the founding of our nation.

Contributions from: Nicholas Schauder and Kailie Gregrow, USC Public History Program Undergraduate Interns

Potential versus politics: Dialogue as key to exploring political identity and activity amongst millennial college students

Stephanie Saunders, Political Science - Senior

Throughout my time at USC, I have sought out organizations, experiences, and courses in which professional and civic engagement were key elements. Studies in political science and psychology have supplemented the concepts of engagement, community, and politics. I have learned that every perspective differs, but is vital to an understanding of what our society is to people. This project focuses on my peers, millennial college students, utilizing dialogue to explore what influences their political participation. We are a generation known for open-mindedness, interconnectedness, and cultural diversity. We are also understood to be the least institutionally affiliated generation thus far. Utilizing literature on generational theory in the larger context of political theory, as well as media commentary on this cohort, I will study the implications of these traits as it pertains to voter participation and general engagement in the political sphere amongst millennial college students. This study involves a survey of University of South Carolina undergraduate students, graduate students, and recent graduates aged 18-25. The survey, entitled Survey of Political Identity and Activity was formulated based on eight in-depth interviews conducted with USC undergraduates. Utilizing ethnomethodology, grounded with a conversation analysis of the interviews I was able to isolate particular sentiments to study further with quantitative data in the survey. The results of the survey are then to be discussed in focus groups in order to give a multi-dimensional dialogue surrounding political identity and activity in this cohort whose future political activity is an enigma. The perspectives explored in this study will be used to encourage voter participation, particularly in the context of the 2016 elections and derive an understanding of my generation’s approach to and judgments of the political system within and outside of traditional parameters.


Humanities and Social Sciences B

Using French for Humanitarian Assistance: A University of South Carolina Student

Daniel Dor Jr., Biology - Junior; USC Beaufort
Mentor: Dr. Villena-Alvarez, Humanities and Fine Arts; USC Beaufort

In January 2015, a local South Carolina missionary group traveled to Les Cayes, Haiti (a French speaking country) this winter in order to provide Humanitarian Assistance in that region. As the group's primary focus was to explore the needs of the population of Les Cayes in order to devise strategies for further aid, it was important to have competent translators who also understood the Haitian culture. The USC student played a valuable role during this mission as it was necessary to communicate with government, healthcare, and church officials during the planning phase. During the course of the trip, the group undertook a construction project at an orphanage site, taught English and computers to the children of the orphanage, organized arts, crafts, and social activities for the children, and provided medical care for the population. The mission group was able to gather valuable healthcare matrix data, infrastructure information, and cultural insight which it is using to determine the level of need in Les Cayes, Haiti and strategies to respond to those needs.

Can We do Better for International Health Service? A Comparative Study of Sustainable Health models and Non-permanent Mission Work Models in Peru, Ecuador, and Colombia

Keenan Dunkley, Biological Sciences - Junior
Mentor: Dr. David Simmons, Anthropology

The focus into the Exploration funded comparative study of sustainable health models against non-permanent mission work in Colombia, Peru and Bolivia was to establish if reformation in international health aid was necessary, via background and comparison of influence of sustainable, secondary care focused models with short-term, mission models. Research was conducted on both a small scale, personal level through interviews with heads of each model and testimony collection as well as on a large, analytically powered comparative basis with integrated use of databases and peer reviewed study to chart diseases of influence in rural sects of each nation, mortality rate, disease care cost per patient and hospitals vs. mission trips in area. From this base of information, national profiles detailing socioeconomics, foreign health diplomacy and disease trends were developed to portray shortcomings of the current, more widely implemented mission models. Through these profiles, model efficiency was analyzed on the basis of addressing diseases of influence, availability, rural care and cultivation of human health resources. The Andean model of sustainable, permanent healthcare (currently implemented in Ecuador in Pedro Vicente Maldonado and Hesburgh Hospital) was a major focus in contrast to Red Cross, Samaritan’s Purse and privatized short term mission models. Conclusion of study found that non-communicable disease mortality demanding more than vaccination and short-term relief (e.g. diabetes mellitus, ischaemic heart disease) was quintuple the percentage of communicable deaths, which are the focus of current model of mission healthcare. Additionally, across nations of study, a near 70% differential was noted in hospital beds per 1,000 people compared to the U.S. and European counterparts, a gap which traditional NGO aid does address or improve. To truly impact health, meet the healthcare needs, and in doing so address cost efficiency, human resource growth and ultimately the cycle of poverty which engulfs much of the population of Ecuador, Columbia and Peru, permanent, sustainable medical institutions should be the goal of missions, Charities and NGO’s. In short, we can do better in providing real aid for these countries and their poor.

Cocky vs. Athena

Madison McFarland, Anthropology - Senior
Mentor: Dr. Jean Weingarth, Koger Center

In my undergraduate research project, entitled “Cocky vs. Athena”, my goals were to answer two main queries: “How does higher education in other countries differ from higher education within the borders of the United States?” and “How does the university experience for students at the University of Iceland differ from that of students at the University of South Carolina?” In order to provide responses to these queries research was conducted both at the University of South Carolina and also in Iceland, at the University of Iceland (located in Reykjavik). At USC, text-based and web supplemented research was conducted to focus on general higher education with specific attention paid to higher education in Reykjavik and Columbia. Following this broad research, the daily activities of college students here at USC (to be representative of the American university student) were documented and studied. The same process was completed at UOI in order to compare student life at USC versus student life UOI. This study included aspects of life at a university including dormitory life, athletic involvement, use of their free time, university regulations, offered majors, professors, academic standards of the institution, classroom expectations, and classroom experiences. A notable conclusion is that university life is extremely reflective of the nature of their host nations, both in terms of cultural aspects and political environment.

Living with ADHD: Coping strategies when dealing with a child with ADHD

Kayleigh Quinn, Psychology - Senior
Mentor: Dr. Melanie Palomares, Psychology

Attention Deficit Hyperactivity Disorder (ADHD) is a common behavioral disorder that affects around 10% of all school-aged children. Boys are about three times more likely to be diagnosed than girls in early stages of life. Children with ADHD act without thinking, are extremely hyperactive, and have a hard time focusing. These children have a difficult time in school because they cannot sit still, pay attention, or focus on details. Most children act in these sorts of ways, but the difference with ADHD is that the symptoms are present for a longer period of time. Treating ADHD can often be difficult because children react differently to different therapies, which can include medication and occupational therapy. The purpose of this project is to show the strategies of coping with an ADHD child. Many people are involved when a child is diagnosed with ADHD, including parents, siblings, the child's doctor and occupational therapists, the child's teachers, and the actual child. The lives of the involved people have to
be altered so that the child will benefit from the presented therapies. Through
the Child Attention and Perception Lab, the focus is to find different ways to
measure attention and perception in typically and atypically-developing children,
and supports the community that could potentially help families coping with
ADHD. This project shows the progression of individuals with ADHD and their
families as they adjust to medication and occupational therapy. It also shows how
ADHD has impacted the personal journey of a student who decided to become an
occupational therapist.

Learning in Practice: Research for Professional Development
Gracie Ann Roberts, Theatre - Junior
Mentor: Prof. Robert Richmond, Theatre and Dance
My 2013 – 2014 academic year was spent investigating arts administration
programs and aspects of those curricula in practice within the field. I conducted a
best practice search on qualities of 50 of these programs and enrolled in an online
arts leadership program myself. My research drove towards a brief internship
at the Folger Shakespeare Theatre where I got to witness arts management in practice. I’ve heard about arts administration as a viable career path for an artist
for several years now, and I was interested in discovering it, both in and out of
the classroom, myself. I learned that a student in arts leadership can learn just
as much in the workplace as the can in the classroom. What’s being taught to
future arts leaders in academic programs is also grasped through experience.
This greatly influenced how I planned my future, and due to this new awareness
of the field, I was able to better identify what part I desired to play in an arts
management career. Upon returning to the University of South Carolina, I sought
more focused employment within my current place of work, the Koger Center
for the Arts, where I became the Assistant to the Director. My knowledge from
my research project enabled me to be a more effective employee within an arts
administration office, armed with knowledge from my year in research but also
prepared to learn something new every day.

Development and Evaluation of Online Training in Non-Violent Conflict
Resolution
Kevin Stam, Social Work - Senior
Mentor: Dr. Susan Parlier, Social Work
Conflict is a natural and normal part of life that everyone experiences. Important
to handling conflicts constructively is a particular set of skills, knowledge, and
attitudes. Faced with new lifestyles and living situations, college students
experience all types of conflicts and confrontations. However, there is a lack of
educational programs available to college students that enhance their knowledge,
skills, and attitudes in regards to conflict, the way it occurs, and constructive
ways to manage it. To fill this gap, and specifically the lack of conflict resolution
education resources available to college students, the author constructed and
examined the efficacy of an online training module in conflict resolution. The
study’s sample was college students at a South Carolina college. The hypothesis
was that students who complete the training experience improved knowledge of
and confidence in conflict resolution; thus, students report constructive outcomes
from interpersonal conflict.

Ghanaians’ Perceptions of Skin Tone
Erin Steiner, Political Science - Senior
Mentor: Dr. Shelley Smith, Sociology
There is a notion that pervades most African cultures that lighter skin is more
beautiful; Ghanaiian culture is no exception. Around 30% of Ghanaian women use
skin bleachers on a regular basis (UNEP 2008). Several factors must be considered
when investigating Ghanaians’ perceptions of skin tone. The most important
elements include: Ghana’s history of colonial oppression, the country’s current
socio-economic situation, and the global beauty industry’s growth. Building upon
previous research on those topics, I interviewed 6 participants in Accra, Ghana
during the summer of 2014; four university students, one university professor;
and one market vendor. Key themes that arose from the interviews included:
women’s role in starting romantic relationships, the desire for attention, one’s
sense of self, lack of knowledge of the products’ side effects, and the utilization of
the phrase “Black is Beautiful.”

A Case Study in Expressive Writing for Grief Therapy
Emily Eliza Still, Psychology - Senior
Mentor: Dr. Mike McCall, Psychology
The purpose of this study was to examine expressive writing, or journaling, as a
tool for grief therapy. While previous studies have found significant support for
mental and physical health benefits resulting from short-term and focused writing
sessions regarding the emotions surrounding trauma and grief, none have studied
the effects of long-term writing or non-directed writing in regards to grief therapy.
To explore the effects of these neglected factors, the author completed a case
study on herself. She wrote 57 daily letters to her deceased father while traveling
during the summer of 2014. Analysis of the letters following her travels indicated
a reduction in anxiety, better self-understanding, and improved processing of
grief. The writing and reflection process allowed the author to better understand
the role her father continues to have in her life and also encouraged her to
embrace the present. Success of this method depended on establishing the
routine of writing, creating a comfortable writing situation, and having extrinsic
motivation to complete the process. Implications for future research will be
discussed.
Defining a New Cellular Component of the Elastin Fiber Assembly Mechanism
Scott Becker, Biomedical Engineering - Junior
Mentor: Dr. Melissa Moss, Chemical Engineering
Cardiovascular disease affects thousands of people each year. Often patients must undergo surgery to replace a segment of blood vessel that has been damaged. These replacements are generally taken from other regions of the patient’s body. However, obtaining blood vessels from other parts of the body is not always possible which creates the need for finding a new way of generating artificial constructs that can be connected to native blood vessels. These new constructs must be compatible when surgically implanted and show elasticity and resilience. Many of the previous constructs that have been designed lack the necessary biomechanical properties of blood vessels, many times due to low levels of elastin. Elastin is an extracellular protein that plays a vital role in providing tissues with elasticity and resilience. Due to the fact that not much is known about the steps involved in elastogenesis, this study aims to provide some knowledge about elastin production. The goal was to define a new cellular component called the elastindepositor. Using immunohistochemistry, images of human foreskin fibroblasts (HFF) in a 2-D setting were taken at different time points to locate the elastin-depositor structure. In addition, qPCR was conducted to test levels of different proteins involved in elastogenesis at a variety of time points.

Misuse of Stimulant Medication Among College Students: Symptoms of ADHD and Motives for Misuse
Kari Benson, Psychology - Senior
Mentor: Dr. Kate Flory, Psychology
The misuse of stimulant medication, typically used for the treatment of Attention-Deficit Hyperactivity Disorder (ADHD), is a prevalent and growing problem on college campuses. Misuse refers to using a prescription medication in a way that is not prescribed, which includes using too much, using with other substances, snorting, or using without a prescription. According to a recent review of the literature, stimulant medication misuse is significantly correlated with substance use, lower GPA, and various psychological disorders. Researchers have theorized that many students are attempting to self-treat symptoms of ADHD when they misuse stimulant medication. I conducted an extensive online survey, which included demographic questions and psychological measures, of over 1,000 undergraduate students at USC in order to address these topics. This presentation will focus on the findings related to ADHD, Oppositional Defiant Disorder (ODD), and Conduct Disorder (CD) and their relation to misuse and motives for misuse. Relations between demographic characteristics and misuse will also be discussed. Symptoms of ADHD were the greatest predictor of misuse, while CD, gender, fraternity/sorority membership, and year in school were also significantly related to misuse. ADHD was the only significant predictor of misusing for academic reasons, demonstrating support for the self-treatment hypothesis. ODD was the only significant predictor of misusing for recreational motives. The results of our study have implications for the prevention of stimulant medication misuse. My mentor, Dr. Flory, has used these findings to support a grant proposal submitted to the NIH for an intervention program for reducing misuse on USC’s campus.

Identifying a Role for the E3 Ligase ITCH in Colorectal Tumorigenesis
Shandrea Foster, Biological Sciences - Senior
Mentor: Dr. Lydia Matesic, Biological Sciences
Colorectal cancer is the second leading cause of cancer related deaths in the United States, and the third most common world-wide. Aberrant activation of the WNT signaling pathway within the epithelium of the intestine increases its proliferative capacity, and promotes intestinal tumorigenesis. Truncations in adenomatous polyposis coli (APC), a negative regulator of WNT signaling, or gain-of-function mutations in the transcription factor B-catenin, have been found in nearly 85% of colorectal cancers, further highlighting the importance of this pathway in carcinogenesis. ITCH, a HECT-family E3 ligase, is overexpressed in colon cancer, and loss of Itch in ApcMin/+ intestinal adenomas results in a 71% reduction in intestinal polyps. To determine if ITCH promotes tumorigenesis in the colorectal adenocarcinoma cell line HT29, we generated cell lines that stably overexpressed wild-type (HT29-ITCH WT) ITCH or a catalytically dead mutant (HT29-ITCH Mt) of ITCH, as well as HT29 cells in which endogenous ITCH levels have been knocked-down through shRNA. In HT29-ITCH WT, we observed an increase in proliferation compared to HT29-ITCH Mt and HT29 parental cells. An increase in nuclear B-catenin was also observed in HT29-ITCH WT cells. Conversely, we observed a decrease in proliferation as well as reductions in nuclear B-catenin in HT29 cells lacking ITCH. These findings emphasize the importance of ITCH in colorectal tumorigenesis, and highlight a potential role for ITCH in the regulation of the WNT signaling pathway within the context of colorectal cancer.

Creating a tool to downregulate ANT expression in the flower
Olivia Haley, Biological Sciences - Senior
Mentor: Dr. Beth Krizek, Biological Sciences
Flower primordia arise from the periphery of the shoot apical meristem, a dome of undifferentiated cells at the apex of a plant. Floral organ primordia initiate from the flower primordia in four concentric whorls and adopt a fate as a sepal, petal, stamen or carpel due to the activity of floral organ identity genes. A key regulator of floral organ growth is the transcription factor AINTEGUMENTA (ANT). Mutations in ANT result in smaller flowers while ectopic expression of ANT results in larger flowers. In addition, ANT has additional roles in floral development, we would like to identify genes that are regulated by ANT. The purpose of this project is to create a tool that will be useful in identifying genes that show altered expression after downregulation of ANT activity in developing flowers. Transgenic plants containing one of four different artificial microRNA (amiRNA) lines were created to target the ANT gene and silence its expression either by translational blockage or mRNA cleavage. In these
transgenic lines, expression of the amiRNA is controlled by ethanol. In T2 lines containing these constructs, we have not observed an ant mutant phenotype after ethanol induction. Testing of these lines will be repeated on T3 plants that are homozygous for the transgene.

**The effects of chronic stress, high sugar diet, and exercise on depressive symptomatology and associated physiology in rats**  
*Austin Kaiser*, Biology - Senior; USC Aiken  
Mentor: Dr. Michelle Vieyra, Biology/Geology; USC Aiken

Major Depressive Disorder (MDD) is one of the most common mental illnesses in the United States, having a lifetime risk of approximately 17% (Depression, 2015). Only 20.3% of Americans perform an adequate amount of aerobic and strength training exercise weekly (CDC, 2013). Americans eat a diet that has 400% of daily sugar requirements, on average (Cheng, 2014). This study sought to test the efficacy of exercise as a treatment for depressive symptomatology in the context of a high-sugar diet and chronic stress, which mimics the average Western lifestyle, using Sprague-Dawley rats as an animal model. 21 rats were subjected to the chronic-mild stress (CMS) model of animal depression, and placed into four groups that were treated with different combinations of exercise and high-sugar diet for a period of eight weeks. The rats were subjected to behavioral testing before the CMS model, after the CMS model, and after the eight week trial period to measure depressive symptomatology. Urine was collected at each period of behavioral testing to measure changes in BDNF concentration. The rats were then sacrificed and blood and fat samples were taken. Brain weight and body-fat percentage were measured. Hippocampus was removed from each subject for neural density histology. Raw data appear to suggest that exercise groups performed better on behavioral testing, regardless of diet treatment, after the trial period, but statistical analyses have yet to be performed. If results fail to reject the null hypothesis that exercise is an efficacious treatment for depression in rats, it would suggest that exercise can be used as a treatment for depression without requiring the patient to undergo a complete lifestyle change, and that this could be a safe, low-cost alternative to therapies and pharmaceuticals currently used to combat MDD.

**Increased otolith size in juvenile fish due to prolonged exposure to ocean acidification**  
*Patricia Perez*, Marine Science - Senior  
Mentor: Dr. Tom Hurst, National Oceanic and Atmospheric Administration

Due to increased atmospheric carbon dioxide, the ocean has become 25% more acidic in the past 300 years. While ocean acidification is known to negatively affect a range of calcifying organisms, the effects on fishes have been less explored. Past studies have shown increased otolith growth in larval fishes when faced with elevated CO2 levels. However, the effects of prolonged exposure to ocean acidification have yet to be widely researched. This study examines the effects of a 32 week exposure to ranges of elevated CO2 on otolith size using juvenile walleye pollock. Under elevated CO2 conditions, pollock showed increased otolith sizes compared to those from ambient conditions. Hypercalcification of the otolith in response to increased CO2 appears to be persistent and continue into juvenile life stages. Otolith sizes of wild-caught fish were used to evaluate the magnitude of the OA-induced hypercalcification in relation to other natural factors that influence otolith size. It is believed enlarged otoliths could cause increased sensitivity in fishes. Impacts on sensory function could affect survival and recruitment, providing the need for deeper understanding of ocean acidification effects.

**Synergistic effect between caffeine and sugar on cognitive performance**  
*Sandra Uriquiza*, Biology - Senior; USC Aiken  
Mentor: Dr. Michelle Vieyra, Biology/Geology; USC Aiken

Many studies confirm that, working independently, both caffeine and sugar provide benefits to attention and memory. However, there is sparse literature on the synergistic effects of caffeine and sugar on improved cognitive performance when taken together. In this study, we explored the dynamics between caffeine and sugar when consumed under ordinary conditions – as a cup of coffee. 25 undergraduate students were asked to refrain from consuming caffeinated products for 12 hours and to fast 4 hours prior to the study. At the start of the session, participants completed a baseline cognitive test and one of the three variables was given at random in the form of a cup of coffee: decaffeinated with sugar, caffeinated with no sugar, and caffeinated with sugar. The remaining two variables were administered over the next two sessions. After each variable, participants completed the same cognitive test, and results were compared within subjects and between subjects to assess effects on short-term memory. Overall, participants performed better on the most difficult memory task when caffeine was consumed (with or without sugar). Coffee drinkers did best when consuming caffeine alone, the caffeine plus sugar condition providing no benefits above baseline. Non-coffee drinkers improved with caffeine alone and did best with caffeine plus sugar. The effects of caffeine on cognitive performance is mediated by additives and consumption habits.

**Transcription of Dopamine Receptor Subtypes in the Prefrontal Cortex and Nucleus Accumbens Following Prenatal Ethanol Exposure**  
*Daniel Wood*, Biochemistry and Molecular Biology - Senior  
Mentors: Dr. Sandra Kelly, Psychology  
Dr. Seung Joon Lee, Biological Sciences  
Dr. Jeff Twiss, Biological Sciences

Fetal Alcohol Spectrum Disorders (FASD) are a set of physical, cognitive, and behavioral deficits that result from exposure to alcohol in utero. It is one of the most prevalent preventable sources of neurological deficits in the Western world. Hyperactivity and attention deficits are among the most common behavioral and cognitive characteristics of FASD, yet seem to exhibit a distinct cognitive and behavioral profile from those seen in ADHD without FASD co-diagnosis. A dysfunctional dopaminergic mesocorticolimbic pathway of the mammalian brain has been linked to attention deficits. There are five known subtypes (D1, D2, D3, D4, and D5) of dopamine receptor in the human and rat central nervous system. It is hypothesized that the transcription of the dopamine receptor subtypes is altered in those afflicted with FASD, resulting in mesocorticolimbic dysfunction. In this project a three-trimester alcohol exposure intubation rat model of...
FASD was used. Animals were divided into three groups: ethanol treated (ET), intubated control (IC) and non-intubated control (NC). Ethanol treatment was in both the prenatal and postnatal period of the rat which is equivalent to all three trimesters in the human. The IC group controls for the method of alcohol administration used in this project. Quantitative polymerase chain reaction (qPCR) was used to assess transcriptional changes in all five dopamine receptor subtypes in the prefrontal cortex and the nucleus accumbens, brain areas involved in the mesocorticolimbic pathways. The results of this project could provide a deeper molecular understanding of the attention deficits and hyperactivity commonly seen in FASD. Supported by the University of South Carolina Office of Undergraduate Research Magellan program.

**Science, Technology, Engineering, and Mathematics**

**Using Differential Privacy to Protect Sensitive Data**
*Connor Bain, Computer Science - Senior*
Mentor: Dr. Srihari Nelakuditi, Computer Science and Engineering
All you hear about in the news these days is the latest massive private data breach. And with the expanding availability of internet cloud services, more and more data will be accessible online, waiting to be attacked. Now with online research data repositories like Harvard’s Dataverse Network quickly gaining prominence, considering the security and privacy issues of sharing sensitive research data is of utmost importance. The question becomes: how do we allow access to research data without compromising the privacy of any individual in the dataset? As part of the Privacy Tools for Sharing Research Data project, we propose using differential privacy to protect sensitive data. Differential privacy is a rigorous mathematical definition of privacy. In effect, it allows you to quantify how private a system is. By integrating differential privacy into the statistical analysis software Zelig, we can release summary statistics to users without compromising privacy. Our work focuses on releasing differentially private means and covariance matrices for large datasets. For covariance matrices, in addition to implementing and analyzing two different differentially private mechanisms, we also use the released covariance matrix in order to perform private ordinary least squares regressions. We hope that through differential privacy, we can prevent potentially harmful leaks of private information.

**Catalysis Synthesis of Ruthenium Hexaamine on Silica by Strong Electrostatic Adsorption at High Surface Loadings**
*Eric Bringley, Chemical Engineering - Junior*
Mentor: Dr. John Regalbuto, Chemical Engineering
Strong Electrostatic Adsorption (SEA) is a catalysis synthesis method that takes advantage of the Coulomb force between two charged species, to adsorb metals onto oxide and carbon supports. Oxide supports, such as Silica, contain terminal hydroxyl groups in aqueous solution that can be protonated or deprotonated by adjusting the pH, creating a charged surface for the ionic metal complex to adsorb. SEA has been shown to produce ultra-small metal nanoparticles (approximately 1nm) creating more active sites per gram of precious metal. SEA is commonly performed on thin slurries because it is hypothesized that metal adsorption capacity will be inhibited by higher counter ion concentrations present in thick slurries. This retardation of adsorption is also predicted by the Revised Physical Adsorption Model (RPA) with good accuracy. Industrial catalysis synthesis use Dry Impregnation which is performed with enough liquid to wet the support. Although it is simple method to perform with no loss of metal, metal-support interactions are often uncontrolled and produce a wide distribution of particle size. An effective synthesis strategy that combines the advantages of dry impregnation (thick slurry) and SEA (small metal particles) has been introduced. Nevertheless, a systematic study showing how metal ion adsorption capacity via SEA varies with slurry thickness is still lacking. In this study, we have studied SEA...
Redox and Light Dual-responsive Photothermal Stable Gold/mesoporous Silica Hybrid Nanoparticle as a Theranostic Platform for Cancer Therapy

Bei Cheng, Pharmacy - Senior
Mentor: Dr. Peisheng Xu, Pharmacy
A gold/mesoporous silica hybrid nanoparticle (GoMe), which possesses the best of both conventional gold nanoparticles and mesoporous silica nanoparticles, such as excellent photothermal converting ability as well as high drug loading capacity, has been developed. In contrast to gold nanorod and other heat generating gold nanoparticles, GoMe is photothermal stable and can be repetitively activated through NIR irradiation. Doxorubicin loaded GoMe (DOX@GoMe) is sensitive to both NIR irradiation and intracellularly elevated redox potential. DOX@GoMe coupled with NIR irradiation exhibits a synergistic effect of photothermal therapy and chemotherapy in killing cancer cells. Furthermore, 64Cu-labeled GoMe can successfully detect the existence of clinically relevant spontaneous lung tumors in a urethane-induced lung cancer mouse model through PET imaging. Altogether, GoMe can be utilized as an effective theranostic platform for cancer therapy.

The Application Process of the Barry Goldwater Scholarship

Jeffrey Davis, Mathematics - Junior
As a young mathematician with plans to attend graduate school and earn my Ph.D., I applied for the Goldwater Scholarship. I have received funding for three research projects (two NSF REUs and a South Carolina Honors College SURF Grant), and so thought myself to be an ideal candidate for a Goldwater. Past Goldwater recipients and nominees have shown an awareness of the necessity for research. The scholarship offers funding to lessen the financial burden of college and opportunities to begin thinking about graduate school, to get advice from faculty outside of your major, and to practice writing competitive applications. The Goldwater committee, headed by Dr. Doug Meade of the Department of Mathematics, supplied me with greatly appreciated feedback to polish my application and my research proposal. Going through the whole process and fellowship applications in the future. Applying for a national fellowship is beneficial to any applicant, whether or not they are named a winner.

On hp-Approximation of Point Clouds in High Dimensions

Marybeth Lundquist, Geophysics - Senior
Mentor: Dr. Peter Binev, Mathematics
We consider approximations of functions on a domain of large dimension. Our goal is to extend hp-adaptive methods in FEM to add flexibility in the approximation of high dimensional functions while avoiding the curse of dimensionality. We generalize newest vertex bisection in 2D in our adaptive partitioning of the domain, assumed a simplex, to relate the process of partitioning to the building of a binary tree, whose terminal nodes correspond to the cells of the partition. The simplest procedure uses a piecewise constant approximation on each cell, but limits the order of approximation to 1. Our approach is to increase the number of degrees of freedom on each cell by introducing linear functions depending on k parameters, ≤ D+1. The complexity of the approximation is the sum of all degrees of freedom (k) of the partition.

Digital Root of Power Tower

Christian Kalacanic, Undeclared - Freshman; USC Salkehatchie
Mentor: Dr. Wei-Kai Lai, Mathematics; USC Salkehatchie
For a positive integer a, its power tower of order n is defined by “a raised to the power of a raised to the power of a ... for n times”. Because their values increase dramatically as n increases, power towers have not been widely studied. Among a few articles we found, we learned that the technique of modulus can be used to find the last digit of a power tower of order n. Using the same technique, we analyzed the digital roots of power towers from 1 to 9 and discovered some patterns. In this presentation we will introduce these patterns, as well as the methods we used.

A Special 15-Puzzle Revisited

Anton Khristyuk, Undeclared - Sophomore; USC Salkehatchie
Mentor: Dr. Wei-Kai Lai, Mathematics; USC Salkehatchie
Magic Square and 15-Puzzle are two popular puzzles in mathematics world. In Magic Square players need to create an equal sum from numbers in each row, column, and both main diagonals in the square, while in 15-Puzzle players are asked to rearrange the movable numbers to a fixed form one number at a time. In this talk I will introduce an ancient problem that involves both puzzles. By discussing its solution, I will also explain the techniques used in each puzzle, hence in this problem.

Investigating the 1/3-2/3 Conjecture for Two-Dimensional Posets

Anna Kirkpatrick, Mathematics - Senior
Mentor: Dr. Joshua Cooper, Mathematics
A poset, or partially ordered set, (P, ≤) is a set P with a partial order relation . A partial order relation is a binary relation which is transitive, reflexive, and anti-symmetric. A linear extension of a poset is a total ordering on P which respects the partial order . For any fixed poset, we can examine the set of all linear extensions. For any two elements, x and y, we can then ask: in what proportion of all linear extensions does x come before y? This question motivates the 1/3-2/3 conjecture. We say that (x,y) is a critical pair if the probability that x precedes y in a linear extension is at least 1/3 and no more than 2/3. The 1/3-2/3 conjecture states that, for every poset P which is not a chain, there exists a critical pair of elements x and y belonging to P. The conjecture is a major unsolved problem in poset theory. This project aims to investigate the 1/3-2/3 conjecture in the specific case of two-dimensional posets. Important tools include the bijection between two-dimensional posets and permutations, geometric pictures of two-dimensional posets, and computational experimentation using SAGE. Both theoretical results and computational evidence will be presented.

On hp-Approximation of Point Clouds in High Dimensions
goal is to find a partition and assign degrees of freedom to its cells so that the total error is minimal for a given complexity. We use a probability measure \( q \) defined on \( D \) to focus on values of interest and to find a near-best \( hp \)-adaptive approximation. We base our algorithm on local error estimators for cells of the partition and find a near-best approximation by modifying these errors to reflect the local complexity of the partition. In practical implementation, we find estimates of the local error functionals from a given data set of \( N \) points. To reduce the complexity of the algorithm we use sparse occupancy trees to process the data.

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**USC Connect Showcase A**

**Observing and Motivating Physical Activity in Children and Collegiate Softball Players**

*Taylor Barbalace, Exercise Science - Senior*

**Internship:** During my last semester at the University of South Carolina, I was an intern at Policy to Practice Youth Programs. P2YP is a research team that works with programs that serve children outside the school days (summer camps and afterschool programs) to improve what type and amount of food they consume as well as the amount of physical activity the children are exerting. This research is extremely important to improving the health of children across the States. Child obesity is increasing daily and it is an issue that we as a country need to focus on. During my internship, I was given the opportunity to collect data at different sites as well as analyze the data. My specific job was analyzing the snack receipts. This internship gave me an opportunity to work with a research team as well as allowed me to use my creativity when finding a solution to the problem at hand. It also solidified that I want to work with children and their health in my future career.

**Leadership:** Since I was 10 year old, I grew up loving the playing the game of softball. I dedicated my life to learning the different strategies and rules it takes to win. I came into college with the same mentality. I ended up walking on for the collegiate team. From tryouts I was offered the position of student manager. This opportunity gave me the chance to continue being around the sport I loved. I was fully involved with the team by attending all the practices and games as well as attending the camps offered to the community. I was given the honor to travel with the team for games and at the games I was in charge of taping the games. And throughout the season I was in charge of the apparel for the team. I got to watch the team grow into family as each season new recruits joined. It was an experience I am truly grateful for and will never forget.

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**USC Dance Marathon: A Home at Carolina**

*Mari Basil, Tourism Management - Senior*

USC Dance Marathon (USCDM) is a student run philanthropy organization that raises money for Palmetto Health Children's Hospital, Columbia’s local branch of Children's Miracle Network Hospitals. USCDM is a year-long effort to raise funds and awareness for the children and families of Palmetto Health Children’s Hospital and culminates every spring in our Main Event. Previously the Main Event has been 24-hrs, but in an effort to raise more money than ever before and increase participation, this year’s event has been changed to 14-hours. With this change USCDM is striving to raise Half a Million in Half the Time. I have been lucky enough to serve on the Executive Board of this organization for the past three years and can say with confidence that it is where I have made my greatest impact at the University of South Carolina and in this community. When I began college, I wanted to be involved, but did not know in what. Through the Student Organization Fair, I found Dance Marathon with two of my friends. I’m not a dancer by any means, but USCDM combined two of my favorite things – kids and
helping others. I fell in love with this organization and all that has given me. I have found my place at Carolina through an organization striving to make a difference in their community. Through my passion For the Kids, I have found confidence to conquer anything life throws my way and know that what I am doing is making a difference.

**Education and Entrepreneurship in Amman, Jordan**

**Nicole Bills**, Political Science – Junior  
Mentor: Prof. Carolina Nagel, Geography

Like most countries in the Middle East and North Africa, Jordan faces high youth unemployment. Although 47% of young people attend college, there is a critical incongruity between the skills developed in the university system and those required by employers. In response to these challenges, entrepreneurship can provide an opportunity for students (particularly those graduating with a degree in business) to leverage their unique skills and gain work experience. While traditional development theory emphasizes the economic benefits of entrepreneurship, the intent of my research is to explore the often-ignored educational benefits of entering the start-up community. In order to analyze the relationship between entrepreneurship, education, and career skills, I crafted a brief survey for business students and professors. Between March 8th and 14th, I traveled to Amman, Jordan to interview these populations as well as entrepreneurs and employees of entrepreneurial- and education-related NGOs. Ultimately, I hope to develop curriculum suggestions and policy reforms that could possibly be implemented to improve employment outcomes.

**My Journey as a Resident Mentor: Discovery, Reflection, and Introspection**

**Amber Lynn Dicker**, Psychology - Senior

Ella Wheeler Wilcox once said “With every deed you are sowing a seed, though the harvest you may not see. As a third year resident mentor in the Carolina Women’s Community, I have had the distinct pleasure of fostering an inclusive and diverse community where residents have the opportunity to develop into strong and empowered female leaders at the University of South Carolina, and in their future endeavors. My experiences as a mentor for women in this living and learning community have also shaped and defined my character and personal life. When I began in this role as a nervous and shy sophomore, I had no idea how influential this experience would be in developing my communication skills, understanding of other people and cultures, capacity to work effectively on a team, and my ability to adapt and respond to new and challenging situations. This journey has been one of individual discovery, reflection, and introspection marked by a surprise harvest of immense personal and professional growth.

**How to Make the Most of your Maymester**

**Alexandria Hall**, Exercise Science - Senior  
Mentor: Dr. Jim Mensch, Exercise Science

In May of 2014 I was lucky enough to be able to be able to travel to Greece and Italy on a study abroad program to study the culture of sports history. This experience made such an incredible impact on my time at Carolina because I was able to travel, meet new people, and do things I thought I would never be able to do. Within these two short weeks, there was so much to absorb and learn about these two incredible countries. The purpose of this presentation is to give a survival guide for making the most of your maymester when you are studying abroad. In this presentation, I will discuss two main themes and describe how both themes helped me have the most amazing time in Greece and Italy. The themes included are: documentation and cultural integration. In addition to these two themes, I will give you tips on what not to do while abroad. If you follow my words of wisdom and don't lose your wallet, there is no chance that your semester won't be the best yet.

**Global Learning: How I rediscovered the world around me**

**Emily Olyarchuk**, Public Relations - Senior

In Spring 2014, I studied abroad at Sciences Politiques in Paris, France. Since this experience, my understanding of the world and of myself has drastically changed. While studying abroad, I decided to take courses outside of the usual curriculum for a public relations major at the University of South Carolina. I took classes on world politics and international relations. I continued to pursue my French language studies and at one point gave a great presentation about South Carolina in French. Meeting students from other countries and interacting in this academic environment caused me to realize that there is so much I do not know about the world. My courses on world politics and international relations made me understand that as citizens of this global society, we have a responsibility to protect and support people from all. Following my study abroad experience, I returned to USC with a renewed passion for understanding international affairs and the role that communication plays in international development. Our world is constantly changing and as students of this time, we must learn and react to what is developing around us. My study abroad experience gave me the courage to pursue new projects when I returned to USC, to become involved with our campus newspaper and to find new opportunities to participate in the community. By studying abroad, my entire collegiate experience was greatly enhanced, and I anticipate returning to France to continue my post graduate studies very soon.

**Unexpected Learning**

**Dylan Opalich**, Management - Senior

University 101 has incorporated a peer leader into the classes not only as an added facilitator, mentor, and resource for students in transition but also to support the leadership development of the peer leader. I have been a University 101 Peer Leader for three semesters and a Senior Peer Leader for one semester. I have co-instructed with three members of the USC staff and taught over 80 students. I applied to be a peer leader because when I took U101 in my first semester, my peer leader brought energy and a student's perspective to our class, which to me, made all the difference. Throughout my time as a peer leader, I have learned how to be a more effective facilitator, a more engaged listener, and struggled through a few failed lesson plans. My role as a peer leader connected me even more to the University that I so love and helped me evolve from a student with my own agenda into a mentor for others with a purpose beyond myself. I want to share my experiences to encourage others to explore the many leadership and service opportunities on our campus that will not only help them develop, but
also give back to the University that has given them so much. Ultimately my work has a peer leader has informed much of my thinking about higher education and transformed my career path. I am currently deciding between graduate programs to begin my Masters in Education with a focus in Higher Education in either the summer or fall of this year.

Leadership in Athletic Training
Daniel Riggio, Athletic Training - Senior
As an Athletic Training Student, I have had the opportunity to work with and provide medical care to a vast array of athletic populations ranging from elementary and middle school children to top-tier Division I athletes with NFL, NBA, MLB, and other professional-level aspirations. As my knowledge base and level of experience grew with each new team I worked with, so too did my responsibilities which included patient education, making rehabilitation protocols, using therapeutic modalities such as therapeutic ultrasound and Russian Electrical Stimulation, and massage therapies, to name a few. My deep-rooted passion to help others fueled my motivation to acquire large amounts of theory and practical knowledge in my field where I learned the valuable skills of preparation, creativity in problem solving, and how to integrate new research and understanding of human anatomy and physiology into practical treatment plans for patients. As is common within the Professional and Civic Engagement pathway, my experiences outside the classroom have molded me and prepared me for my future endeavors in the profession and I will be presenting on some of my most memorable experiences such as Marcus Lattimore’s knee dislocation in the fall of 2013. These experiences have developed me into a confident individual who is ready to properly and successfully handle any injury/condition that I am presented with whether it be a sprained ankle or a life-threatening pathology. As I look towards my future I plan to become a certified Athletic Trainer then attend Physical Therapy school, eventually becoming dual credentialed as a DPT, ATC. I hope to pass my knowledge on to others so that they can be better prepared to take care of themselves and others, creating a more caring and healthier community.

USC Connect Showcase B

My Communication Has No Limits
Alexis Coleman, Criminology and Criminal Justice - Senior
Alexis always put forth great effort to chase her dreams and one was to travel abroad to the continent of Africa. During the summer of 2014 Alexis was awarded a national scholarship through the Benjamin A. Gilman Foundation to travel to Ghana for four weeks. The program was provided to her through the University Studies Abroad Consortium, (USAC) where she was able to receive credit towards her African American studies minor at the University of South Carolina. While in Ghana, she was able to take courses in Anthropology, Music, Service Learning and sat in on a Twi language course. All of her experiences were captured via photos and video. Upon her return, she compiled the media outlets into a short film on the application iMovie on her macbook. This was done first to showcase to students in the Opportunity Scholars Program and also used as apart of her follow on service project with the Gilman scholarship. As a senior criminal justice major and pursuant of leadership distinction in professional and civic engagement, when graduating May 2015, this experience allowed her to strengthen her communication skills and showed her how much of a value it can be when faced with cultural differences.

Redefining the Definition of Student
Courtney Enright, Marketing - Senior
Mentor: Ms. Tricia Kennedy, University 101
Carving the pathway for success for first year students is the basis of the University 101 program. Through this program students are guided to academic success, encouraged to become leaders and are introduced to the Carolina culture. Becoming a part of this program started when I began my career at this University as a freshman. What it developed into was the opportunity to be a Senior Peer Leader during the fall of my senior year: I created lesson plans, developed individual leaders and fostered relationships with my twenty students who were Peer Leaders in their own classroom. While my leaders held the title of student, they proved that the definition we are so used to, can actually carry many more meanings. While I may have held the ability to sit at the front of the class, I felt more like the student as my time with them progressed. Through this experience I strengthened my knowledge of the importance of communication, enhanced my listening skills and came to realize that learning and knowledge don't have a finish line, but are continuous. This experience was the capstone to my time here at USC, brought together everything I absorbed in the classroom, and was the physical application of all these academic theories. My presentation will strive to show you a glimpse into the insights I gained from my experience with this program and the impact my incredible students had on me.
A Change in Perspective: Learning to Thrive in an International World

Natalie Medler, International Studies - Senior

During my time at the University of South Carolina, I was able to study abroad twice in France. I studied French in an immersion program in Tours, France at L'Institut de Touraine and the following spring semester in Paris at L'Institut d'Études Politique, or Sciences Po. Studying at these two universities greatly affected my outlook on the different ideas that direct how nations interact with one another due to the fact that I got to learn about the world from a different perspective. At L'Institut de Touraine, I was able to focus on commanding the language outside of the classroom setting and in a real, organic manner. Studying at Science Po challenged the way I originally looked at intergovernmental interaction by learning from professors and ideas that offered different perspectives than those I had learned in the United States. As I lived and studied abroad, I gained a deeper understanding of the different cultural norms that govern the lifestyle of France and other European countries. But along with gaining a better understanding about France, I also learned more about myself. Studying in France challenged me to move out of my comfort zone in both a learning and social manner in order to thrive so far from home. This change in my perspective about the world has taught me that challenging my customs and ideas by learning about others’ is how, I feel, we can create a more harmonious world in the future.
Learned Leadership through Scouting
Troy Spires, Nursing - Sophomore; USC Salkehatchie
Mentor: Dr. Sarah Miller, History; USC Salkehatchie
Prof. Shannon Belangia, English; USC Salkehatchie
Mrs. Terri Boone, Leadership Institute; USC Salkehatchie
Volunteering with the Pineland District Cub Scout Pack 686 in Colleton County, I have developed leadership abilities through interacting with the Cub Master and our boys. I have served as a Den Leader from 2010 to present with a diminished roll currently. Since the boys have various personalities and a need for constant stimulation, I had to quickly adapt and change how I interact with them. In my presentation, three of these scouts are highlighted, each one with a distinct personality and different temperament. I will describe their personalities and how having to manage them taught me to be adaptable and have patience. Other leadership traits were gained by observation and interaction with my leader and mentor, Connie Carlin, the Cub Master. Through her I learned that organization is must to be an effective leader. Being organized is needed to manage groups of all sizes. She also instilled ways to ease the burdens of leadership by delegation of duties to others. I observed her actions, body language and facial expresses to gain affirmatives from those being asked. Furthermore, she defined adaptation through using control and confidence to navigate through unforeseen obstacles that fall outside the plan. Lastly, I will briefly explain how the experience of planning, executing, and leading a Family Pack Camp Out reinforced the purpose of having plans, being organized, and staying flexible. It also made me understand the importance of giving clear and concise instruction to delegates.

USC Connect Showcase C

The Role of Nurses in the Community and the Quest For Positive Health Outcomes
Oyeyemi Adeniran, Nursing - Senior; USC Lancaster
As a nursing student, I developed an interest in taking care of clients at the community level. I chose community service as my pathway for graduating with a distinction in leadership with the intent of reaching out and giving back to the community, as well as, looking into ways of making healthy choices available to the homeless and low income earners; choices which may prevent illnesses or alleviate undesirable symptoms from existing disease processes. Despite an improvement in technology and treatment advances, disease conditions cannot be adequately managed, if risk factors are not addressed. In addition, addressing health outcomes at the preventative stage would reduce healthcare costs in the long run. I learned a lot from my Nursing 431 class, however, I learned more from the service-learning experience, taking knowledge learn beyond the classroom. My goal is to participate in an effort to make healthy food available to the homeless and low-income earners in Rock Hill, through Family Promise and Pilgrim’s Inn. As healthcare professionals we make a link between dietary choices and management of chronic diseases, which is said to account for 63% of all mortality annually (While, 2004). However, for some individuals/families, they really cannot make that choice. Availability of nutritious choices at no additional cost to these individuals enable them make the right choices. The analysis for this presentation was done through one-one contact by volunteering in the pantry, interviewing clients and staff, as well as, participating in point-in-time count event; a head count of the homeless in York County.

Graduating with a Distinction in Leadership in Professional and Civic Engagement in Athletic Training
Elizabeth Crips, Athletic Training - Senior
Mentor: Dr. Susan Yeargin, Physical Education and Athletic Training
During the past four years, my experiences in and outside of the classroom at the University of South Carolina has evolved and shaped me personally. I decided to engage in this project not only to graduate with a Distinction in Leadership in Professional and Civic Engagement, but also to reflect on and examine the things I have done as I turned them into accomplishments. I worked in different clinical settings within the athletic training program to integrate class topics into outside experiences. I was able to develop patient rehabilitation, incorporate injury recognition and prevention, and to educate patients about injuries. I also chose to participate in leadership roles as a mentor and teacher assistant to aide in helping undergraduate students to discuss concepts within and beyond the classroom. I believe that seeing and incorporating the use of topics and techniques learned within the classroom, solidified the importance of the items outside of the classroom. Through my experiences I learned the importance of continued education, integration of evidence based practice, organizational skills, preparedness and cultural differences. Through these skills and experiences I learned how valuable my experiences were, and how I could apply that knowledge as I graduate and become a certified athletic trainer.
**GLD Professional and Civic Engagement: My Experience with Supplemental Instruction**

**Matthew Csonka**, Biochemistry and Molecular Biology - Senior

Mentor: Ms. Rachel Brunson, Student Success Center
Mr. Steve Barth, Student Success Center

Supplemental Instruction (SI) is a learning enhancement program offered by the Student Success Center in order to help undergraduate students with historically difficult courses. SI Sessions provide students the opportunity to collaborate with their classmates and a peer tutor, the SI Leader, in order to improve their understanding of the course material. Over four semesters, I have been a SI Leader for three different courses in calculus and biology. During my first few semesters at USC, SI was very beneficial for me, and I knew personally how big of an impact it can have on students, especially underclassmen. During this time, I was also encouraged by friends and classmates to apply for this position after helping them with their coursework. Over the past four semesters, I have learned better and more efficient communication skills, professionalism, and responsibility. My experience as a SI Leader has been much more rewarding than I had originally thought it would be. Initially, I thought it would be great to help students who were struggling with their coursework, but I soon found myself being a mentor for them both inside and outside of the classroom. With graduation around the corner for me, I plan to take the experiences, skills, and friends that I have gained through SI with me to my future career.

**Lessons in Leadership**

**Lindsay Richardson**, Political Science - Senior
Mentor: Ms. Lisa Camp, USC Connect

Lessons in Leadership describes my learning from the professional and civic engagement portfolio for Graduation with Leadership Distinction. My portfolio is the summation of experiences, learning, and conclusions that matter in life. The experiences I have had both inside and outside the classroom prove that effective communication, soft negotiation and delegation to be essential to leadership. It reveals my insight to myself, perceptions on women in leadership and work with the Carolina Closet, a project that showcases my leadership legacy in the Carolina Community.

**The Three Keys to a Student-Centered Classroom**

**Kayla Engel**, English - Senior

Today’s educational system concentrates on a classroom structure that is contingent upon teachers enumerating facts that students are required to memorize, regurgitate for standardized tests, and then rarely use again. This is known as the banking theory of education as presented by Paulo Freire, and it is a style of education that ultimately has the potential to leave students questioning the purpose of education and becoming detached from their academic experience. Entering the educational sphere, it is my ambition to see a change in the disconnected approach that infiltrates classrooms and dissociates our students from their learning. Because of my passion for mentoring coupled with my desire to create a classroom environment conducive to student discovery and creativity, my time at the University of South Carolina has been spent participating in various opportunities that have taught me how to best create that environment. After critically and retrospectively exploring my collegiate journey and its applicability to my teaching profession, I have found three essential and easily utilized keys to creating a classroom environment that is not only propitious to students having a successful academic experience, but also to an enriched personal experience that results in beyond-the-classroom skills. These three keys to a student-centered classroom are the importance of recognizing the individual, the art of engagement, and setting efficacious expectations for students. In this presentation, I will chronicle how both my academic and extracurricular experiences have led to each key insight, and then postulate how these three keys can be applied to an English, secondary education classroom.

**IBCE: A Student’s Perspective On USC’s Intensive Experiential Learning Program**

**Emily Zhao**, International Business - Junior

Mentor: Dr. David Hudgens, International Business

International Business and Chinese Enterprise is an immersive, experiential learning program that entails two years of study abroad in Hong Kong - the entirety of sophomore and senior year. As a junior, I have completed my first leg there, and will soon embark on my second. I originally joined this program because I wanted to feel more in touch with my heritage, and because with China gaining importance in the global economy, I felt IBCE was a pragmatic choice in addition to being exciting. Time has revealed the real value of this program, however, and it stretches beyond simple pragmatism. IBCE has provided me with opportunities to grow in ways I never expected of myself. A self-proclaimed background character in high school, I was surprised to find myself representing USC at international case competitions, interning in a Fortune 100
company in Shanghai, and attending national leadership conferences. I improved my Chinese language fluency, fostered relationships with people from around the world, and learned first-hand what it means to live and work in Asia’s biggest, busiest cities. From traveling across Asia to finding family in my cohort, IBCE has shaped my college career. It was in IBCE that I discovered my passion for social justice and delved into development economics - so different from what I used to imagine for myself. That personal growth, skill expansion, developed worldliness, and experiential learning is what really makes IBCE a remarkable program for its students.
Into the Umbra: a photographic inquiry into the microscopic world of plankton
Julia Bennett, Marine Science - Senior
Mentors: Prof. Meg Griffiths, Art
Dr. Tammi Richardson, Biological Sciences
This series of images was created with the intent of exploring and communicating the importance of marine plankton. The work is composed of photographs, captured in-microscope, of both live and preserved samples, which were facilitated by the IMOS Plankton Lab in Brisbane, Australia. Viewers are invited to observe these samples within an abstract visual framework and consider the means by which, through both scientific and artistic processes, we are able to create the world we seek to observe. By deconstructing the context in which the images exist, framing them in a way that references outer space, it is my goal to initiate a conversation about the extent of our knowledge of oceanic processes in a time when human interactions with the marine environment are particularly fragile.

We Are Merely Players--An Offstage Exploration of Shakespearean Performance
Jamie Boller, Theatre - Junior
Mentors: Dr. Nina Levine, English Language and Literature
Prof. Robert Richmond, Theatre and Dance
If the art of Shakespearean performance can benefit those living under extreme social circumstances, how can it inform non-performing students at the University of South Carolina? This project involves two parts: attending an intensive Shakespearean acting conservatory at a renowned school of performance and then applying this experience to create an immersive workshop for undergraduate students at USC. By training at the British American Drama Academy and collaborating with Shakespearean experts at USC, I will be equipped to create a method for teaching performance to non-performers and explore the potential of applied theatre.

CMA EDU Helps Bridge the Gap Between Students and Music Industry Professionals
Kelly Ballance, Sport and Entertainment Management - Senior
CMA EDU is the Country Music Association's collegiate music business initiative whose primary focus is to educate students on all aspects of the music and entertainment industries. Often times industry veterans find that students enter the job market with a specific career in mind, yet they know little about what the position actually entails. CMA EDU is the way to bridge that gap and prepare students for life in the music business. After volunteering last summer at CMA Fest and approaching CMA with the idea of adding a chapter here at Carolina, I soon began organizing an Executive Team, developing a marketing/PR plan, working with our Student Life office, and reaching out to local venues and artists. Each semester, CMA EDU invites industry professionals including artists as guest speakers to share their insights into the field, discuss current industry trends and impart concrete advice on how to successfully pursue and excel in a music business career. In our first year on campus, we have already worked on projects and promotions for artists like Carrie Underwood and Sam Hunt and for companies like Big Machine Label Group. We have started forming relationships with venues like Tin Roof and Music Farm as well as radio stations like 97.5 WCOS in hopes of working with them for future events. My hope for the future of CMA EDU is that we create a greater interest on campus and also emphasize the need for this organization to industry professionals and all members of CMA.

Traditional Romanian Music in Classical Performance
Timothy Hall, Music Performance - Senior
As a student of the classical guitar entering my final year of undergraduate study, I decided to apply for the Research Fulbright grant as it would give me the opportunity to perform, compose, arrange, teach, and learn musical traditions from another part of the world. As a musician, it is important to gain a variety of experiences that utilize different musical skills, and to work with musicians in new and unknown environments. The Research Fulbright Scholar grant was brought to my attention by OFSP, and so I reflected on my interests and strengths, and sought to draw up a compelling and important course of study to fit Fulbright requirements. Given my interest in both classical and folk music traditions, and knowledge of Latin based languages, I designed a project to study and transcribe a particular strand of folk music in Romania called Doina, and arrange it for the classical guitar and other instrumental ensembles. The process of brainstorming, researching, reflecting, writing and rewriting, meeting with the Fulbright committee, and finally submitting my application was rewarding and an accomplishment for me. It was the first grant that I’ve applied for, and with what I’ve learned from this experience I intend on applying for many more.
Creating a documentary film

**Michael Tolbert,** Journalism, Mass Communications Concentration - Senior
Mentor: Prof. Denise McGill, Visual Communications

I received a Magellan Scholars grant to work with Denise McGill, Assistant Professor of Visual Communications, on her documentary film and multimedia site, The Gullah Project, a project about the land, water, and people of St. Helena Island, South Carolina. Over the last year, I have had the opportunity to work with Professor McGill hands on in the Gullah/Geechee community. Last November, we traveled to St. Helena Island to film the Heritage Day Festival, an important cultural event on the island. I was able to meet the people featured in the project plus get to experience their culture and traditions first hand. While filming on the island, I worked as a camera operator, I ran sound, and I made sure to get model releases signed. In addition to the grant work, I also contribute by working as the web and social media coordinator since May 2014 to the present. This includes reaching out to different organizations/blogs/ and other multimedia sites that are dedicated to promoting stories about the land, food, agriculture, and African American cultures. The final result will be a documentary film released in summer 2015.

Following the Crumbs Back From Music to Orality

**Aubrey Leaman,** Music Performance - Junior
Mentor: Dr. Leon Jackson, English Language and Literature

Language and music are both so much a part of our daily lives that it is virtually impossible to imagine life without them. But it would also be impossible for music as we know it to exist without language. Specifically, techniques associated with primary oral culture are pervasive throughout all Western music, offering insight into the efficacy—or lack thereof—of current musical practices. In an oral culture, there is no way to retain any information outside of memory. Therefore, thoughts and stories had a number of characteristics: repetition, redundancy, rhythm, formulas, balance, addition, and more, to ground the listener (and orator) in the thought progression or story. Music, a comparably aural phenomenon, uses these same techniques to present a coherent work that the brain can process in real time. Academics have already studied this concept without knowing it, or at least without directly acknowledging it, through specialized fields such as rhetoric and psychology. Yet oral culture techniques are the underlying, implicit ingredients under these and similar fields and effectively explain the difference between "popular" and not-as-popular music. A number of these techniques will be considered in many different kinds of music from the Romantic era on, in order to show that even though orality’s influence has long since faded from society as a whole, it is still ever-present in music.

The Columbia Infringement Arts Festival, encouraging art appreciation and student recognition in the community

**Emily Olyarchuk,** Public Relations - Senior
Mentor: Prof. Lisa Sisk, Journalism and Mass Communications

An Infringement Arts Festival is a grassroots arts movement that brings attention to social issues through artistic expression. This senior thesis project brings an Infringement Arts Festival to Columbia March 20-22, 2015 to help the city further progress in its community development, to give opportunities to all local artists, and to bring students into the discussion. The target audiences of USC students and community members were thoroughly researched to determine their interest and media consumption habits. The festival will take place in venues around the city, including Conundrum and Drip coffee. With the help of community members and students, performances ranging from hula-hoop dancing, spoken word poetry and musical performances are scheduled throughout the weekend. The festival is a weekend filled with free arts appreciation, performances and exhibits, and will remind students and community members that everyone is an “artist.” The result will be a successful and influential community arts festival. Success is defined as at least 200 people attending the collective events; at least 50% of the art exhibits and performances by students; and coverage from at least four student media outlets and at least two local news media outlets. Student film majors will create a video diary of the festival that can be used as promotional material. The success of the event will be evaluated by questionnaires distributed to attendees, artists and venues. The results and evaluation of the festival’s success will provide guidance and incentive for the community to host a Columbia Infringement Arts Festival in 2016.
Creating the Green Office Certification Program
Connor Bain, Computer Science - Senior
Max Ciarlone, Environmental Science - Freshman
Matt Kehr, Environmental Studies - Sophomore
Mentors: Ms. Hayley Efland, Office of Sustainability
Mr. Michael Koman, Office of Sustainability

Sustainable Carolina’s Green Office Certification Program is designed to help faculty and staff members reduce the environmental footprint of their workplace. This program recognizes departments who are making an effort to incorporate sustainable practices into their daily activities, including energy conservation, green consumption, waste diversion, alternative transportation, and recycling. By participating in our Green Office Program, an office takes an important step in helping to create an eco-friendly community at USC, as well as the University to save money and resources. We’ve spent the last year redesigning the Green Office Certification Program from the bottom up. The new, more user-friendly program was just launched this semester and is already drawing interest from offices all across campus. In order to apply, an office must meet five prerequisites and then score above a certain threshold on an office sustainability survey. As part of our redevelopment of the program, we created a resource manual that not only walks participating offices through the application process, but also provides info on how and why to make an office greener. Now run entirely by students, the program will continue for years to come, encouraging faculty and staff to do their part in making our University into a truly sustainable community. For more info, visit www.sc.edu/green/office.

Qualitative Study of Gaps in Juvenile Justice System Programming for Girls
Jessica Blosch, Criminology and Criminal Justice - Senior
Mentor: Dr. Tia Stevens, Criminology and Criminal Justice

Though the rate of juvenile incarcerations is dropping, more American females are finding themselves being jailed, placed in residential group homes, or boot camp programs due to status offenses. While in these facilities, treatments available to girls are not always adequate or available at all. To investigate what gaps in programming existed for girls in the juvenile Justice system, three graduate students from Michigan conducted 27 interviews with local girls who had been through it. From September, 2008 to May, 2010, multiple interviews were conducted to measure the life success rates of each girl who had passed through the system. The purpose of the study was to gather insight of what brought them there, the treatments they received, and what assistance the girls could have utilized but was not available. My year-long Magellan research project was to take all 27 interviews that my mentor had conducted; then study, analyze, and synthesize into percentages the qualitative results. Our results concluded that every girl was negatively influenced by friends or peers, 92% struggled with family problems, 85% suffered from mental health problems, substance abuse, past trauma and victimization, and found their way into the system through school truancy. Fortunately, only 3 out of 27 girls could be considered “unsuccessful” at the end of the interview period, yet many criticized how negatively they were treated by court staff.

Gamel Woolsey: A Southern Poet?
Janice Butler, English - Junior; USC Aiken
Mentor: Dr. Tom Mack, English; USC Aiken

This project examines the history of Aiken-born poet Gamel Woolsey, the characteristics of Southern poetry, the details of Woolsey’s poetic work, and the work of established Southern poets to answer whether Woolsey may be truly considered a Southern poet. The goal of this project is to substantiate Woolsey as such with quantitative evidence of Southerness in her poetry and place her on similar footing with poets such as Ransom and Tate.

Cultural and Environmental Diversity from a Global Perspective
Emma De Neef, Biological Sciences - Senior

My study abroad experiences have ranged from a summer outside of Cape Town, South Africa to a semester in the Andes of Ecuador to a Maymester on the beach in Mexico conducting research on endangered sea turtles. As an Environmental Sciences and Biology major, being able to visit the Amazon Rainforest and the Galápagos Islands, cage dive with Great Whites, go on a wildlife safari, and witness sea turtles nesting and hatching have all been invaluable experiences to me. The natural world around us has so much to offer, and my experiences helped me confirm my passion for conservation and research with a global focus. Not only was I able to experience such incredible diversity in environments and wildlife, but I was also exposed to amazing cultural and human diversity. Human-environmental interactions are a complex and many-sided issue, and being able to see the way other cultures interacted with their environment and their takes on conservation and sustainability has helped me shape my own outlook on environmental problems.

Fulbright English Teaching Assistantships and Cross-Cultural Exchange
Tyler Johnson, Religious Studies - Senior

The Fulbright Program provides funding for more than just graduate study abroad. One example of additional funding provided by the Fulbright Program is its English Teaching Assistantship (ETA) Program. Recipients of the Fulbright ETA award spend one academic year abroad as an assistant to a full-time English instructor. Working in a public school setting, ETA recipients have the opportunity to expose themselves to another culture while simultaneously developing teaching skills. In my presentation I will discuss the benefits of applying for a Fulbright ETA and my own experience applying to the program. I applied to the Fulbright English Teaching Assistantship Program in the Fall of 2014 with the hope of being able to teach English in Taiwan during the following school year. I am a Chinese studies minor, and I have strongly desired to spend time studying in China or Taiwan but lacked the funds to do so. Furthermore, I’m strongly considering pursuing a career in TESOL (Teaching English to Speakers of Other Languages). In addition to being an immense asset for college graduates looking to acquire teaching experience abroad, the Fulbright ETA program serves
as a powerful vehicle of social exchange. Applicants to the Fulbright ETA have the potential of helping strengthen cross-cultural understanding and appreciation, which I believe is the foundation of healthy international relations. This is the element of the Fulbright ETA program that excites me most, and I am particularly interested in helping propagate American Roots Music as a form of cultural exchange while in Taiwan.

**Peaceful-Easy Wandering: Ethics in the ‘Zhuangzi’**
*Tyler Johnson*, Religious Studies - Senior
Mentor: Dr. Daniel Stuart, Religious Studies

Few texts in China’s vast literary tradition are as highly celebrated as the ‘Zhuangz’i, the nucleus of which was first penned in the fourth century B.C. The text is the longest classic of Daoism, “the philosophy which expresses the side of Chinese civilization which is spontaneous, intuitive, private, [and] unconventional” (Graham 1981, 3). It is not until quite recently that a large number of Western philosophers have started to take seriously the ethical ideas found within the ‘Zhuangzi’. A current challenge facing scholars is the need to adequately address “the issue of how the ‘Zhuangzi’ is able to present a positive vision of how one should best live one’s life” that is consistent with the text’s own skeptical tendencies and the demands of societal life (Cook 2003, p 2). My project consisted in critically examining and assessing some of the ways in which philosophers and Sinologists over the past thirty years have sought to address this question and evaluate the worth of Zhuangzi’s ethical ideal. I argue that the text cannot provide us with a model of the good life that can realistically be adopted wholesale. Nevertheless, it can help enrich our lives by stimulating readers to critically reflect on how limited points of view, engrained ways of thinking, and our relation to nature affect our lives.

**Works Cited**


**Czeching That Box: The Five S’s of Study Abroad**
*Alex McGill*, International Studies - Senior
Mentor: Dr. Kirk Randazzo, Political Science

Czeching That Box is more than a reflection on a study abroad semester in the Czech Republic. This presentation is divided into five distinct and important categories - selecting a place, securing the funds, settling in, seeing the sights, and finally saying goodbye. The talk will focus on the importance and nuances of each topic and how spontaneity can pay off. Furthermore, I will talk about the process of working with USC’s study abroad office and what potential study abroad students can expect. Finally, there will be a brief discussion on life after study abroad.

**Spurred to Lead**
*Ann-Marie Nunziata*, Marketing - Junior
Mentor: Dr. Kirk Randazzo, Political Science

The Carolina Leadership Initiative Leadership Scholars have spent the past year developing a vision of ‘Carolina Leadership’ based on an array of leadership theories and models that capture the immense diversity of the University of South Carolina’s campus leaders. With so many opportunities to lead, the focus of this project has been to provide a common identity or framework that might guide a student’s leadership journey during their time spent at USC. As student leaders, we understand that defining ‘Carolina Leadership’ is a significant undertaking, but we hope that by creating a common identity among Carolina leaders, we can inspire more students to take advantage of all the leadership opportunities here at USC, and in the Columbia community.
Hidden Violence: An examination of intimate partner violence against women among London’s lower class: 1800-1899

Breton Huntley, Anthropology - Senior
Mentor: Dr. Carlina De la Cova, Anthropology

Domestic abuse, or intimate partner violence (IPV) is a social illness that affects individuals at every level of society and is discussed extensively both locally and globally. While IPV is often considered a modern day problem, it has been documented historically. However, few researchers have analyzed its physical manifestations on the skeleton in past populations. This study used skeletal data from two historic cemeteries in London, England (St. Brides lower and Cross Bones), modern sources, and modern clinical studies to interpret IPV trauma patterning. This research also examined the pervasiveness of IPV during the nineteenth century as social expectations tied to marriage and the laws that governed them changed. This research is significant in that it evaluates the frequency and fracture trauma associated with IPV in women living in England between 1800 and 1899, using a biocultural framework to focus on a time and place when married women of low income were especially marginalized and had few, if any, legal rights to change their situation.

The Benefits of Undergraduate Research Experience for Future Career Choices

Logan Judy, Interdisciplinary Studies - Senior
Mentor: Dr. Suzanne Adlof, Communication Sciences and Disorders

As the job market becomes increasingly competitive, it is ever more important to pursue higher levels of education, which requires large investments of time and money. Deciding how best to direct these resources is a continual source of stress for students as they approach graduation. In this presentation, I will describe my own undergraduate research experience and how it has informed my decisions about further studies and career options. Specifically, I will discuss how I reevaluated my career goals after discovering unexpected aspects of academic research and working alongside a mentor who is dedicated to their field.

Are We Adequately Prepared: Students’ Perspectives on Cultural and Linguistic Competency in Healthcare

Jamie Lawson, Nursing - Junior
Mentor: Dr. DeAnne Messias, Nursing

The rapidly increasing Hispanic population in South Carolina and the United States highlights the growing demand for culturally and linguistically competent healthcare professionals. The purpose of this research was to assess undergraduate students’ exposure to principles and practices of cultural and linguistic competency and their level of preparedness to care for limited English proficient (LEP) patients. Data were collected through 3 audio-taped focus group interviews with pre-licensure nursing and healthcare professional students (n=8) and an online survey of upper-division nursing students (n=63). Qualitative descriptive analysis of the transcribed focus group data resulted in the identification of three main themes: the role of communication in healthcare; heightened emotions as an added layer to the asymmetry of language barriers in healthcare; and role switching as resulting in increased empathy towards...
limited English proficient individuals. Analysis of the survey data indicated that 74% of surveyed students report very little or no language proficiency in Spanish and 80% report feelings of inadequate preparedness to work with LEP patients. Participants’ responses to questions about their exposure to and perceived preparedness to care for LEP patients indicated recurring themes of disconnection between students’ exposure and level of preparedness. An overwhelming majority reporting feeling ill prepared to care for LEP patients. These findings will be useful in identifying areas of improvement in nursing and pre-professional curricula and the development of specific teaching/learning strategies to better prepare students to care for LEP patients.

**The Impact of Outreach and Education of Oral Health On the Community**  
*Nadia Meshreky*, Exercise Science - Junior  
Mentor: Ms. Eileen Korpita, Pre-Professional Advising  
The purpose of this research is to assess the knowledge, behavior, and attitude changes of individuals towards oral health through education. MHASC is a statewide organization that aims to provide wellness to the mentally ill in a low socioeconomic status through care and awareness of health issues. This organization is seeking for help to incorporate oral health in their efforts to help guide clients through all aspects of a healthy lifestyle. It is hypothesized that with increased education and awareness, the clients’ knowledge, attitudes, and behaviors towards oral health will improve. The experimenters provided presentations, written handouts, and designed hands-on-activities to MHASC patients. The clients were also supplied with toothpaste, a toothbrush, floss, and mouthwash to eliminate possible monetary barriers. Surveys were supplied to assess the progress of the patients. The experiment is still in progress; therefore, the results and conclusions are not finalized.

**A Comparative Analysis of Popular North American and Hispanic Health Care Beliefs and Practices**  
*Haley Powell*, Exercise Science - Senior  
Mentors: Prof. Carla Swygert, Languages, Literatures, and Cultures  
Dr. Teresa Moore, Exercise Science  
Health care practices and beliefs often vary from location to location or from one culture to the next due to different experiences, values, and life-styles. This is also the case for health care beliefs and practices in many Hispanic populations. With recent increases in immigration from Hispanic countries, it is important to understand these differences to avoid health care disparities. This observational study was conducted with the hopes of better understanding Hispanic health care beliefs and practices in an attempt to bridge the cultural gap that exists when working with many Hispanic patients in the US. I have been fortunate enough to work at a clinic in rural Santo Domingo, Ecuador, and at a Hispanic clinic in Columbia, SC. Therefore, in this study, I will compare my experiences in those settings with the encounters I have had while working in traditional US physician practices, and I will add data collected in previously conducted studies. Through my studies I have come to the conclusion that, while the primary health care model in the US is the biomedical model, many Hispanic countries, often more rural with heavy indigenous and/or older generation populations, have health care beliefs centered around biomedicine and folk medicine, and rely on biomedical, religious, and spiritual medicines as cures. This assertion needs to be addressed if we want to provide Hispanics with comprehensive care in the US.
3D laser scan reconstruction of the masticatory anatomy of ancient carnivorans from South Africa

**Tyler Antonelli**, Finance - Senior  
**Katheryne Brown**, Biological Sciences - Senior  
**Ka’la Drayton**, Biological Sciences - Senior  
**Carissa Leischner**, Biological Sciences - Senior  
Mentor: Dr. Adam Hartstone-Rose, Cell Biology and Anatomy

Our group travelled to South Africa to collect data from a collection of carnivoran skulls in Langebaanweg, South Africa. We used two separate methods for collecting data: a traditional cast-and-mold method and a new method of taking 3D scans using a NextEngine 3D scanner of the specimens. The overarching goal of our trip was to collect data that would help us assess the diets of the extinct carnivores from this five-million-year-old site and to see if 3D scanning of specimens is an effective and efficient replacement for the cast-and-mold method. At the conclusion of our research in South Africa, we concluded that while 3D scanning still has a few setbacks, it is far simpler and more effective than casting and molding when it comes to analyzing data. The creation of digital files when using the scanner allow near perfect replicas of actual specimens to be electronically sent to colleagues anywhere in the world within minutes, and computer programs now exist that allow the scans to be precisely measured, saving researchers incredible amounts of time and work. The method of 3D scanning is a useful replacement for the cast-and-mold method and researchers in all fields of science will soon benefit from its quick and accurate ability to copy specimens. We are also in the process of using these data to evaluate the diets of the diverse carnivore guild that includes giant forms of bears, weasels and civets among the dozens of fascinating species from this important South African site.

Optimizing germinal transposition of mPing in Arabidopsis thaliana

**Courtney Burckhalter**, Biology - Senior; USC Aiken  
Mentor: Dr. C. Nathan Hancock, Biology/Geology; USC Aiken

Transposable elements (TE) are repetitive sequences that are able to move throughout the genome. Some types of TEs, including mPing from rice, are mobilized by a cut and paste mechanism catalyzed by transposase and ORF1 proteins. The overall goal of our research is to develop mPing into an efficient mutagen for gene discovery in plants. To be effective, mPing must produce heritable insertions that disrupt gene function. Previous studies have shown that mPing preferentially inserts near genes and can cause mutant phenotypes in plants. The objective of this project is to test novel mPing mutagenesis constructs to determine if they increase the germinal mPing transposition rate in plants. A chimeric ORF1 (ORF1S-C1) made by combining the Pong and Ping ORF1 and adding a strong nuclear import signal was shown to drastically increase transposition of mPing in yeast. Our hypothesis is that using the ORF1S-C1 protein will increase the transposition rate and the number of germinal transposition events in A. thaliana. Constructs with the RPSSA promoter driving either Pong ORF1 or ORF1S-C1 and the GmUb promoter driving Pong TPase were transformed into Arabidopsis using the floral dip method. mPing transposition in the T1 generation was monitored by the use of a GFP reporter construct. The ORF1S-C1 constructs produced a higher percentage of plants with sectors of GFP expression, indicating that this altered protein also has higher transposition in plants. The T2 generation of this population is being analyzed to determine the germinal transposition rate. When complete, this research should provide more information about how to optimize using mPing as a mutagenesis tool.

Assessment of Polyphenols as Alleviators of Amyloid-Induced Apoptosis in Neuroblastoma Cells

**Elizabeth Crummy**, Biomedical Engineering - Junior  
Mentor: Dr. Melissa Moss, Biomedical Engineering

Alzheimer’s disease (AD) is a neurodegenerative disorder characterized by behavioral changes, memory impairment, and impairment of bodily function such as walking and swallowing. AD, the most common type of dementia, consists of 60% to 80% of dementia cases with approximately 5.2 million afflicted with AD in the United States alone. Current Alzheimer’s disease (AD) research has largely focused on one of the primary hallmarks of AD – the self-assembly of amyloid-β (Aβ) monomers into soluble aggregates and later insoluble fibrils that deposit as plaques. Currently, smaller soluble aggregates are proposed to be the primary neurotoxic species. Polyphenols, micronutrients and secondary metabolites in plants that act as immune response agents, have been extensively studied as neuroprotective agents and possible therapeutics, due in part to their promotion of endogenous antioxidant properties and free-radical scavenging. Polyphenols have also been shown to inhibit Aβ fibril formation. In the current study, the capacity of polyphenol compounds to reduce Aβ-induced apoptosis is explored. SHSY5Y cells are treated with Aβ1-42 oligomers formed in the presence or absence of polyphenols, including lutenol, resveratrol, apigenin, and piceatannol. Terminal deoxynucleotidyl transferase dUTP nick end labeling (TUNEL) staining is employed to assess the level of apoptotic activity, which is further quantified by a specialized MATLAB code. Several compounds have demonstrated significant reduction in apoptotic activity, providing evidence indicating the potential role of certain polyphenols to serve as mediators of amyloid toxicity. This data supports research exploring the potential of these natural compounds as complimentary therapeutics or as lead compounds for drug discovery.

Precise repair of mPing excision sites is facilitated by target site duplication derived microhomology

**David Gilbert**, Biology - Junior; USC Aiken  
Mentor: Dr. C. Nathan Hancock, Biology/Geology; USC Aiken

DNA transposons are sequences that excise and re-insert into the genome, facilitated by transposase proteins. Some transposons, including miniature inverted transposable elements (MITEs), do not encode transposase proteins, but are mobilized in trans. In plants, these MITEs reach very high copy number and influence genome evolution. MITE insertion produces identical target site duplications (TSDs) flanking the element. Stowaway and Tourist MITE families
differ in their alteration of the genome following excision. Stowaway-like MITEs (Mariner elements) leave short sequences from the end of the element at the excision site, while Tourist-like MITEs (PIF/Pong/Harbinger elements) usually excise precisely. Our goal is to determine what differences in the transposition mechanisms of these two classes of elements lead to this difference in genome alteration. We tested this by altering the TSDs of the Stowaway-like MITE 14T32-T7, and the Tourist-like MITE mPing in two different yeast strains, one of which is unable to perform non-homologous end joining. From these experiments, we conclude that mPing excises precisely due to microhomology created as a result of staggered cleavage of the TSDs. In contrast, 14T32-T7 transposase cleaves within the terminal inverted repeat sequences, leaving no microhomology.

Transport of Amyloid-β Aggregates by P-glycoprotein in Alzheimer’s’ Disease

Elizabeth Moore, Biomedical Engineering - Junior
Mentor: Dr. Melissa Moss, Biomedical Engineering
Alzheimer’s disease is characterized by the accumulation of amyloid-β (Aβ) plaques, deposits of aggregated Aβ, within the brain that disrupt the neuronal cell network, communication, and survival. Efforts have been made to inhibit the deposition of the plaques, thus delaying the progression of the disease, though halting it. Alternatively, removal of the protein aggregates from the brain could be facilitated by P-glycoprotein (P-gp). P-gp is a transmembrane protein at the blood-brain barrier, which functions in an ATP-coupled manner to expel substances from the brain. Evidence indicates that P-gp blockage inhibits removal of Aβ from the brain, and P-gp up-regulation leads to decreased brain Aβ levels. This study aims to determine the optimal aggregation states of Aβ to be expelled by P-gp. Using an ATPase assay, binding of P-gp to various aggregation states of Aβ was evaluated. When incubating P-gp with different aggregate sizes of Aβ, results demonstrate that P-gp binds selectively to smaller aggregates, but not monomer. Future work will examine the transport of Aβ by P-gp in vesicles and human cells. Determining, quantifying, and verifying the relationship between Aβ and P-gp will guide future research to develop an effective method to reduce or remove the plaque buildup in the brain, which could identify P-gp as a key therapeutic target for Alzheimer’s disease.

The dose dependent effects of caffeine on cognitive performance and neuronal activation

Helen Morris, Biology - Senior; USC Aiken
Mentor: Dr. Michelle Vieyra, Biology/Geology; USC Aiken
People often assume that the more caffeine you drink, the more focused you can become, and students are drinking caffeinated beverages more than ever. Overconsumption of caffeine has many negative effects including bouts of nausea, gastrointestinal upset and cardiovascular issues. If there are no dose related cognitive benefits to caffeine consumption people should limit their intake and look to healthier alternatives, such as improved diet, exercise or sleep patterns. This study compared cognitive performance after consumption of 0mg, 100mg or 200mg caffeine. It also looked at the whether there would be a correlation between cognitive performance and neuronal activation at these different doses.

Antimicrobial and Biofilm Disrupting Coatings from Sustainable Materials

Stephen Singleton, Chemistry - Senior
Mentor: Dr. Chuanbing Tang, Chemistry and Biochemistry
Medical device-associated infections, largely resulting from biofilm-forming bacteria, are difficult to eradicate using conventional antibiotic therapy. Despite the presence of efficient surface sterilization techniques, there is a clear need for surfaces with inherent resistance to bacterial colonization. We have previously derived a quaternary ammonium (QA) containing compound from resin acid which has been shown broad-spectrum antibacterial activities with minimal cytotoxicity to human cells. Herein we report the antimicrobial and anti-biofilm properties of surface immobilized, resin acid derived, QA containing, compounds and polymers for potential medical device applications. Surface immobilization was performed on glass slides using the highly efficient copper-catalyzed azide-alkyne 1,3-dipolar cycloaddition ‘click’ reaction and surface-initiated atom transfer radical polymerization. The surfaces were characterized using static contact angle measurements, X-ray photoelectron spectroscopy, UV-vis spectroscopy, and fluorescence microscopy. Both surfaces (Figure 1) demonstrated potent antibacterial and anti-biofilm activities against S. aureus and E. coli observed by Live/Dead staining analysis using confocal laser scanning microscopy, colony forming assays, and standard crystal violet staining methods. Additionally, the surfaces demonstrated strong biocompatibility hemolysis assays and human dermal fibroblasts growth.

Targeted insertion of the transposable element, mPing

Ashley Strother, Biology - Senior; USC Aiken
Mentor: Dr. C. Nathan Hancock, Biology/Geology; USC Aiken
Transposable elements, including mPing from rice, are mobile pieces of DNA that move throughout the genome through a cut-and-paste mechanism. mPing, is mobilized by two proteins, ORF1 and Transposase, encoded by the autonomous transposons, Ping and Pong. This element preferentially inserts in gene-rich regions and has high transposition activity, making it a great tool for disrupting genes to determine gene function. Our overall goal is to design a mechanism that would allow mPing insertion to be directed to a specific location within an organism's genome. If mPing insertion can be targeted to specific sequences, specialized mutagenesis applications, including disruption of gene
function and alteration of promoters, could be performed. The resulting mutant phenotypes could then be compared to control plants, allowing researchers a better understanding of the targeted gene’s function. Our strategy is to fuse the Transposase protein with the Cas9 D10A protein from the CRISPER/Cas9 system. Cas9 D10A is a partially disabled version of the Cas9 protein, which has a targeted endonuclease activity. The Cas9 D10A protein is guided by a gRNA that can be synthesized to correspond to any target site within the genome. To determine if targeted insertion of mPing is possible, we fused the Cas9 D10A protein to the N-terminus of the Transposase protein. The targeted sequence was the CAN1 gene that when mutated will allow yeast to grow on plates containing the toxin canavanine. We tested if expressing the Cas9 D10A Transposase fusion protein along with the ORF1 protein in the presence of mPing and the gRNA would impact the transposition rate and location of mPing insertions.

Detecting climate trends in oceanographic time series in a noisy world

**Julia Hogan**, Marine Science - Sophomore

**Mentor:** Dr. Ryan Rykaczewski, Biological Sciences

Detection of long-term trends in oscillatory time series is critical to the study of environmental responses to climate change. Trends in ocean wind stress have consequences for fisheries productivity and the ocean-atmospheric exchange of carbon dioxide. Here, we analyzed time series of wind stress in the four main upwelling regions of the world’s ocean. Long-term trends in wind stress are particularly difficult to identify due to the short duration of observed time series relative to anomalies associated with interannual to decadal modes of variability. We considered the magnitude of observed linear trends, the standard deviation, and the autocorrelation in the time series of wind stress to quantify the duration of observations necessary to identify trends in these data. In addition to observationally based wind-stress records from 1948 to 2005, we analyzed wind data generated by 21 different atmosphere-ocean general circulation models that simulated global conditions during the 1860 to 2100 period. Given the levels of variability and autocorrelation in the time series, our preliminary data indicate that an average of 81 years of data are necessary before clear changes in winds will be evident. This analysis suggests that it is unlikely that observed trends in these time series are distinguishable from trends associated with modes of interannual and decadal variability. However, the rates of change in wind stress are expected to accelerate as climate change becomes more pronounced. We expect that, when analyzing models from 2042-2100, it will take less time to detect a trend caused by climate change.
A Comprehensive Survey and Comparison of Breeding Habitats for the Pine Barrens Treefrog (Hyla andersonii) at Carolina Sandhills National Wildlife Refuge

**Gregory Joye**, Civil Engineering - Sophomore
Mentor: Dr. Eran Kilpatrick, Biology; USC Salkehatchie

Hyla andersonii (Pine Barrens Treefrog), a state-listed species with significant conservation status, was first surveyed at Carolina Sandhills National Wildlife Refuge from 1975 to 1982. A span of thirty years passed before the next comprehensive survey, which detected fewer H. andersonii in actively managed habitats compared to habitats within a gas line right-of-way. Monitoring continued in 2014 to further explore H. andersonii occurrence at right-of-way sites and to document the associated anuran community. From May 30 - August 15, 2014 two non gas line right-of-way sites, two non right-of-way sites, and two sites where H. andersonii occurred historically were surveyed using Song Meter digital recorders. H. andersonii was detected 347 times with the majority of detections (69%) occurring at right-of-way sites and 27% of detections occurring at non right-of-way sites. Acris gryllus (Southern Cricket Frog), Hyla femoralis (Pinewoods Treefrog), Lithobates catesbeianus (Bullfrog), Lithobates clamitans (Green Frog), and Lithobates virgatipes (Carpenter Frog) were detected most often with H. andersonii. The trend for H. andersonii to be detected more frequently, and produce more active choruses in right-of-way sites could be attributed to vegetation structure, associated anuran assemblage, and watershed properties. The gas line right-of-ways, which are not actively managed for H. andersonii, are serving as productive surrogate habitats and source populations for this species on the refuge. Habitat measurements will take place in 2015 and an analysis of these variables, in combination with H. andersonii call data, will help guide future management decisions for this important species in South Carolina.

**Strong Electrostatic Adsorption of Platinum on Specialty Carbons**

**Susan McQuiston**, Chemical Engineering - Sophomore
Mentor: Dr. John Regalbuto, Chemical Engineering

Strong Electrostatic Adsorption (SEA) is a simple and rational approach for creating highly dispersed metal catalysts on a wide variety of supports. Carbon supported metal catalysts find a great deal of applications in liquid phase hydrogenation reactions as well as fine chemical synthesis. In this study, SEA has been extended to synthesize metal nano-particles on a number of specialty carbons. The carbons used in the study comprise a set of multi-walled carbon nanotubes with varying surface functional groups and orientation of graphene sheets. The goal is to analyze the effects of the surface variations on the adsorption of metal. The study consisted of determining the BET surface area and point of zero charge followed by pH shift and uptake experiments on the various carbons. After determining the point of zero charge, the appropriate precursor, (PTA, Platinum Tetraammine, or CPA, Chloroplatinic acid) was chosen to perform the uptake experiment in order to determine the optimal pH of adsorption. The uptake for the entire range of carbons is summarized below. Carbon Type - PZC - Uptake (Micromoles/m2) MWCNT I - 5.6 - 0.1 MWCNT I Oxid - 2.7 - 0.8 Nano fibers (HerringBone) - 3.8 - 0.1 MWCNT II - 9.3 - 0.4 MWCNT II-OH - 5.9 - 0.2 MWCNT II-COOH - 3.1 - 0.9

The lower than usual or no uptake (~0.1 micromoles/m2) may be attributed to the presence of surface impurities that render an artificial PZC to the support. The carbons were subjected to acid, basic or neutral wash to remove surface impurities.

**Investigating decadal changes in Sea Surface Salinity as an indicator of Global Water Cycle intensification**

**Bryce Melzer**, Marine Science - Junior
Mentor: Dr. Subramanyam Bulusu, Earth and Ocean Sciences

Evidence suggests that the Global Water Cycle (GWC) has accelerated over the past six decades as a response to anthropogenic global warming. Any further acceleration could potentially lead to increased severity of floods and droughts in certain regions of the globe. The GWC is dominated by Evaporation and Precipitation (E-P) over the oceans, of which sea surface salinity is a strong indicator. We analyzed satellite data to uncover recent trends in salinity as a diagnostic of the rate of GWC acceleration. Using global gridded observations from the NASA-Aquarius mission, sea surface salinity was coupled with reanalysis data to highlight the recent salinity increase in evaporative-dominated gyre systems as compared to the salinity trend observed over the extended period of 1950-2014. Results indicated an average salinity increase of 0.2 PSU in the target regions from 1950-2014, compared to 0.17 increase globally from 60°N to 60°S. This points to an associated salinity intensification of 1.6±6%, of which 1.4±2% occurred within the recent span of 2011-2014. Furthermore, all three (Pacific, Atlantic, Indian) gyres in the southern hemisphere showed significantly greater intensification in salinity than their counterparts at equivalent latitude in the northern hemisphere (P=0.0001). This addition of satellite derived salinity patterns at high spatial resolution will aid in developing models to directly relate salinity to freshwater fluxes, and also serves to extend the salinity record by effectively connecting satellite data to existing models and observations with sound agreement.

**Intelligent Wireless Sensor Network Monitoring System**

**Joel Miller**, Computer Information Systems - Senior; USC Upstate
Mentor: Dr. Chunyu Ai, Mathematics & Computer Science; USC Upstate

As a Computer Information Systems major, I endeavor to incorporate the seemingly endless sources of technology and data in a way that is meaningful and purposeful. It is extremely important for technology to not only be intelligent, but also provide a service to humanity in a convenient manner. The focus of the project is an intelligent sensor network application that collects real-time data in order to alert people of dangerous situations inside a building. To deliver this information conveniently, a mobile application was chosen as many people already carry smartphones. The intent was not only to alert people, but also to deliver navigational guidance in a way that would keep users safe from identified danger zones detected by the sensor network. To assist in the recovery of trapped individuals, information would be given to incident responders with locations of individuals who may require special assistance. A separate application receives information on the locations of individuals from data supplied by the smartphones. I have come across several challenges during the course of my project, but feel that they have provided me with opportunities to further develop...
photos, videos, and text. Dr. Pournelle and her colleagues at the University of Basra visited this area repeatedly over the past decade, to assess the role of marshlands in sustaining ancient civilizations, and their future capacity to support urban life there, in the first comprehensive archaeological study of the southeastern Iraqi alluvium—home to the world’s oldest-known, longest-lived, cities. We created six story maps integrating elements of ArcGIS, Google Earth, Google Maps, Arc Story Maps, Zotero, Flickr, and Dropbox technologies with digital photo, video, and data archives, allowing exploration, at multiple scales, of the relationships among scientific discoveries. The first provides an overview of the places visited. The second shows the evolution of rivers and associated human settlements over the past six thousand years. The third details the evolution of the marshland systems fed by those rivers. The fourth and fifth show points where environmental and archaeological data were collected, and explain how they support those reconstructions. The last shows how the marshland environment affected the form and function of cities there, and how civilization has changed the area over time.

my logical skills. This project has allowed me to incorporate many concepts and ideas learned at USC Upstate, and feel it has advanced my understanding of the many possible applications for information systems in society.

**Synthetic Lectin Arrays: Toward Detecting and Staging Ovarian Cancer**

_Katie Miller_, Biochemistry and Molecular Biology - Senior

Mentor: Dr. John Lavigne, Chemistry and Biochemistry

Ovarian cancer, the fifth deadliest cancer overall in the United States, has a great need for a simple non-invasive screening technique to detect it in its earliest and most treatable stages [1-2]. Previous work by the Lavigne group used synthetic lectins (SLs), peptides functionalized with boronic acids that bind to sugars, to create a cross-reactive sensor array to discriminate colon-derived cell lines based on metastatic potential. The combination of fluorescent binding intensities from multiple SLs forms a “fingerprint” pattern differentiating cancerous metastatic, cancerous non-metastatic and normal healthy cell lines among seven colon cancer cell lines with 97% accuracy [3]. This method has been expanded with the discovery of new synthetic lectins bringing the total to nine SLs in a typical array. Specifically this project uses SLs to discriminate two human ovarian cell lines and a normal human prostate cell line control using both membrane-bound glycoproteins and glycoproteins secreted by the cells into media: PA-1 (metastatic ovarian cancer), OVCAR-4 (non-metastatic ovarian) and RWPE-1 (healthy prostate cells). The human prostate cell line was used as a control due to availability and because previous results [4] suggest that prostate and ovarian cancers display similar glycosylation patterns. Initial results are quite promising with a classification accuracy of 100%. Works Cited


**Sealands Archaeology and Environment Program; Making Science Results Publicly Accessible**

_Nick Smillie_, Environmental Science - Sophomore

_Matt Kehr_, Environmental Studies - Sophomore

_Melaina Dyck_, Environmental Science - Sophomore

Mentor: Dr. Jennifer Pournelle, Environment and Sustainability

Individual scientists often find it difficult to present their research to a broader public. From the public viewpoint, interpreting scientific literature can be difficult. New information technologies can bridge this communications gap. We use ArcGIS Story Maps to present science findings of the Sealands Archaeology and Environment research program in a visually appealing manner that combines interactive maps, remotely sensed imagery, geological and archaeological data,
**USC Connect Showcase A**

**Breaking into Wall Street**

*James Bonds*, Finance - Senior

During the summer of 2013, I participated in an internship with J.P. Morgan in New York City. As a member of the Finance Analyst Development Program, I worked with a team of experienced professionals to complete tasks to help monitor and strengthen the company’s financial position. My role during the summer program was in the Corporate Financial Reporting group; I worked on the Treasury International Capital team as the preparer of the Monthly TIC B, TIC S, SLT, and Quarterly reports. The purpose of the Monthly/Quarterly reports is to provide timely information on movements of capital between the U.S. and Foreign Countries primarily for construction of balance of payments, formulation of international financial/monetary policy, and to comply with regulatory standards. This experience gave me the opportunity to apply the concepts that I have studied in the business school. The internship was also an opportunity for me to witness the regulatory changes made by the Dodd-Frank Wall Street Reform and Consumer Protection Act, which, in order to make a greater transparency in providing information to the public regarding the company’s financial transactions. The core competencies that the program wants Finance analysts to display are analytics, technical skills, strategic thinking, interpersonal skills, communication skills, personal excellence, professional development, and leadership. I strongly believe that I displayed each and every one of these skills during my time. The coursework that I have completed through my years at the University of South Carolina was extremely helpful in bridging the gap between possessing the knowledge and applying it empirically.

**Rise Above: Pursuing Excellence in All We Do**

*Janelle Buniel*, Broadcast Journalism - Sophomore; USC Sumter

For most college students, their main goal is to obtain a diploma to help increase their chances of finding a job – whether it be in the same field as their major or not; college is seen as just a means to an end. I have chosen to not simply coast through college, but instead, take advantage of these first two years of college, attain my AA degree, and graduate with leadership distinction. Through this process, I have learned the usefulness of knowing your and others’ personality types to improve your interactions with people, the value of being confident and finding the balance between egotistical and fearful mindsets, and the importance of resisting the tendency to be complacent. These are just a few of the many lessons that I will take with me as I continue to further my education and begin my career. My goal is to encourage my fellow college students to rise above the current state of apathy, take charge of their futures, and pursue excellence in all that they do.

**When Plans Do Not Go Accordingly but Turn Out for the Best**

*Mary Ellen Dudash*, Public Relations - Senior

Mentor: Ms. Mikie Hayes, Medical University of South Carolina

During the summer of 2014, I interned with the Public Relations department at the Medical University of South Carolina. They represent the medical center, and they work to convey how the staff of the university is working to change and progress health care, to raise awareness of the university’s services, and they are always searching for the most effective ways of communication to the surrounding communities. I was a feature writer for the interdepartmental newspaper, The Catalyst. I did this internship because I was interested in doing public relations for a hospital. I learned that you must be organized and detailed; you must be knowledgeable about what MUSC does; you must be willing to do extensive background research on people that you are interviewing, and that effective communication is key to being successful in the Public Relations world. I helped with a story about Child Life Specialists and how they helped paint a mural in the PICU. This story struck me because I am passionate about working with children, and this career sounded like something I would love to do. They are advocates between the patient and family and offer developmental support to the child. Had I not helped take pictures for this story, I would have never found out what a Child Life Specialist was. I would be still searching for what it is that I am meant to do, career-wise. This means that I have found what I want to do with the rest of my life. I am so excited that I have found a career that I can put my passion and efforts into. I want others to learn that sometimes their initial plan does not work out, but something will always come out of it that is impactful. My future plans are to take more classes to be a certified Child Life Specialist and then become one, hopefully at the Medical University of South Carolina’s Children’s Hospital.

**Be The Change**

*Jalissa Fulton*, Theatre - Senior

Being a theatre major with an African-American studies minor, I want to make my college experience a blending of these two areas, worlds. As an actress and founder of an organization purposed for change, I have challenged myself to implement change in my present so I and others can have a better future. Many young minority students do not know about the accomplishments of many of their people. This lack of knowledge and examples can make these students, as with anyone, feel as though they cannot accomplish certain tasks or things in their lives. My experiences as a resident mentor, a campus and community volunteer, and the founder and president of the student organization Black Box, gave me the resolve to educate myself and others about all of our greatness. Using my experiences and education as a compass, I developed the ‘Creating Positive Change for You and Your Community’ presentation. It is geared toward 15 to 21-year-olds, and it provides them tools on how to effectively become an impetus for change and self-improvement. It provides insights on the accomplishments and inventions of African Americans that are rarely taught.
I Just Can’t Wait To Be...a Leader?
Alex McGill, International Studies - Senior
Being a leader is so much more than just telling people what to do or how to do it. It is about being a great role model, seeing your position as a privilege not a right, and never asking what you yourself would be unwilling to do. These insights were ideas that I learned, not ones I was born with. Leaders are made; sometimes it takes years and sometimes moments. This belief, that leaders are made, is at the heart of an even greater idea - a amazing leader can come from anywhere. This presentation will discuss the path I took from wide eyed freshman to someone who wanted to make a change. I will talk about the opportunities presented to me at the University of South and opportunities I made happen. Above all this will be a discussion of possibilities.

What the Economist Won’t Tell You
Benjamin Peachey, Economics - Senior
This past summer and school year I worked for the Central South Carolina Alliance, a regional economic development organization in Columbia. The goal of the Central SC Alliance is to attract companies into the central South Carolina region to promote investment, create jobs, and broaden the local tax base. As a University of South Carolina senior majoring in Economics, this internship helped me bridge the gap from theory learned in my major course work to the practical understanding I gained from my experience. My work projects included updating and maintaining our website, researching individual property statistics, and assisting in the planning of a week-long, six-country marketing mission to Europe. My time spent at Central SC showed me first hand how hard work can tangibly benefit local communities.

Up, Up, and Away: The Purpose of a Higher Education
Elizabeth Rogers, English - Sophomore; USC Sumter
As a university student in multiple leadership positions, I have noticed more and more students becoming stagnant in their education, and not just skipping out on an occasional class or neglecting to study until the night before a major exam. So many have developed the mentality of “D’s get degrees”. When did this become our goal, to just pass? To just barely get by? Why can we not aim higher, to shoot for the stars we used to dream of as children? Through my experiences in service, peer mentor roles, and various positions on campus, I have learned that while what we learn as students in the classroom is vital to full achievement, we cannot stop here. Pursuing Graduation with Leadership Distinction has challenged me to develop myself as a total person and has added to my university experience. Through numerous involvements, I can say with confidence that I am accomplishing above and beyond the standard, and I will graduate with a new confidence in my abilities and hopefully, having helped others achieve the same.

Path to Graduation with a Leadership Distinction
Paradise Taylor, Statistics - Senior
Mentor: Ms. Hayley Efland, Office of Sustainability
Following the professional and civic engagement route, I am graduating with leadership distinction. With a Bachelors of Science in Statistics, I see before me the potential to reap scholarly satisfaction in many fields. As a result of participation in professional and team settings, my take on life has been drastically affected. From studying as an exchange student to being constantly active in the sustainable community, my eyes have been opened to countless opportunities. Environmentalism has found a place deep in my virtues while a quantitative mindset has been deeply embedded hand in hand with complementary attributes.
**Discovering My Voice: Becoming a Leader in My Community through Service**

*Daniel Binette, Biological Sciences - Senior*

In the following presentation, I will discuss my Graduation with Leadership Distinction pathway in community service, demonstrating the invaluable service-learning experiences that were integral to finding the leader in me. Volunteering in community service programs and events has been something I have always embraced, even before I attended the University of South Carolina. However, I never had the opportunity to participate in service-learning, student engagement opportunities both within and beyond my classroom participation until college. Through my service-learning experiences, I have gained a wealth of knowledge of concepts and theories discussed within class lectures and then was able to apply this knowledge to better help me in my involvement in community service outside the classroom. More importantly, service-learning had provided me the tools to reflect on my academic career to better help me define who I am and how I wanted to contribute to my community. In addition, I learned that my intrinsic passion to be engaged in the community was a form of leadership in itself; through my experiences of aiding in summer educational and job-search programs at Fast Forward, to mentoring students at Birchwood High school in the Department of Juvenile Justice, to cleaning debris and repairing homes within the Tuscaloosa, AL community after the 2011 tornado, I was able to inspire and empower others to learn how they can lead and contribute in their own communities. I look forward to using what I have learned from my service-learning experiences after my time as an undergrad, as I plan to pursue a career working with non-profit, governmental or other organizations that are actively engaged and committed to directly addressing community needs.

**Lessons Learned: Three Mundane, Yet Influential Ideals Structured**

*Norvel Brown, Psychology - Senior*

Any environment or setting has the power to mold the minds of its inhabitants. And as I reflect on the shelter of my collegiate career and my brushes with the “real world,” I have realized how the solid structures of academia have unintentionally conditioned and periled students to hide in the proverbial “box.” We end up fixated in certain thought pathways, and sometimes, we do not even notice. Through my different service projects, I drew three conclusions that the effects of today’s competitive atmosphere surrounding academics would have us students forget. One, sometimes it is not necessarily the solution that is wrong, sometimes it’s the problem or question that is faulty. Two, there are always multiple and viable ways to solve a problem. And third, you do not need a job description, a fancy title, or an organization backing you up to provide meaningful service for others. In fact, informal service like picking up trash as you are walking to class can be just as meaningful as going to an Adopt-A-Highway event. The aggregation of these three pedestrian lessons have helped me to become a person beyond my curriculum vitae.

**Learning about Crises Management through Practical Application and Experience**

*Kaitlin Daley, Public Relations - Senior*

During my second semester senior year, I interned in the Marketing and Communications department of Palmetto Health. This department is responsible for all of the marketing and communications that go out to media, patients, physicians, etc. about Palmetto Health Baptist, Palmetto Health Richland and Palmetto Health Parkridge. I worked under Tammie Epps, the media relations and crisis communications director. I primarily wrote press releases, social media posts, crisis communications plans and helped with event planning. I applied for this internship because I discovered when I took the crises communications course at USC, I had found my passion and my future career goal was to work in crisis communications/crisis management. I wanted to learn and grow in an environment that would give me experience but also a realistic perspective on crisis management of an organization. I have garnered and cultivated skills in crisis communications and crisis management and learned best practices for handling and communicating during a crisis. Since crises have a dominant presence in today's society, whether it be political crises, social crises, entertainment crises, or even sports crises, the skills that I am learning are applicable and necessary in any of these situations. Participating in this internship reaffirmed my passion for crisis communications and management and my future career goal to own and manage my own crisis communications and management firm.

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**Leadership: Cumulative Perseverance**

*Sarah Borum, Marketing - Senior*

**Mentors:** Prof. Mallory Reeder, Midlands Technical College  Prof. Pat Hanly, Management

Running is cumulative. As each mile passes you add strength and determination to your run and ultimately to yourself. Even if you set out to run four miles and you end up only running two, you still ran two miles. No one can take those two miles from you. The same can be said for leadership. No one can devalue or take away the experiences you had as a leader. Each experience is a “mile” you have earned and learned from. All too often runners and leaders alike forget to celebrate the mini milestones because they become so focused on the larger picture. The greatest frustration with running is that you cannot see the immediate effects. Often times the same occurs with leadership. As a leader you must come to terms with the fact that it might take many long hours and many months to see the effects of your efforts. Both running and leadership require a great deal of perseverance. The cumulative experiences, or the cumulative miles, make each leader individually strong. This is because no experience or mile is the same. A particular hill might be harder for one verses another but each person still conquered the hill. Running teaches you to appreciate others who endure similar adversities or even vastly different adversities than you. While everyone might be competing for the fastest times, runners understand the immense effort it takes to complete a race. The same can be said for leaders. Leaders support the cumulative perseverance of like-minded individuals.
Importance of Communication and Leaving a Legacy  
*Katherine Oldham*, Public Relations - Senior  
*Mentor: Ms. Tricia Kennedy, University 101*  
Throughout my time at University of South Carolina, I've served on the Board of Directors for Dance Marathon as the Recruitment Director. I've gotten involved with mentoring first-year students by being a U101 Peer Leader. Outside of school, I've worked as a counselor and staff at YMCA Camp Cheerio. I chose to be involved in USC Dance Marathon because I have a passion for working with children. As a camp counselor at Camp Cheerio, I have always been in awe of children's fresh perspective on life. I am so impressed by these children, but almost more so by the miracle children of Palmetto Health Children's Hospital. I chose to become a U101 Peer Leader because of my time with the Capstone Scholars program. One of the tenets of Capstone is “Leave a Legacy”. I was determined to make an impact on the University that has given so much to me, and ended up falling in love with higher education. I’ve learned a lot about working in a team, communication, and preparation through my experiences at USC. Being a part of the Board of Directors for Dance Marathon has taught me how to work through decision making, and motivating and leading different committees toward a goal. Through my time as a head counselor at Camp Cheerio, I worked on by ability to give effective feedback, and also manage problem solving. Through University 101, I learned how to prepare meaningful lesson plans, and ease first-year students into the college transition. I am thrilled to take everything I’ve learned as I begin my full-time position as Counselor in Training Director at Camp Cheerio.

Graduation with Leadership Distinction: How Greek Life Taught Me to Lead  
*McKenzie Osborne*, International Business - Senior  
During the fall of my freshman year at USC, I became a member of Gamma Phi Beta sorority. Prior to joining, I had no idea how this choice would help me grow as a leader and an individual over the next four years. In addition to serving on the executive board of my own chapter, I have also had the opportunity to work with the Office of Fraternity and Sorority Life as a member of Greek Programming Board and Sorority Council’s Recruitment Staff. All of these experiences helped me become a better leader and develop organizational, communication, and crisis-management skills, each of which proved useful during my internship at Credit Suisse during the summer of 2014. My presentation will focus on the insights I gained from each of these experiences and how they have shaped me into the person I am now.

Launching and Building a Brand  
*Jourdan Simpson*, Public Relations - Senior  
*Alyssa Shillingford*, Public Relations - Junior  
Social media is a must for any organization or corporation in today's business world. Failing to have a strong social media presence limits your ability to communicate with customers, build brand loyalty and spread your message. As University Ambassadors and public relations majors, we sought to launch the following social media platforms for the University of South Carolina Visitor Center: Twitter, Instagram and Facebook, at the beginning of January 2015. We had to determine our objectives and think about our audience in order to develop an effective strategy. Upon implementing our campaign, we had to find a way to measure our success by checking our analytics. We constantly adapted to the changing medium of social media. We were able to apply what we learned in the classroom through our public relations classes to this project and have learned skills and tactics that will translate well into our future careers. Although our brand was specific to prospective students and their families, we found strategies that any business or organization could implement to build their following and engage their customer base. Through this experience, we have learned how to increase an organization’s social media presence and we are eager to share how social media can assist in making a mission known.

Seeing the Bigger Picture: A Journey of Discovery Through a Small Lens  
*Shelby Sipperly*, Social Work - Senior  
During the summer of 2014, I studied abroad in La Universidad del Pais Vasco in San Sebastian, Spain. This experience was an incredible opportunity for me to enhance my Spanish language skills and to experience the full-immersion of a new culture, as someone with a Spanish minor and who wants to work with Spanish-speaking populations in the future. During my time, I learned over 100% more Spanish than I had already known, and completed nine hours of coursework in classes such as Spanish composition and Basque culture. Additionally, I lived with a Spanish-speaking host family who taught me about both Spanish and Basque culture and language. I spent my time studying in a foreign country not only to become fluent in another language, but also to increase my skills and knowledge in the form of cultural competency that I know I will be using in my career, and to subject myself to new experiences in order to be able to better understand both myself and future clients. Overall, I learned plenty of useful Spanish, but I also learned other invaluable skills: adaptability, how to interact successfully with a population I was less than comfortable with, and how to engage myself in practice outside my comfort zone. Additionally, I was able to develop a solid and lasting relationship with my host family, people who spoke literally zero words of my native language, and who I was able to get to know and come to love. These skills and experiences are all significant for me because they are ones I have no doubt I will be using in my future as a social worker in different settings. I also believe that these abilities will help me work better with other foreign and diverse populations, Spanish or otherwise. Being back in the United States has only enhanced my appreciation of the Spanish language and culture, enriched my enthusiasm for the social work profession, and augmented my drive to meet and help people from more diverse populations. My goal, as a lover of people, travel, and experiences, is to share these skills with diverse populations both in and out of the United States in order to aid people of diverse cultures who may be oppressed. My experience abroad, though short-lived, sparked a passion in me that has been building since then. It is a passion of being able to understand more of the world around us that I intend to share with my peers and colleagues, in order to be able to provide as much assistance as possible in working towards more social justice in it.
Anonymous Faith: Shakespeare’s Religious Ambiguity as seen in The Winter’s Tale, Hamlet, and Primary Documents
Katherine Afshar, English - Senior
Mentor: Dr. Esther Richey, English Language and Literature
William Shakespeare stands as the greatest playwright in literary history, yet one of his dominant characteristics remains a mystery to this day. Despite ages of unwavering critical attention to his life and works, scholars have yet to confirm Shakespeare’s religion. An author’s religious code can heavily dictate their works, especially if they are immersed in a culture as religiously driven as that of England at the turn of the seventeenth century. However, newly installed religious tolerance of the Elizabethan Age shrouded Shakespeare in privacy. His plays exhibit various denominations through a theatrical scope, making the discovery of the author’s belief a labyrinthine mission. Nevertheless, the frequency and influence of religious themes in Shakespeare’s works begs the question of his own belief in the hopes of discovering new meaning in the text. For my senior thesis, I will attempt to support the theory that Shakespeare was in fact secular by examining historical contexts and the juxtaposition of religions in Hamlet and The Winter’s Tale. Scholars predominantly theorize that Shakespeare identified as Catholic, but I intend to highlight contrary evidence found in primary documents pertaining to the playwright and his family, critical reviews of religion in his life and works, and my own analysis of the plays themselves. By extracting various hypotheses and evidence from distinct sources I hope to create a unique angle from which to perceive Shakespeare’s secular beliefs and consequently reform meaning in plays such as The Winter’s Tale and Hamlet. I predict that my findings will expose Shakespeare’s underlying belief that truth cannot be blind but instead should be based on absolute knowledge and personal intuition, which diminishes the need for institutional religion.

An Unrecorded Legacy: The History of Preston Residential College and University Expansion in the New South
Lois Carlisle, Art History - Junior
Mentor: Dr. Bobby Donaldson, History
Last year, Preston College celebrated its 75th anniversary by opening its doors to alumni, all of whom told a different story. For some, Preston was the “Waldorf-Astoria” the south, for others it was a roach motel, a safe haven during the Vietnam protests, the athletes’ dorm, a naval barracks. So my question became, how did Preston College serve as a pivot point for university history since 1940? I began by combing through newspaper archives which revealed a dispute between Preston’s architects and a secondary firm. Now, I am reading President McKissick’s personal letters of appeal to the WPA which are very dense and part of a larger debate surrounding university expansion and the New South. Soon, I will begin a series of oral histories with former Preston residents and live-in faculty. As a history student passionate about architectural history, this project teaches me many practical methods of researching a building’s history for the
A study on the British choral tradition as demonstrated by choirs at Cambridge University

Anna Carro, Music - Senior
Mentor: Dr. Alicia Walker, Music Education, History, and Theory

British choirs typically have a different characteristic tone than choirs in the United States. In the British choral tradition, ensembles are known for pure intonation and a bright, forward tone placement. Eric Whitacre describes this tone as “bright and clear, with a healthy spin and not too much vibrato.” On the other hand, American choirs are sometimes described as having a “rounder tone” and may make greater use of vibrato. These unique traits associated with British and American choirs stem from the differences in approach to resonance placement. In June, I travelled to England and stayed at Cambridge University for two weeks to observe the rehearsals of selected collegiate choirs, listening to the distinctive sounds of each choir and interviewing various directors, singers, and faculty. I had the opportunity to sit down with directors of music Andrew Nethsingha, Stephen Layton, Graham Walker, and former director Christopher Robinson to ask questions about their approach to conducting, rehearsals, choral tone, and to discuss why the British choral sound is so distinctive. Through meeting with current singers and choral scholars, I also learned about the life of a collegiate singer at Cambridge and how it differs from that of myself and my peers in American college choirs. By illustrating the unique qualities of the British choral sound and the choral practices at Cambridge, it is my hope that singers and conductors alike can gain valuable insight into the British approach to choral tone and placement.

Isolation in Mrs. Dalloway

Kelsey Dreyer, English - Senior
Mentor: Dr. Gretchen Woertendyke, English Language and Literature

After WWI, London was conflicted between addressing shell-shock and focusing on the dazzling technologies of modernity. Virginia Woolf’s Mrs. Dalloway expresses the concern and admiration that British society had in both of these aspects. The two main characters, Clarissa and Septimus, struggle to maintain their own identity in the midst of a drastic societal change. Psychologists aim to fix Septimus, who struggles with PTSD, and Clarissa strives to meet her expectations as a women, but continues to struggle between public conventions and her private confictions. In order to save their private self, Septimus chooses suicide to avoid compromising his identity. Through this suicide, Clarissa realizes that she has already compromised her identity, and must accept her life and move forward. While both Septimus and Clarissa are ultimately able to overcome an overwhelming fear of isolation, Woolf’s ending may point to the inevitability of a private self ever existing in this society.

Aesop’s Fables: A Greek Reader

Olivia Garrett, Classics - Senior
Mentor: Dr. Alexander Beecroft, Languages, Literatures, and Cultures

The Greek in many college textbooks is composed of fabricated stories with simplified syntax and vocabulary. The selections of Greek drawn from actual texts are often simplified or heavily annotated. This is true of USC’s current text for its Greek grammar sequence, Athenaze. Making the transition between beginning Greek and actual ancient texts can be difficult and intimidating to many students. Thus, the goal of this project is the composition of a Greek reader with fifty of Aesop’s fables, available as a print on demand text and as an online resource. The Greek reader will make the fables accessible to a student who has finished, or is finishing, a Greek grammar sequence. The texts of the Aesop’s fables in Greek with vocabulary and grammatical commentary will serve to help students confidently move onto Greek reading courses such as the Greek New Testament, Plato, Homer, etc. My methods in completing this project are: I translate the fables with the aid of Kaegi’s Greek Grammar and the Lidell and Scott Greek-English Lexicon. Within each fable, I note difficult grammar points, and compose comments for them. I include these comments on the page opposite the text, along with new vocabulary for each fable; the assumed vocabulary is the vocabulary of Athenaze. I also provide a complete vocabulary list as an appendix for the text of the fables. In composing this, I use the online resource The Thesaurus Linguae Graecae and Perseus Project, which provide online access to Lidell and Scott’s Greek-English Lexicon, among others.

The Subaltern’s Highway: Automobility and the post-colonial in India

Alexander Keene, History - Senior

Spanning much of the 20th century and brief moments in the 21st this work’s multilevel approach attempts to apply the ethereal theoretical plane to the idiosyncratic complexities of reality. This senior thesis traces the role of motor vehicles in India with a particular focus on Subaltern theory. Subalterns are a development of post-colonial theory and have informed much of South Asian history’s recent debates. Subalterns, a term developed by Gayatri Spivak, are people who are removed from any claim to power, they exist on the margins of the historical record and were purposefully marginalized by both colonial authorities and other South Asians who were inculcated within the dialectical power balances of the British Raj. “The Subaltern’s Highway” offers a new method of thinking about Subalternity including the reinterpretation of how these people accessed public legitimacy and contested their marginalization through the application of postcolonial theory to cars. Roads provide an excellent point of departure as a metaphor for contestation due to their shared nature; colonial sportsters, Sikh taxis, and auto-rickshaws prowled the same streets fighting for control. Utilizing the subaltern, and the developed historiography behind this term, enabled a discussion of India’s dialogue with modernization. Throughout this research it became clear that India was never subjugated by the global drive to modernity but acceded to its pull. This conclusion involved marrying development and post-colonial theories mitigated their separate difficulties thus allowing for usable truth which emphasized subaltern agency.
Religion as an Exciting Cause for Insanity in South Carolina

Taylor Turnbull, Biological Sciences - Senior
Mentor: Dr. Erin Roberts, Religious Studies

The prevailing etiological theory of mental illness in 19th and early 20th century America prompted asylum psychiatrists to attribute the insanity of individual patients to an “exciting cause,” roughly defined as the final incitement that splintered an already weakened nervous system and sent patients over the edge of sanity and into a state of madness. Asylum case histories and annual reports indicate a variety of possible exciting causes including heredity, intemperance, domestic trouble, and religion. The purpose of this investigation is to gain a better understanding of how and why religion came to be included amongst this list. The widespread psychiatric theory claiming the need for an exciting cause of insanity combined with the high-energy revivalistic traditions that swept through the American South following the Second Great Awakening naturally led professionals of the time to view certain religious behaviors as a threat to the sanity and emotional stability of the population. Thus, many individuals were institutionalized as a result of their apparently fanatical religious beliefs. Individual case history documents from the South Carolina State Hospital for the Insane give great insight into the actions of these “overly zealous” patients and shed a new light on the dangers of religious excitement as they were perceived during this time period.

Affect of SIRT1 Knockdown on Lifespan of Daphnia pulex and Daphnia pulicaria

Craig Anderson, Biological Sciences - Senior
Mentor: Dr. Rekha Patel, Biological Sciences

The heat shock response proteins are induced at transcriptional level when cells experience proteotoxic stress. Sirtuin-1 (Sirt1) is a protein that is involved in regulating a variety of transcriptional pathways in cells. One such pathway is induction of heat shock protein 70 (HSP70). Sirt1 positively regulates HSP70 expression by deacetylation of the transcription factor HSF1 (heat shock factor 1). Deacetylated Hsf1 is capable of binding to the HSP70 promoter; however, the acetylated form of Hsf1 does not bind to DNA and is thus not capable of inducing transcription. The aim of this study was to determine if Sirt1 cloned from Daphnia has similar enzymatic activity and to test if it affects human HSP70 expression positively. We used HSP70 promoter-reporter constructs to assay the effect of Sirt1 expression on HSP70 induction under proteotoxic conditions. Our results indicate that Daphnia Sirt1 has a positive effect on HSP70 induction in response to proteotoxic stress. Sirt1 activity has also been linked to longevity and increased life span in several model organisms. In humans there exists correliative evidence that compounds such as resveratrol (found in red grapes) that increase Sirt1 activity may contribute to longevity. Thus, we would like to test if RNAi (RNA interference)-mediated knockdown of Sirt1 protein levels in Daphnia would lead to reduced life span. Our hypothesis is that reduced Sirt1 protein levels will result in significantly reduced life span in Daphnia pulex and Daphnia pulicaria. The experiments are underway to determine if we can knock down Sirt1 using RNAi in Daphnia and any effect the knockdown would have on life span. Craig W. Anderson, Charles A. Schumpert, Rekha C. Patel

The Effect of the Elevated Circulating Levels of IL-33 on Metastasis of Colorectal Cancer

Christina-Lin Brown, Biological Sciences - Junior
Mentor: Dr. Maria Pena, Biological Sciences

In the United States, colorectal cancer (CRC) is the third leading cause of cancer-related deaths in both men and women. The pathogenesis of colorectal cancer begins with the development of polyps in the innermost colorectal lining and progresses to the final stage when metastasis occurs. Metastasis is the spread of cancer cells to other organs, and has been shown to be organ specific rather than a random process. Genes that direct tumor cells to target specific organs have been identified. The primary tumor is thought to secrete molecules that promote the establishment of liver metastasis even before the arrival of cancer cells into this organ. We have previously isolated a highly liver metastatic cell line, CT26-FL3 by in vivo selection of CT26 cells in Balb/c mice. Microarray analyses showed that the CT26-FL3 cells expressed 34-fold higher levels of the interleukin 33 (IL-33) cytokine as compared to the parental and less metastatic CT26 cells.
Over-expression of IL-33 was shown to potently promote tumor proliferation and metastasis to the liver indicating that IL-33 plays a crucial role in the pathogenesis of colon cancer. We hypothesized that the increased secretion of IL-33 in CT26 tumor cells will increase cell metastasis to the liver, and that increasing circulating levels of IL-33 in mice bearing CT26 tumors will be sufficient to enhance its ability to metastasize to the liver. In this study, we will increase circulating serum levels of IL-33 using a gene therapy approach by in vivo electroporation of a plasmid expressing IL-33, pV1J-IL33. Here we report the construction of plasmids expressing IL-33 and verification of expression of IL-33 from these plasmids in transfected cells by Western blot analyses. The data showed that these plasmids are functional and are useful for further studies in vivo in tumor bearing mice.

Effect of Progerin Expression on the Nature of DNA Double Strand Break Repair

Sona Chowdhary, Biological Sciences - Junior
Mentor: Dr. Alan Waldman, Biological Sciences

Hutchinson-Gilford Progeria Syndrome (HGPS) is a rare genetic condition in which premature, accelerated aging manifests itself early on, leading to an average life expectancy of 14 years. In progeria, the LMNA gene that normally produces the protein lamin A, an essential component of the nuclear lamina, contains a point mutation causing it to produce a truncated form of lamin A known as progerin. Progerin is overexpressed in progeria, causing detrimental effects to the nuclear architecture, inducing alterations to proper chromatin organization, interfering with DNA replication, delaying DNA double strand break (DSB) repair, and leading to the accumulation of spontaneous DSBs. The purpose of this project was to investigate how progerin expression affects the nature of DNA DSB repair with the knowledge that there are two systems of repair: homologous recombination, or accurate repair, and non-homologous end joining (NHEJ), which is intrinsically mutagenic repair. Normal human fibroblast cells containing an integrated DNA DSB repair reporter substrate were stably transfected with expression vectors, allowing them to express GFP-progerin or simply GFP. These cells were subsequently electroporated with a vector expressing endonuclease I-SceI in order to induce a DSB in the repair substrate. Cells were then placed under G148 selection to identify those that had undergone a DSB repair event. The data obtained indicated a possible shift towards NHEJ as the primary mode of DSB repair in GFP-progerin cells as compared to GFP cells, and these results were found to be statistically significant with p=0.004, using a 2-sided Fisher exact test. This suggests that progerin expression does alter the DNA DSB repair pathway of choice, making the intrinsically mutagenic NHEJ repair pathway more likely. Studying the effects of progerin expression on DNA repair events is important because it allows us to gain a more in-depth understanding of the repair mechanisms prevalent in conditions such as progeria.

Quantitative Analysis of Intact and Degranulated Mast Cells Using Image Analysis

Morgan Edwards, Biological Sciences - Senior
Mentors: Dr. Carole Oskeritzian, Pathology Microbiology and Immunology Dr. John Fuseler, Pathology Microbiology and Immunology

Mast cells (MC) are tissue-resident cells, key players of allergic reactions. In homeostatic conditions, they harbor granules or vesicles filled with mediators. Upon activation, also called degranulation, MC release these mediators, triggering allergic symptoms. No quantitative method is available to measure differential parameters distinguishing resting from activated MC. Using a preclinical model of eczema, an allergic skin disease initiated by exposure to an allergen (Ag), we investigated the activation status and anatomical location of MC in skin tissue samples of saline- (control) versus Ag- (diseased) mice. After collection, the samples were processed, sectioned onto microscopy slides and stained with Methylene Blue, which uniquely stains MC cytoplasmic granules purple. Slides were observed on a Nikon E600 light microscopy system equipped with a digital camera. Images were acquired at 10x and 40x (100-400 magnification) and analyzed for comparative differences pertaining to MC morphology and activation/degranulation with MetaMorph 6.1 image analysis software (Molecular Devices, Sunnyvale, CA). For quantification of MC morphology, we considered parameters of area, perimeter, length to breadth ratio and integrated optical density. Our preliminary analyses suggest the mean ratio of integrated optical density/area (IOD/A) for resting/intact MC is 17.638±2.36 IOD/A (n=6), and for degranulated MC 12.864±2.136 IOD/A (n=6), allowing for accurate measurements (IOD/A Intact MC degranulated MC; P=0.004) associated with differentially activated MC. This newly developed method will be useful to investigate the contribution of MC and MC-derived mediators in any disease state. Supported by NIH/NIAID R01 AI095494 to CAO.

Epigenetics and Variation in Lifespan

Mason Holtel, Biological Sciences - Senior
Mentor: Dr. Jeff Dudycha, Biological Sciences

Epigenetics involves the study of changes in an organism caused by modification of gene expression and not by changes in the DNA sequence itself. One particular method of epigenetic modification is DNA methylation, where methyl groups are added to cytosines in the DNA. Previous studies have shown that methylation content on genomic DNA decreases as an individual ages due to a loss of efficacy of a certain methyltransferase, DNMT1. This phenomenon may play a role in the physiological symptoms of aging and age-related deterioration. This project aims to detect global methylation patterns in the water flea, Daphnia. Six Daphnia cohorts each of a different clone were raised to three separate age groups: neonate, young age, and old age. Within each cohort, three biological replicates were determined at ten individuals each. Genomic DNA was isolated for each replicate and underwent a fluorometric DNA methylation quantification assay. Results showed that Daphnia pulicaria has a low level of methylation that remains low for the entire lifespan. Daphnia pulex showed methylation rates dependent on age, but each clone expressed a different methylation pattern as age progressed. We conclude that change in DNA methylation does not play a significant role in...
Effects of IKLLI Peptide on Breast Cancer Stem Cells Maintenance and Tumorsphere Formation within PEGDA Hydrogel

**Samuel Keeney**, Biomedical Engineering - Sophomore
Mentors: Dr. Esmaiel Jabbari, Chemical Engineering
Ms. Lily Daneshian, Biomedical Engineering

One difficulty with in vivo cancer cell studies is isolating specific factors within the microenvironment and studying their effects. Most previous in vitro studies utilized 2-dimensional cell culture plating which does not mimic the real microenvironment for the cells. It has been shown that inert polyethelene glycol diacyrlate (PEGDA) hydrogel is a 3-dimensional biocompatible network that allows us to isolate and study cancer cells’ response to a specific factor in their microenvironment. Among the properties of their microenvironment, the matrix stiffness plays a crucial role in regulating cell functions. Our group has shown that breast cancer stem cells (CSCs) are able to grow and form tumorspheres in an ideal hydrogel stiffness of 5kPa. In this experiment, the effect of IKLLI peptide conjugated to the PEGDA gel on MDA breast CSCs was studied in a concentration dependent manner. In order to determine the cell response to the IKLLI peptide, tumorsphere size, density, and expression of CSC markers were examined using fluorescent microscopy and qRT-PCR. Results show that tumorsphere formation within the control group had an average size and density of ~180μm and ~9000spheres/mL, respectively. As the concentration of IKLLI increased, the average size and density of the tumorspheres decreased to the point where there was no sphere formation above 4%. This indicates that IKLLI peptide suppressed the tumorsphere formation of breast CSCs. Further research is required in order to find the pathway that IKLLI peptide uses in order to suppress tumorsphere formation within breast CSCs.

Identifying the Lysine Residues Involved in Ubiquitin-mediated Regulation of the RAD51D Homologous Recombination Protein

**Michael Marone**, Biological Sciences - Sophomore
Mentor: Dr. Douglas Pittman, Drug Discovery and Biomedical Sciences

It is estimated that there are 12.3 new cases of ovarian cancer per 1,000 women per year, and 7.9 of these will result in death. Recently, RAD51D was identified as an ovarian cancer susceptibility gene. Loss of RAD51D results in disruption of DNA repair and genomic instability that likely contributes to cancer formation. Ubiquitination events play an important role in the signaling of DNA damage repair, and an E3 ubiquitin ligase, RNF138, directly interacts with and facilitates RAD51D ubiquitination. Elucidating the interaction between RNF138 and RAD51D has the potential to provide alternate ways to diagnose as well as to treat ovarian cancers. The goal of my project is to identify the lysine residues along RAD51D that are ubiquitinated by RNF138 and necessary for RAD51D function. The lysine residues predicted to be targeted for ubiquitination are K159, K200 and K235 due to their proximity to known functional domains. Using site-directed mutagenesis, missense mutations that change a lysine to an arginine amino acid are being generated. Further studies using an in vivo ubiquitination assay will determine if loss of ubiquitination at these sites disrupts the DNA damage response. These data will provide insight into the role of this post-translational modification and potentially lead to new diagnostic and treatment strategies for ovarian cancers.

Caffeine promotes autophagy in skeletal muscle cells by increasing the calcium-dependent activation of AMPK

**Taniya Mathew**, Biology - Senior; USC Upstate
**Regina Ferris**, Biology - Senior; USC Upstate
Mentor: Dr. Bradley Baumgarner, Natural Sciences & Engineering; USC Upstate

Caffeine promotes autophagy in skeletal muscle cells by increasing the calcium-dependent activation of AMPK. Among the properties of their microenvironment, the matrix stiffness plays a crucial role in regulating cell functions. Our group has shown that breast cancer stem cells (CSCs) are able to grow and form tumorspheres in an ideal hydrogel stiffness of 5kPa. In this experiment, the effect of IKLLI peptide conjugated to the PEGDA gel on MDA breast CSCs was studied in a concentration dependent manner. In order to determine the cell response to the IKLLI peptide, tumorsphere size, density, and expression of CSC markers were examined using fluorescent microscopy and qRT-PCR. Results show that tumorsphere formation within the control group had an average size and density of ~180μm and ~9000spheres/mL, respectively. As the concentration of IKLLI increased, the average size and density of the tumorspheres decreased to the point where there was no sphere formation above 4%. This indicates that IKLLI peptide suppressed the tumorsphere formation of breast CSCs. Further research is required in order to find the pathway that IKLLI peptide uses in order to suppress tumorsphere formation within breast CSCs.

Calcyon regulates axonal transport of PI4K11a vesicles in cultured rat sensory neurons

**Zak Roth**, Biomedical Engineering - Junior
Mentor: Dr. Deanna Smith, Biological Sciences

Cytoplasmic dynein is a motor protein representing an essential component in directed microtubule trafficking of membrane bound vesicles. Dynein is primarily responsible for retrograde, or minus-end directed axon transport. Recently, we have shown that Calcyon (Caly, NSG3), a protein important for targeting of Clathrin Adaptor Protein-3 cargos, interacts with dynein (Muthusamy et al, in preparation). In order to explore this protein's viability as an efficient regulator of dynein activity, we have used time-lapse microscopy and kymographs to analyze trafficking in cultured adult rat sensory neurons. The kinase variant PI4K11a is a known Calcyon-interacting protein involved in endosomal trafficking. Motility of organelles enriched in PI4K11a is altered by changes in Calcyon expression. In addition, the loss of PI4K11a in mice has been shown to result in an adult onset neurodegeneration phenotype (Simons et al, PNAS, 2009). Based on our studies, we hypothesize that the Caly/PI4K11a interaction is an important regulator dynein-dependent axon transport, and disruption of this interaction leads to axon degeneration.
**Role of Jagged-2 in colorectal tumorigenesis**

**Michaela Close**, Biological Sciences - Senior

Mentor: Dr. Minsub Shim, Biological Sciences

The Notch gene family encodes transmembrane receptors, which are activated by the interaction with their ligands on the cell surface. In developmental processes, Notch signaling plays a critical role in cell-fate determination. Dysregulated expression of Notch receptors or their ligands are frequently observed in various human cancers, suggesting their role in tumorigenesis. The aim of this research was to determine the function of Jag2 in the DNA damage response pathway and in the development of colorectal cancer. We have found that the treatment with doxorubicin, a DNA-damaging agent, induces an increase in the expression of Notch ligand Jagged-2 (Jag2). Doxorubicin-induced expression of Jag2 was mitigated by the addition of pifithrin-α, a p53 inhibitor. Furthermore, Jag2 induction was suppressed in p53-null mouse embryonic fibroblasts (MEFs). Knockdown of Jag2 further increased the doxorubicin-induced expression of p21, a known p53 target gene. These results suggest that there is a negative feedback between p53 and Jag2 where p53 induces Jag2 expression, and Jag2 then represses the transcriptional activity of p53. Over-expression of Jag2 resulted in an increased proliferation of HCT116 and HT29 colorectal cancer cell lines while knock-down of Jag2 inhibited their proliferation. In addition, we have found that Jag2 is secreted into culture media, suggesting a novel mechanism by which Jag2 target cells beyond the direct cell-cell contact. Our results indicate that Jag2 may be a therapeutic target in colorectal carcinogenesis. Further study will focus on the in vivo role of Jag2 in colorectal cancer using an orthotopic mouse model.

**DNA Methylation of Mussel Sperm and Eggs**

**Matthew Csonka**, Biochemistry and Molecular Biology - Senior

Mentor: Dr. Richard Showman, Biological Sciences

Epigenetics is the study of changes in organisms by modification of gene expression rather than the alteration of the genome itself. A common epigenetic modification is cytosine methylation which establishes a silenced chromatin structure and thus regulating nuclear gene expression. Studies have shown that patterns of global hypermethylation of DNA in sperm not only reduces their level of fertility but also to induce these cells into an apoptotic pathway. The purpose of this project was to investigate the patterns of DNA methylation in mitochondrial and nuclear DNA of sperm cells and nuclear DNA of eggs in mussels. Two antibodies were used to immunohistochemically label methylated cytosine nucleotides: anti-5-hydroxymethylcytosine polyclonal antibody and anti-5-methylcytosine. Sperm, both mature and immature, and eggs were acquired from spawning mussels during mating season. Slides of each sample were prepared. Each slide contained an experimental sample being labeled with one of the antibodies along with anti-mouse IgG (FITC) and a negative control sample labeled with only anti-mouse IgG (FITC). After being labeled, the slides were mounted for photography. Results from the project show that while methylation of sperm appear to contain hyper methylation of the nuclear DNA, the methylation pattern is localized. In contrast, there appears to be no methylation in the egg nuclear DNA and both sperm and eggs show no methylation of the mitochondrial DNA. Future studies in this area could focus on other epigenetic modifications within gametes and their fertility.

**The role of IL-27 in human mast cell degranulation and cytokine production**

**Juline Deppen**, Biomedical Engineering - Junior

Mentor: Dr. Gregorio Gomez, Pathology Microbiology and Immunology

Allergies, including those that cause mild or life-threatening reactions, and asthma are major health problems in the United States with an estimated 60 million sufferers. Mast cells are responsible for these allergic reactions. These specialized cells contain pre-formed allergic mediators in cytoplasmic granules that are released immediately after activation in a process called degranulation and produce inflammatory lipids and cytokines. Mast cell activation generally occurs through cross-linking of FcαRI, the high affinity receptor for the immunoglobulin E (IgE) antibody. Interleukin-27 (IL-27) is a cytokine present in the human body that regulates the activity of certain immune cells and is thought to affect mouse immature mast cells. However, IL-27’s effects on human mature mast cells have not yet been reported. Therefore, in this study, the role of IL-27 on FcαRI-induced degranulation and cytokine production from human skin mast cells was investigated. Quantitative real-time PCR demonstrated the expression of mRNA transcripts for gp130 and WSX-1, the proteins that comprise the functional receptor for IL-27, in resting human skin mast cells. Our results showed that IL-27 neither enhanced nor inhibited FcαRI-induced degranulation. However, IL-27 strongly increased the production of tumor necrosis factor (TNF), a prototypical pro-inflammatory cytokine that is thought to contribute to pulmonary allergic inflammation. Together, these data demonstrate that IL-27 does not likely affect IgE-dependent immediate hypersensitivity reactions but can enhance allergic inflammation by enhancing the production of TNF from human mature mast cells. Overall, these findings identify IL-27 as an enhancer of IgE-dependent mast cell-mediated inflammation in humans.

**Mutation of Y470 of human DAT is critical for HIV-1 Tat-induced inhibition of dopamine transport**

**Richard McCain**, Biological Sciences - Junior

Mentor: Dr. Jun Zhu, Drug Discovery and Biomedical Sciences

The HIV-1 Tat protein is critical for the HIV-1 infection-induced dysfunction of the dopamine (DA) system. Previous studies have demonstrated that Tat decreases DA uptake through allosteric modulation of the DA transporter (DAT). We demonstrated that Tat interacts directly with the DAT and inhibits its function. In this study, computational modeling simulations were used to predict potential binding sites on human DAT (hDAT) for Tat. We found that mutations of tyrosine 470 (Y470H, Y470F and Y470A) differentially affected Tat-induced inhibition of the DAT, suggesting that this tyrosine 470 acts as a functionally relevant residue for Tat binding. We further determined [3H]DA uptake, basal DA efflux and DAT cell surface expression in wild type hDAT and its mutants. Compared to wild type hDAT, Y470H and Y470A but not Y470F reduced the maximal velocity of DAT uptake.
concentration, and ionic strength all influence the self-assembly kinetics and microstructure of the collagen hydrogel that ultimately govern its mechanical properties. These factors can be used to tailor scaffolds with a high degree of specificity towards their biomimetic application. For example, the collagen matrix could be synthesized to mimic the structural organization and mechanical properties of in vivo vascular tissue. Vascular cells cultured in tubular collagen matrices would then be introduced to hemodynamic loading and studied. Our matrices are also used as biocompatible platforms for implantable drug delivery systems. We are currently exploring anti-inflammatory drug-eluting hydrogels that are fitted to implanted devices to reduce implant encapsulation.

Identifying the Position of a T-DNA Insertion in the fro3 Mutant Arabidopsis Plant and Determining the Membrane Localization of the FRO3 Gene

Samantha Quattlebaum, Biological Sciences - Junior
Mentor: Dr. Erin Connolly, Biological Sciences

Iron is an essential metal, working as an important cofactor involved in biological processes such as photosynthesis, DNA synthesis, respiration, and nitrogen fixation. The FRO family of genes encode ferric chelate reductase enzymes that are involved in reduction of ferric iron chelates to soluble ferrous iron. In plants, the various FRO enzymes perform a variety of vital functions to maintain iron metabolism. Arabidopsis FRO3 is localized to mitochondria and is hypothesized to play important roles in mitochondrial Fe homeostasis. To further understand FRO3’s role in iron reduction, we identified an Arabidopsis mutant line that carries a T-DNA insertion in the FRO3 gene. To fully understand the T-DNA's impact on FRO3 gene function in this fro3 mutant plant, we must know exactly where the insertion is located within the gene. In this work, I have used PCR and DNA sequencing to map the T-DNA to position 2959 in exon 8 of the FRO3 gene. I then extended this research to determine if FRO3 is localized in the inner or outer membrane of the mitochondria. I used proteinase K treatment of purified mitochondria, followed by both western analysis and assays of ferric chelate reductase activity to obtain preliminary data that suggests that FRO3 localizes to the outer membrane. This work should improve our understanding of iron metabolism in plants and enable the development of crop varieties with enhanced iron content. Such plants could help to alleviate iron deficiency in humans, which affects an estimated 2-3 billion people worldwide. Samantha Quattlebaum, Anshika Jain, Dr. Erin Connolly

Synthesizing 3D Collagen Scaffolds for Cardiovascular Tissue Engineering

Karna Ringham, Baccalaureus Artium et Scientiae - Sophomore
Cameron Morrell, Biomedical Engineering - Junior
Mentor: Dr. John Eberth, Cell Biology and Anatomy

Traditionally, 2D cell cultures have been the primary testbed for observing cellular behavior in vitro but modern 3D scaffolds allow for an improved biomimetic environment. Collagen is a favorable biomaterial for 3D scaffold construction due to its biocompatibility and inherent mechanical tunability. Type I Collagen monomers can be isolated by treating a locally procured cowhide with acetic acid and pepsin, grinding it down, and running it through a hydraulic press. Samples are “salted out” to decrease collagen solubility, centrifuged to remove supernatant, and dialyzed against DI water to remove the remaining salt. Collagen can then be polymerized (self-assembly into fibrils) within molds via a pH neutralization thereby forming 3D constructs. The pH, temperature, concentration, and ionic strength all influence the self-assembly kinetics and microstructure of the collagen hydrogel that ultimately govern its mechanical properties. These factors can be used to tailor scaffolds with a high degree of specificity towards their biomimetic application. For example, the collagen matrix could be synthesized to mimic the structural organization and mechanical properties of in vivo vascular tissue. Vascular cells cultured in tubular collagen matrices would then be introduced to hemodynamic loading and studied. Our matrices are also used as biocompatible platforms for implantable drug delivery systems. We are currently exploring anti-inflammatory drug-eluting hydrogels that are fitted to implanted devices to reduce implant encapsulation.

Preventing Apoptosis of Transplanted Stem Cells through HIF-2α Inhibition

Allison Tipton, Chemical Engineering - Senior
Mentors: Dr. James Blanchette, Chemical Engineering Dr. Melissa Moss, Chemical Engineering

Osteoarthritis (OA) affects millions of people in the United States alone. However, there is currently no cure for the disease, only surgeries that slow its progression and reduce pain. OA occurs because mature cartilage in joints begins to degrade. The cells responsible for generating and maintaining cartilage, chondrocytes, are lost through apoptosis. Therefore, a promising therapeutic approach for curing OA is implanting stem cells to regenerate cartilage at the injury site. Chondrocyte degradation, or hypertrophy, generally occurs because the surrounding environment receives inadequate oxygen supply. This microenvironment activates hypoxia-inducible factors (HIFs) that are thought to play key roles in OA progression. Studies have shown that the main factor that promotes chondrocyte hypertrophy is HIF-2α. Therefore, the goal of this study was to evaluate the impact of inhibiting HIF-2α on chondrocyte phenotype. To do this, adipose derived stem cells (ADSCs) were formed into spheroids. These spheroids were preconditioned in a hypoxic environment and then chondrogenesis and subsequently hypertrophy were induced, simulating the progression of OA. A HIF-2α inhibitor was added at various points in the process. Cross sectional analysis of the spheroids showed that inhibiting HIF-2α resulted in increased cell survival, and by inhibiting HIF-2α during early chondrogenesis, the production of collagen II, a cartilage marker, increased. This study demonstrated that apoptosis of chondrocytes in a hypoxic environment could be prevented if HIF-2α was inhibited. These promising results will guide future stem cell based approaches for treatment of OA patients.

Mechanism of PACT-induced PKR activation and programmed cell death

Victoria Willingham, Biological Sciences - Junior
Mentor: Dr. Rekha Patel, Biological Sciences
Authors: Victoria Willingham, Lauren S. Vaughan, Evelyn Chukwurah, Rekha C. Patel
Severe cellular stress resulting from the accumulation of misfolded proteins in the endoplasmic reticulum (ER) has been implicated in several neurodegenerative diseases such as Parkinson's and Alzheimer's disease. During ER stress, dsRNA-binding protein PACT activates protein kinase PKR, which phosphorylates transcription initiation factor eIF2α, inhibiting protein synthesis and causing cell apoptosis. Interestingly, mutations in the PACT protein have been
PKR activation by PACT is regulated during ER stress by negative regulator protein TRBP. TRBP binds to PACT, preventing it from associating with and activating PKR in absence of stress. In presence of stress, phosphorylation of PACT on serines 246 and 287 causes dissociation from TRBP and thus PACT can associate with and activate PKR. In addition, PACT point mutations A91E and L99E result in significantly decreased PACT-TRBP interaction. Since phosphorylation at serines 246/287 is essential for efficient PACT-PKR interaction, we created a triple mutant that combines A91E or L99E with phosphomimetic (DD) or phospho-defective (AA) mutations at 246 and 287. The A91E/L99E, DD mutant is expected to enhance PKR activation and apoptosis even in absence of stress due to a lack of interaction with TRBP. The A91E/L99E, AA mutant is expected to decrease PKR activation and apoptosis in absence or presence of stress due to increased interaction with TRBP. Using various apoptosis assays, we are analyzing relative levels of apoptosis in cells overexpressing these mutants by transient transfection of HeLa cells.

Structural Analysis of Dihydrodipicolinate Reductase
Amy Arnette, Biological Sciences - Senior
Mentor: Dr. Maksymilian Chruszcz, Chemistry and Biochemistry
Analysis of the genomes of many bacteria harmful to humans has shown multiple enzymes within the lysine biosynthetic pathway that are essential for the growth and proliferation of these bacteria. This research focuses on one enzyme within the pathway known as dihydrodipicolinate reductase or DapB. Essential enzymes in the lysine biosynthetic pathway are viable drug targets because human beings and other mammals lack the ability to synthesize the amino acid, lysine. Humans have no known homolog to DapB; a drug would prevent growth of the bacteria while having no adverse effect on the individual. Here we report the structural analysis of DapB from Vibrio vulnificus and Mycobacterium tuberculosis in an effort to aid in the discovery of potential antibiotic drug candidates.

A block one-quarter method for solving oscillatory initial value problem
Jenny Beebe, Biology - Sophomore; USC Salkehatchie
Mentor: Dr. Fidele Ngwane, Mathematics; USC Salkehatchie
A continuous hybrid method using trigonometric basis with an off-stop point is developed and used to construct a new method by using collocation and interpolation techniques. The new method is implemented in block form. Numerical examples are presented and the efficiency and accuracy of the new method are discussed.

Testing the Biocompatibility of a Novel Copolymer Ligand Applied to Semiconductor Nanocrystals (Quantum Dots)
Colin Johnson, Biological Sciences - Senior
Mentor: Dr. Andrew Greytak, Chemistry and Biochemistry
In recent decades, fluorescence microscopy has become a chief diagnostic stratagem utilized by medical professionals in a wide variety of specialties. Conventional organic dyes used for tagging and contrasting are falling behind the capabilities of the recent imaging techniques, which demand increasingly robust, photo-stable, and target-specific materials. Colloidal semiconductor nanocrystals, more commonly referred to as quantum dots (QDs) are growing in precedence and practicality within the field of biological imaging. QDs fulfill numerous favorable criteria for imaging standards, such as small size, high molar extinction coefficients, high quantum yields, increased photo-stability, and the potential for a variety of surface modifications. Before QDs can be utilized in biological imaging applications, they must first be bio-functionalized, i.e. they must be made soluble in polar media, checked for acute toxicity, and prove functional in specific-cell targeting. These three attributes of bio-functionalized QDs are highly dependent upon the ligand or polymer used to encapsulate the QD core, which can contain heavy elements that present toxicity concerns. When this surface modification is applied size and brightness of the QD may present some compromises. My project demonstrates the utility of a novel copolymer ligand boasting a unique
methacrylate backbone and potentially multi-dentate imidazole binding motif in biological imaging applications. The polymer itself is synthesized through a RAFT-mediated polymerization procedure and the QD starting materials are purified through gel permeation chromatography (GPC), providing well-established metrics for our experimentation. Utilizing a LIVE assay, we have proven low toxicity with our bio-functionalized QDs when incubated with HUVECs over a 24-hour period. We have also demonstrated low non-specific binding (NSB) with these QDs, utilizing a new high-throughput plate-reader method. These NSB results were confirmed with fluorescent microscopy.

**Determination of Bisphenol S leached from Plastics**

**Quentin Lane**, Biological Sciences - Sophomore; USC Lancaster  
Mentor: Dr. Bettie Obi-Johnson, Chemistry; USC Lancaster  
Bisphenol A (BPA) has been replaced by bisphenol S (BPS) in some plastics, but both compounds have similar estrogen activity (EA). These compounds have been found to have negative health effects on vertebrates. Currently, methods such as Liquid Chromatography Mass Spectrometry (LC-MS) are used to detect low concentrations of BPS. However, LC-MS is expensive and not widely available in labs. Due to rising concerns of BPS in our food supply, a readily accessible and economical method is needed to determine low levels of BPS in solutions. In this study, Ultraviolet-Visible Spectrophotometry (UV-Vis), High Performance Liquid Chromatography (HPLC), and pre-concentration by Solid Phase Extraction (SPE) were evaluated with standard solutions and plastic leachate samples. The limit of detection of BPS using UV-Vis was found to be 500 nmole/L (125 pg/L). BPS levels from water microwaved in polysulfone plastic bottles for five minutes measured between 700 and 9200 nmole/L (175-2300 pg/L). A variety of plastics have been tested using the same method, and detectable amounts of aromatic compounds with potential EA have leached from them. The compounds are currently being identified by HPLC. Future work will involve applying these test methods to a broader range of plastics.

**Detection and identification of textile dyes on fabrics exposed to environmental weathering.**

**Mackenzie Matney**, Biological Sciences - Senior  
Mentors: Dr. Stephen Morgan, Chemistry and Biochemistry  
Ms. Molly Burnip, Chemistry and Biochemistry  
Trace evidence fibers are seldom recovered in pristine condition from a crime scene because fiber and dye components change and degrade because of temperature or moisture conditions to which they have been exposed. Microscopy or spectroscopy of fibers recovered from a victim’s body may confirm similar characteristics to those from a suspect’s environment; however, after weeks or months of environmental exposure, attempts at identification of dyes often fail due to loss of dyes due to leaching by moisture, or because of photochemical degradation with oxygen in the presence of water. Our research hypothesis is that fiber dyes on acrylic, cotton, nylon, and polyester can be identified at trace levels by microextraction/liquid chromatography, even after weathering. Our results show that, although dye amounts diminish with time, sufficient dye for identification is present after a year of outdoor exposure in climate extremes tested (Phoenix, AZ, and Miami, FL). Analyses of weathered fabric samples by liquid chromatography (LC) provides insight into the effects of environmental exposure on fibers, and thus establish a scientific basis for trace evidence examiners to explain chemical changes in weathered fibers to juries. Identification of dyes after weathering may be relevant in solving cases in which unknown fibers are found on or near a victim after a period of outdoor weather exposure. Additionally, these methods may be applied to weathered fibers from cold cases previously thought to be too difficult to reliably analyze.

**Modification of Nanoparticles Using Cyclic Azasilane**

**Tina Monzavi**, Chemistry - Freshman  
Mentor: Dr. Brian Benicewicz, Chemistry and Biochemistry  
In our group, the modification of silica nanoparticles has been traditionally done with a linear aminosilane followed by attachment of a RAFT (reversible addition-fragmentation chain transfer) agent for polymerization. While this method has shown good results in the past, the silane modification can take up to 18 hours. A new method employing the ring opening reaction of a cyclic azasilane was investigated. The cyclic azasilane was shown to react with free hydroxyl groups on the surface of silica nanoparticles. The reaction was complete in less than 5 minutes compared with linear amino silane. The graft densities of RAFT attachment are controlled by varying the feed ratio of cyclic azasilane to nanoparticles. Graft densities achieved are comparable to that previously obtained with linear aminosilanes. Also, the attached RAFT agent is still viable for polymerization after attachment to create polymer-grafted nanoparticles.

**Franklin Square**

**John Risher**, Undeclared - Freshman; USC Salkehatchie  
Mentor: Dr. Wei-Kai Lai, Mathematics; USC Salkehatchie  
An n×n magic square is a square grid composed by consecutive integers 1 to $n^2$, so that the sum of the numbers from each row, each column, and each of the two main diagonals is the same. From the material we studied, we found out that Benjamin Franklin also studied this topic, and developed his own methods to create “almost” magic squares, now called Franklin Squares. These squares satisfy most of the magic square’s rules and in addition to that, several other neat properties. In the poster, we will introduce some Franklin squares, together with all the neat properties they have. We will also discuss the method developed by Franklin and use this method to create our own Franklin squares.

**Observing Cellular Response to TGF-β1 and the Mechanical Environment via Tunable Hydrogel Substrates**

**Caleb Snider**, Biomedical Engineering - Senior  
Mentor: Dr. Mythreye Karthikeyan, Chemistry and Biochemistry  
Traditional cell biology involves experimenting with cells growing on tissue culture plates. This approach neglects the role of interactions with the physical and biochemical properties of the extracellular matrix (ECM). The process of mechanosensing has emerged as an area of significant interest in the role of ECM on cell signaling and behavior.1 To observe effects of the ECM, a 3D matrix must be synthesized for cells to be seeded on. Polyacrylamide hydrogels are one such
Fall-Detection with Mobile Devices and Smart Infrastructure

**Philip Conrad**, Computer Science - Junior
Mentor: Dr. Srihari Nelakuditi, Computer Science and Engineering

Even with modern preventative measures, falls continue to be a major source of injury the elderly. Rapid detection and reporting of falls to caregivers can enable medical assistance to arrive on-site quickly, increasing the chances of a good outcome. Most modern fall-detection systems use specialized sensors that have to be worn at particular locations, such as at the hip or ankles—our system uses commercial off-the-shelf (COTS) smartphone and smartwatch hardware, along with sensor-augmented floor tiles (courtesy of the SDII lab's FREES project). We are studying how to correlate data from multiple sensor sources to accurately determine whether or not a fall occurred in real-time. Our work is planned to integrate with sensor-augmented infrastructure to further increase its accuracy of detection.

IT Capstone Project: District 5 IT Day Camp - Speaking on Opportunities in IT with Demonstrations

**Ryan Fleming**, Integrated Information Technology - Senior
**Nicole Gilland**, Integrated Information Technology - Senior
**Joseph Alagna**, Integrated Information Technology - Senior
Mentor: Dr. Karen Patten, Integrated Information Technology

The District 5 IT Day Camp is an annual, day-long event, attended by students in 7th, 8th and 9th grades. Students were given the chance to rotate through three different workshops; with each workshop being centered around one specific technology. The 2015 camp included Additive Manufacturing with 3D Printing, An Introduction to Programming with Scratch and An Introduction to Web Development with HTML5. While the camp focused around three specific technologies, the intention was to incite a general sense of interest in the technology field. Students were able to learn about a wide array of careers available within the technology sector, and the current status (of rapid growth and need for talent) within the field. 2015 marked only the second year for the District 5 IT Day Camp. Students provided feedback through survey questions and the feedback was utilized in order to formulate improvements for future camps.

Developing an Interactive Graphical Search for MIRC

**Camron Godbout**, Computer Information Systems - Junior
Mentors: Dr. Duncan Buell, Computer Science and Engineering  Dr. Heather Heckman, Moving Image Research Collect  Dr. Heidi Cooley, Film and Media Studies

I have developed a graphical search application for the USC Libraries’ Moving Image Research Collections (MIRC). The application will allow for less “linear”—more interactive—searching of the collections than what is currently possible via the MIRC website’s more conventional search function. This means that users engage visually with their search queries. In the past, users had to type words into search fields and look through lists of video descriptions to find what they approach and can be tuned by varying the concentrations of its monomers to achieve different stiffness\(^1,2\). The hydrogels must be functionalized with an ECM protein such as fibronectin for cells to adhere. These substrates provide different mechanical environments to allow for testing of cellular responses to signals such as the growth factor TGF-\(\beta\)\(^1,2\). Fibronectin is involved in cell attachment to in vivo ECM similarly to its role in attaching cells to the polyacrylamide hydrogels. Fibronectin can exist in a soluble form or assembled into a stable, insoluble fiber via a process called fibrillogenesis\(^3\). Fibrillogenesis occurs via self-assembly of fibronectin molecules bound to receptors such as Integrin \(\alpha 5\beta 1\), ultimately influencing cell motility and wound healing\(^3\). This project aims to develop a controlled method for producing substrates of tunable stiffness to investigate the mechanical environment’s role on cell response to TGF-\(\beta\)1 and the ECM’s role in wound healing. Using my substrates, I investigated the effect of TGF-\(\beta\)1 on cellular morphology, viability, and migration using wound healing assays. The findings and implications of these studies will be presented.
were looking for. My software, on the other hand, displays thumbnails from video clips and allows users to pick what they want to see. I use the already existing metadata about the videos together with Latent Semantic Indexing (LSI) to allow users to get related (“semantically” similar) videos by clicking on thumbnails of videos. I am now expanding this search application to 3-dimensional space, using virtual reality and the Oculus Rift head-mount display platform. The Oculus allows users to view the data in a way that is very unique. Presenting data in three dimensions allows for total immersion in the search field, and each video is an object occupying a position in virtual space. To accomplish this, I have learned how to program advanced web applications along with video game programming to utilize virtual reality. This project will bring attention to the important content contained in MIRC’s database.

Gamecock Mobile: Increasing Student Engagement Through Mobile Applications

**Jared Piedt**, Computer Information Systems - Junior

Mentor: Dr. Jose Vidal, Computer Science and Engineering

Currently, there is a major lack of mobile applications that provide college students with a comprehensive assortment of their university’s resources. Gamecock Mobile is a prototype Android app that solves this demand by incorporating many university resources that improve both organization and student engagement. The app utilizes web scraping, relational database management, and data parsing to provide features that include: course schedule management, student calendar, and Daily Gamecock top stories. Using a web scraping Python program, developed by Dr. Jose Vidal, all course information is parsed from HTML into a database. This database is used by the app to allow students to choose their courses and view their schedule on their device. The calendar feature allows students to keep track of their assignments and displays them in an easy to read and functional format. The Daily Gamecock feature uses an RSS feed parser from the Daily Gamecock website and allows the user to browse articles and keep up-to-date on University activities. All mobile apps must employ good design in order to provide both usability and appeal to the app. Gamecock Mobile incorporates the latest Material Design elements to provide an overall enjoyable experience to the user. The main goal of this project is to demonstrate different ways universities can provide mobile functionality to their student population and kick-start the improvement of the University of South Carolina’s mobile presence.

The Utilization of Mathematics to Extract Information from Images of Sheet Music and the Interpretation of the Data by the NAO Robot

**Audrey Talley**, Computer Engineering - Sophomore

Mentor: Dr. Francisco Blanco-Silva, Mathematics

Over the summer, I had the opportunity to design and execute a research experiment in robotics under the guidance of Dr. Francisco Blanco-Silva (Department of Mathematics, USC). The goal of my project was to create a software package that enabled a NAO robot to read, interpret, and perform sheet music. We have accomplished the first part of this project. The ideal software package finds solutions to three challenges. The first challenge, retrieval of musical notation from sheet music, has been performed through the use of image processing techniques. The second challenge will involve the creation and analysis of a large amount of data. We aim to create a database that allows the robot make decisions about how to play an instrument based on correlations between the musical piece, and environmental parameters. For instance, the robot will have to decide how to approach a piano, and how to efficiently position its hands on the keys. The final challenge will involve the actual performance. The design of this project is greatly influenced by my interest in robotic surgery. My future goal is to help develop computational techniques in this field. The challenges are of a similar technical nature; the reading of music imitates the interpretation of an open body. The decision-making process needed to perform effective surgery mimics the same spatial and logical steps as approaching and playing a musical instrument.

IT Capstone Project – USC Website Upgrade for USC’s Department of Chemistry and Biochemistry

**Laquasia Tyson**, Integrated Information Technology - Junior

**Chad Robichaux**, Integrated Information Technology - Senior

Mentor: Dr. Karen Patten, Integrated Information Technology

The University of South Carolina’s Department of Chemistry and Biochemistry is in the process of updating their new website to meet the University’s website standards by using the University’s Content Management System, OmniUpdate. As our iT Capstone Project our team will create each of the faculty pages for the new website using the styling and formatting guidelines provided by the University and defined templates. Along with creating the faculty pages we also are providing links on each page for the faculty’s documents and other web pages they use for their research, publications and group sites (the professor’s personal webpage). Another aspect of each faculty page is that we include their research interests and also upload images that go along with their research. In order to help us better manage our project we used Microsoft Project. Since we have a limited amount of time to finish the faculty pages we utilize our MS Project file to help us understand more of what we have done and how much more work and time we have in order to complete the project. The Department of Chemistry and Biochemistry is expecting to make their website go live in June. With the help from our team completing the faculty pages the Department of Chemistry and Biochemistry has space to focus on other page content and gives them assurance of their new website going live in June.
IT Capstone Project – Web design and development for Classy Closet, an Entrepreneurial Columbia firm

Raven Woodruff, Integrated Information Technology - Senior
Antrown Littlejohn, Integrated Information Technology - Senior
Tanasia Hall, Integrated Information Technology - Senior

Mentor: Dr. Karen Patten, Integrated Information Technology

Classy Closet is a locally owned business by Monique Flowers. My group members and I were lucky enough to take on this project to help transform our client’s thoughts and ideas into a website for the whole world to see. At this moment, Ms. Flowers has an eBay business for her products but she wants to transform the eBay business into an actual website so she can gain more traffic. We have been excited from day one to be such a huge help with Ms. Flowers by establishing the foundation for her business. Our Capstone Project is basically ensuring our client that we will build her a webpage based on her criteria and we will set up a database for the products, domain, and place proper content as far as products and product information onto her site as you would see on a regular clothing or store website. Our main goal aside from creating a webpage from the eyes of Ms. Flowers is to create it, but make everything simple for her to manage after we are no longer here to help her.

Degree of bioresorbable vascular scaffold expansion modulates loss of essential function

Nichole Abla, Biomedical Engineering - Senior

Mentor: Dr. Tarek Shazly, Mechanical Engineering

Drug-eluting bioresorbable vascular scaffolds (BVSs) have the potential to restore lumen patency, enable recovery of the native vascular environment, and circumvent late complications associated with permanent endovascular devices. To ensure therapeutic gains persist for sufficient duration prior to scaffold resorption and resultant functional loss in structural strength and ability to controllably release local drug, many factors dictating BVS performance must be identified, characterized and optimized. While some factors relate to BVS design and manufacturing, others depend on device deployment and intrinsic vascular properties. Importantly, these factors interact and cannot be considered in isolation. The objective of this study is to quantify the extent to which degree of radial expansion modulates BVS performance, specifically in the context of modifying device erosion kinetics and evolution of structural mechanics and local drug elution. We systematically varied degree of radial expansion in model BVS constructs composed of poly DL-lactide-glycolide and generated in-vitro metrics of device microstructure, degradation, erosion, mechanics and drug release. Experimental data permitted development of computational models that predicted transient concentrations of scaffold-derived soluble species and drug in the arterial wall, thus enabling speculation on the short- and long-term effects of differential expansion. We demonstrate degree of expansion significantly affects scaffold properties critical to functionality, underscoring its relevance in BVS design and optimization.

Defect Engineering Graphene as a Biofilm Platform for Electrical Bacterial Diagnostics

Joseph Andrews, Electrical Engineering - Senior

Mentor: Dr. MVS Chandrashekhar, Electrical Engineering

Biofilms appear in nature as a protective colony made up of individual bacteria cells surrounded by an polymeric extracellular matrix. These biofilms form on both living and nonliving surfaces and can be harmful in many different ways. We proposed and proved that graphene (2-dimensional carbon allotrope) is a viable platform for the bacterial biofilm growth, and also that there is a significant change in the electrical properties of graphene that closely follow the life cycle of the biofilm. AC impedance spectroscopy was used to determine the impedance change in graphene as the biofilm formed. The results showed immediate change in the graphene’s impedance only 7 minutes after inoculation of roughly 4.5% at the lowest frequency measured, 0.75 Hz. This change then began to grow gradually and at full biofilm maturation the change in impedance relative to before inoculation was approximately 600% at 0.75 Hz. The greatest change occurred at the lowest frequencies and as the frequency increased the percent difference between before inoculation and after began to decrease. Thus we can
conclude that the biofilm growth alters the overall capacitance of the graphene in such a significant way that a sensor may easily be developed using the graphene as a biofilm platform. This graphene biofilm sensor would have a huge impact in the field of bacterial detection and diagnostics.

Multifunctional Protection for DC Power Systems

Patrick German, Electrical Engineering - Senior
Jacob Roper, Electrical Engineering - Senior
Brittany Richards, Electrical Engineering - Senior
Daniel Bauer, Electrical Engineering - Senior
Mentor: Dr. Roger Dougal, Electrical Engineering

The goal of this project is to design, build, and test a multifunctional device for protecting power distribution circuits and loads in dc systems. The industrial-scale protection device, rated at 500V, 25kW has three principal functions: it can limit short circuit fault currents to prevent adverse effects on the main supply bus, it can prevent an undesirable condition on the dc power bus from affecting a critical load by acting as an uninterruptable power supply, and it can compensate for negative-incremental impedance instabilities caused by constant-power loads. This device was designed using theory developed by Dr. Ugo Ghisla, and has been realized using solid-state power semiconductor elements, industrially available components, and advanced controls developed specifically for this system. It has been developed with the primary intent of allowing industrial facilities to operate on a dc distribution network, and the technology was originally developed to support the US Navy’s vision for an all-electric ship. The final product, approximately 8’x12’x16” in size, will conform to the dimensions of a standard 4U half-rack, as commonly found in data centers.

Dependency of Molecular Gas Adsorption on Defect Engineered Graphene for NO2 Emission Sensing

Hani Gomez, Electrical Engineering - Senior
Mentor: Dr. MVS Chandrashekhar, Electrical Engineering

Nitrogen dioxide, or NO2, is a gas produced from combustion emissions. It is a gas linked with ground level ozone formation, or smog, as well as respiratory health issues at concentrations higher than 10ppm. Today’s sensing technology prevents environmentally minded agencies, such as EPA, from accurately regulating exposure limits to NO2. Sensors are not accurate enough to enforce lower exposure levels, therefore creating an enforceability gap. This study proposed to develop a new, more accurate and low cost epitaxial graphene sensor. It explored the sensitivity of defect engineered graphene grown on silicon carbide to NO2, hypothesizing that more defects in graphene would lead to a higher sensitivity. Being able to take advantage of defects in graphene for sensing purposes is an innovative concept because commercially produced graphene is often defective. Using an experimental method developed by previous work, several tests were conducted on graphene samples with different defect densities. Fourier Transform Infrared Spectroscopy was conducted to observe each sample’s optical (reflectance) and electrical (conductivity) reaction to gas immersion. Raman spectroscopy was conducted to obtain data on the defect density of each sample. X-ray photoelectron spectroscopy, or XPS, was conducted to obtain data on the thickness of the graphene layers of each sample. The thickness of the graphene layers was kept a control, and the only variable was the defect density. Analytical studies were conducted on the resulting data, and compared to a simulated mathematical model. Correlation between the defect density and immersion of graphene in NO2 environments was found.

Synthesis and Characterization of High Entropy Alloy Thin Films using RF Magnetron Sputtering

Kris Hacker, Chemical Engineering - Freshman
Ghitte Neethling, Chemical Engineering - Freshman
Mentor: Dr. Jason Hattrick-Simpers, Chemical Engineering

The blade material used in jet turbines operate in extremely oxidizing conditions with temperatures exceeding 1500 oC. Next generation turbines will need to operate at temperatures approaching 2000 oC, far beyond the capabilities of current materials thus spurring renewed interest in the design of new alloy classes. Recent research has focused on high entropy alloys (HEA) as they exhibit desirable mechanical and thermochemical properties. A HEA is defined as an alloy system consisting of five or more principal elements in equimolar proportions, which combine to form a single phase alloy. This solid phase solution can show increased strength and resistance oxidation at high temperatures. The purpose of this research is to identify stable and oxidation resistant HEA formulations that can operate at high temperatures. Pseudo-ternary (Al1-x-yCuxMoy)TiFeNiZr composition spread samples of a novel HEA system were deposited using magnetron sputtering and analyzed for HEA stability and oxidation resistance via in situ x-ray diffraction techniques (XRD) and ex situ Raman spectroscopy. We will discuss compositional trends of oxidation in the context of the thermodynamic push-pull between different solid solution structures, relative miscibility of the constituents, and intermetallic formation.

The Effects of Particle Size on the Cycleability of Germanium Anodes for Lithium-Ion Batteries

John Isenhower, Chemical Engineering - Junior
Mentors: Dr. Xiao-Dong Zhou, Chemical Engineering
Mr. Kuber Mishra, Chemical Engineering

As mobile phones and other portable devices become ubiquitous, rechargeable batteries are playing a large role in the global energy economy. Lithium-ion batteries are one of the more prevalent forms of this technology, so their evolution is increasingly important. With this in mind, we investigated the effects of the size of the germanium anode particles on the efficiency and life of a typical rechargeable battery. We controlled ball-milling parameters to obtain these sizes and then coated the resulting ink onto anodes for battery cells. A galvanostatic testing machine ascertained their capacities over at least fifty charge cycles, also known as the stability of the battery. The size of each particle was examined by performing a particle size distribution (PSD) on scanning electron microscope (SEM) images of the anodes. Four diameters were desired but only three have been tested thus far; with the fourth and final size undergoing analysis. Particles of .2 to .3 micrometers and of .5 to .6 micrometers produced stable cells with very little decay in discharge or charge capacity for the duration of testing. When
greater than 1 micrometer, particles decayed rapidly. The final desired particle size is .7 to .8 micrometers in order to determine the threshold diameter for stability of the battery system.

**EM Field Propagation Through Lithography Masks for Assessment of Intensity Suppression**

**Kaitlin Murphy**, Biomedical Engineering - Senior
Mentor: Dr. Ron Shiri, NASA Goddard Space Flight Center
To suppress the back-reflected light from the secondary mirror of eLISA telescope, several different shape coronagraphic masks have been designed and fabricated. An optical testbed in transmission mode has been setup in the Optics Branch Wavefront Sensing and Control Group Lab at NASA Goddard Space Flight Center to verify and validate the suppression capability of these masks. A series of experiments have been conducted where a solid-state laser source of 532 nm illuminated the masks that are on substrates. An EMCCD detector has been placed at the shadow region to record the intensity behind the mask. The optical experiment adheres to the eLISA optical testbed setup of near-field diffraction where the Fresnel number is around 4.7. A set of circular masks was used in the experiment to verify the presence and intensity of the Poisson spot at the detector and these values were then compared to their dimensionally equivalent petal masks in order to determine the suppression. The current binary petal shaped masks show expected suppression of intensity up to two to three orders of magnitude.

**Kinetic Modeling to Elucidate SO3 Formation during Oxy-coal Combustion**

**Bushra Rahman**, Chemical Engineering - Senior
Mentor: Dr. Bihter Padak, Chemical Engineering
In light of current energy demand and global warming, there is a pressing need to reduce CO2 emissions. A large portion of the carbon footprint is attributed to fossil fuel generated electricity. However, it is unrealistic in the distant future to make a clean break from fossil fuels to meet electricity demands. In the meantime, a promising technology to bridge emission reduction and energy generation is the oxy fuel combustion process for carbon capture. The behavior of sulfur in oxy combustion is important to understand due to its corrosive effects on power plant equipment. An area in this particular field is investigating the SO3 formation in oxy combustion conditions. In this work, CHEMKIN software was employed to model SO2 conversion to SO3, through various reaction mechanisms, simulating conditions of a bench-scale reactor. Simulations were run at different equivalence (fuel to oxygen) ratios, oxygen percentages in flue gas, and amounts of SO2 added into the reactor to obtain SO3 and SO2 profiles along the length of the reactor. This revealed trends in those species’ formation/consumption, as well as a result of those three manipulated variables. Sensitivity analysis was conducted to address how specific reactions account for the trends in those species, as well as how the variables affect said reactions.

**Development of Broadband Energy Harvester using Cochlea Mechanics**

**Shelby Rushe**, Mechanical Engineering - Sophomore
**Dylan Madisetti**, Mechanical Engineering - Sophomore
Mentor: Dr. Sourav Banerjee, Mechanical Engineering
To address today’s call for renewable energy sources, an investigation into the sources of previously lost energy has produced a promising candidate: Ambient noise. If a broadband energy harvester can be produced in such a fashion as to be small enough to attach to and help power portable devices, such as cell phones, while at the same time being able to harvest the low frequencies, ~20 Hz to 3 kHz, that surround us in day to day life (but have yet to be successfully tapped as an energy source), society’s energy demand can be alleviated. Research has dictated that the human ear, more specifically the Cochlea, has the unique mechanical properties needed to achieve such a device, and our studies and work have revolved around producing a model that incorporates this bio-design. We have started the design process of such a device through the systematic testing of different geometries and layouts of piezoelectric material, simulating the energy harvesting mechanism using the COMSOL Multiphysics Package for Finite Element Modeling. We have developed cantilevered beams of unique geometries that have not previously been considered for energy harvesters, but due to advances in 3D printing technology, are now attainable enough to be considered and studied. We will be able to investigate the frequencies collected and the amount of energy produced by each geometry and we hope to fabricate a model from our most optimal design. It is our hope that our efforts will someday lead to an industry harvester or sensor.

**Characterizing the interactions of glassy deposits with thermal barrier coatings**

**Rachel Smoak**, Chemical Engineering - Junior
Mentor: Dr. Jason Hattrick-Simpers, Chemical Engineering
A turbine blade is one of the most engineered materials on an airplane partially due to the intense heat load it must withstand during operation. In order to prevent the turbine blade from melting, a thermal barrier coating (TBC) made of yttria-stabilized zirconia (YSZ) is coated on the surface. However, during operation air-borne calcium-magnesium-alumino-silicate (CMAS) materials thermochemically attack the YSZ coating, causing coating failure. The search for a CMAS-resistant TBC has been a recent focus of materials research; however, models of CMAS with wide compositional variation have been used in these studies. This study systematically compares the interaction of 19 model CMAS compositions identified from the literature with YSZ. The CMAS compositions were deposited on pressed YSZ pellets and subjected to multiple heat treatments of times ranging from 20 minutes to 4 hours and temperatures averaging 1500°C and compared with a control sample. The results indicate that the different model compositions do not interact uniformly with YSZ. Specifically, for CaO contents in excess of 1 mol% a CaO stabilized YSZ composition is formed, while decreasing the CaO content results in the formation of cubic or mixed cubic/tetragonal phase YSZ. These results are consistent with literature reports of YSZ destabilization by CMAS, and are a clear indication that during the development of next generation thermal barrier coatings one must investigate CMAS interactions across a wide spectrum of model systems in order to ensure long term durability of the coating.
Determining small scale variability in aeolian sand transport through studying instrument degradation

**Jory Fleming**, Marine Science - Sophomore
Mentor: Dr. Jean Ellis, Geography

Aeolian sand transport is a result of complex interactions between the turbulent wind flow and sediment. The objective of this research project is to investigate the efficacy of the miniphone, which is a standard sensor used to count individual sand grain impacts. The two research goals are to determine the accuracy of the field-based data collected by these sensors and to ascertain whether these sensors degrade over time, which has been suggested in the literature. Eight sensors along a stream perpendicular transect along the beach surface recorded sand impacts at 44100 Hz. Individual sensors were active for different time periods, with the newly deployed sensors acting as the control. Matlab algorithms were generated and executed to complete the statistical testing between sensors. This study must assume that sensors that start at the same time have similar data values. This assumption allows for the quantification of potential degradation. The magnitude of instrument degradation is essential to understand, as models considering climate change and beach erosion incorporate data from these sensors. Previous studies assume perfect functionality and therefore may falsely attribute the differences between sensor readings as different environmental conditions. Analysis of the instruments used in scientific studies is critical, as researchers may have certain biases towards the validity of data they have collected.

Developmental Effects of Low-Dose Radiation on Dragonflies in Chernobyl and Fukushima

**Alexandra Golden**, Biological Sciences - Sophomore
Mentor: Dr. Joseph Quattro, Biological Sciences

The Chernobyl and Fukushima nuclear disasters created large quasi-natural laboratories for the long-term study of low-dose radiation. Chronic exposure in these regions has been shown to negatively affect fitness and development in both vertebrate and invertebrate species, in addition to humans. Radiation is also known to cause oxidative stress, an imbalance between reactive oxygen species (ROS) and antioxidant defenses, which can lead to increased mutation rates. Mutational events can cause developmental instability, which can be reliably tracked by fluctuating asymmetry (FA) and other developmental malformations. Fluctuating asymmetry has been shown in insect species to be an indicator of oxidative stress. For this experiment, dragonflies were chosen as a study species, due to their short generational times, discrete developmental unit (wings), and widespread distribution. We captured dragonflies of several species from the Chernobyl Exclusion Zone in the Ukraine, as well as from Fukushima, Japan. Analysis of fluctuating asymmetry was conducted using sixteen landmark points on fore and hind wings, which corresponded to homologous vein intersections, as markers for measurement of fluctuating asymmetry and overall size. Preliminary results suggest there are significant consequences for development of radiation exposure. Qualitative analysis also demonstrated frequent abnormalities in venation patterns of Chernobyl and Fukushima species. This project is the first step of a multi-year analysis of the health and environmental consequences of the Chernobyl and Fukushima nuclear disasters.
Using an Organic Agricultural Product to Decrease the Bioavailability of Copper to Aquatic Organisms

**Joshua King**, Biology - Senior; USC Aiken
Mentor: Dr. Michele Harmon, Biology/Geology; USC Aiken

Dissolved Organic Matter (DOM) is a crucial component in aquatic systems for the natural remediation of metals pollution. Natural organic compounds from DOM provide macromolecules which strongly attract cations such as copper, lead, zinc, and mercury. Binding with organic molecules reduces toxicity and bioavailability for metals uptake in aquatic organisms. The overall goal of this research was to see if Borregro HA-1, a commercially-available soil amendment product, could be used to detoxify copper pollution from a point-source discharge. Testing was conducted through a series of acute and chronic toxicity tests using the indicator organisms Daphnia ambigua and Ceriodaphnia dubia. Results indicate that the Borregro HA-1 is not toxic to either species at relevant concentrations and that it can effectively diminish the toxicity of copper.

Investigation of Mercury Resistance in Human Gut Microbiota

**Anna Lynn**, Geological Sciences - Sophomore
Mentor: Dr. Sarah Rothenberg, Environmental Health Sciences

Mercury can be found in the environment’s elemental mercury, inorganic mercury, and as organic methylmercury; the latter is known to have serious detriment to human health. Bacterial resistance to inorganic mercury and methyl mercury involves merA, a mercuric reductase enzyme, to reduce inorganic mercury, which reduces inorganic mercury to elemental mercury, and merB, an organomercurial lyase, which catalyzes the removal of mercury from the environment. Bacterial resistance is well-characterized by the presence of merA and merB in the gut microbiota, yet the presence of merB has not been characterized. Using PCR, the presence of merA was determined in the fecal samples of third trimester, pregnant women (n=17); positive results for 5 of 17 samples were noted (analyis for merB is ongoing). The presence of both genes will be correlated with concentrations of total mercury and methyl mercury in maternal fecal samples to determine whether bacterial resistance genes are associated with mercury metabolism.

U-Pb zircon geochronology in the Center for Elemental Mass-Spectrometry

**Anna Lynn**, Geological Sciences - Sophomore
**Meredith Love**, Geological Sciences - Sophomore
**Tobey Wilson**, Geology - Sophomore
**Nick Luzio**, Geology - Freshman
**Brantley Carter**, Geophysics - Freshman
**Joshua McTeer**, Geology - Freshman; USC Columbia
**Justin Holliday**, Geophysics - Junior
**Thomas Pollard**, Geology - Sophomore
Mentor: Dr. David Barbeau, Earth and Ocean Sciences

U-Pb zircon geochronology determines the age of the rocks based on the uranium-lead radiometric dating system using zircon, a nesosilicate mineral that incorporates uranium upon crystallization but excludes lead. Zircons are resistant to melting, weathering, and alteration, making them reliable geochronometers. Their relative isotopic abundances of radioactive U and radiogenic Pb can thus be used to determine crystallization ages, depositional ages, and geological provenance. Herein, we describe our use of zircon geochronology: (1) to determine crystallization ages of plutons in the Antarctic Peninsula batholith, (2) to determine if parts of the southern Appalachian Mountains are exotic terranes accreted to North America, and (3) to determine the timing of uplift of the Colorado Rocky Mountains. Whole-rock samples from each location were collected and documented in a database. There samples were then disaggregated using a jaw crusher and a pulverizer and then sieved through 500 micron mesh. Multiple methods were then used to separate the sieved mineral grains by density and magnetic characteristics, ultimately yielding a high-purity zircon separate. Resulting zircons were then mounted in epoxy, polished and analyzed using laser-ablation inductively coupled plasma mass-spectrometry (LA-ICP-MS) in the College of Arts & Sciences Center for Elemental Mass Spectrometry. Following a series of corrections, the relative abundances of uranium and lead isotopes are then used to constrain crystallization ages using the fundamental age equation.

Eco-Evolution of Chi. B and G. Index Pre-, During, and Post- PrOM Event

**Jeremiah Parks**, Marine Science - Senior
**Lauren Brisley**, Marine Science - Senior
Mentor: Dr. Howie Scher, Earth and Ocean Sciences

Paleoceanographic reconstructions largely rely on chemical signals contained in microfossils of organisms that once lived in the oceans surface. It is not always known where the organisms lived in the water column, and changes in depth habitat in time can bias paleoceanographic signals. Predictable depth gradients and δ18O and δ13C in the upper 100m allow some degree of constraining changes in the depth habitat of marine calcifiers. We measured oxygen and carbon isotopes of Chiloguembelina and Globigerinatheka across the PrOM climate event using an Element Mass Spectrometer.

Students on Ice University Program - Plankton in the Antarctic

**Alison Swan**, Marine Science - Senior
Mentor: Dr. Joe Needoba, Institute of Environmental Health

Antarctica is an extremely important continent with much to tell the world regarding our planet’s ecosystems. It is remote, hostile, and uninhabited, making it so intriguing for scientists and travelers around the globe. The Students on Ice University Program gave me the opportunity to visit Antarctica and do research on phytoplankton living in the Southern Ocean. The main purpose of the field work was to conduct plankton tows and determine the types and density of phytoplankton and krill that lived in the surface waters. Phytoplankton is the base of the Antarctic food web and the distribution and abundance is controlled by nutrient supply and sunlight availability. Our research team hypothesized that different species of diatoms would be found closer to the icebergs because the melting ice was a source of nutrients. In this experiment, plankton tows were conducted from a zodiac at six different locations around the continent and surrounding islands. In addition instruments were deployed to measure temperature, salinity, and density of the water at the sample locations. Phytoplankton were counted and identified by microscope analysis. The results suggested that larger diatoms will thrive closer to sea ice. This result suggests that with global climate change
leading to sea ice melting will increase primary production and could result in a negative feedback on climate warming by sequestering carbon dioxide from the atmosphere. Antarctica research is ongoing and there is still much to be discovered for future scientists that visit the continent.

Making ARMs Against Aflatoxin Synthesis Using a Marine Bacterium
Nora Banaszek, Biomedical Engineering - Senior
Mentor: Dr. Anindya Chanda, Environmental Health Sciences
The Gram-negative bacterium Vibrio gazogenes is a largely uncharacterized marine Vibrio species that synthesizes a group of secondary metabolites that have unique bactericidal and anti-fungal properties. The bacterial properties are investigated here as a potential solution to treating fungal infections in crops and food stuffs. Here, we show that the non-pathogenic marine responds to aflatoxin, a mycotoxin secreted by some pathogenic Aspergilli belonging to completely different ecological niches, by triggering synthesis of a novel metabolite consortium, that we call Aflatoxin Response Metabolites (or ARMs). Treatment of A. parasiticus with ARMs shows an inhibition of aflatoxin synthesis in a dose dependent manner by down-regulation of the transcriptional activation of the genes of aflatoxin pathway. It is also shown that ARMs down-regulates the expression of the methyltransferase, LaeA, a global regulator of secondary metabolism, suggesting that Vibrio metabolites interfere with the entire epigenetic network of the fungus that governs secondary metabolism. This provides a novel concept for treating fungal infections in crops with a safe and environmentally-friendly solution.

Sensitivity of Species Within the Plant Family Solanaceae to FACs from Herbivore Saliva
Laquita Grissett, Biological Sciences - Junior
Mentor: Dr. Johannes Stratmann, Biological Sciences
Plants are commonly preyed upon by herbivorous animals such as caterpillars. When wounded, plants have the ability to retaliate against their predators by synthesizing defense compounds. Plants are able to recognize herbivores because of chemical components found in their saliva. The best known compounds that plants recognize are fatty-acid amino acid conjugates (FACs). Not all plants have the ability to perceive FACs. Extracellular FAC perception results in intracellular signal transduction such as activation of mitogen-activated protein kinases (MAPKs). MAPKs act as the mediator between the external stimuli (herbivory/FACs) and an internal plant response such as activation of genes that code for the synthesis of defense compounds. FAC-induced MAPK activity in leaves of plants can be measured by immunoblotting using an antibody which recognizes only active phosphorylated MAPKs. The goal of the research is to test whether sensitivity to FACs can be predicted by the evolutionary relationship of plants. Plants of the Solanaceae family include e.g. potato (Solanum tuberosum), the garden tomato (S. lycopersicum), and tobacco (Nicotiana) species. When various Solanaceae species were treated with FACs, Solanum tuberosum, and S. cheesmania, both very close relatives of S. lycopersicum, have the ability to perceive FACs while S. lycopersicum and some wild tomato species are insensitive to FACs. I also showed that species in the genus Nicotiana such as N. alata, N. benthamiana, and N. tabacum have the ability to perceive FACs. The data demonstrates that FAC perception may not follow an evolutionary pattern.
Vibrio parahaemolyticus parasitism on Emiliania huxleyi

**Katherine Haney**, Biological Sciences - Senior

Mentor: Dr. Charles Lovell, Biological Sciences

Vibrio parahaemolyticus is a gram negative halophilic bacterium found in nearshore waters, sediment, and in association with marine invertebrates. Abundance and distribution of this organism are also correlated with marine phytoplankton blooms. Most research on this opportunistic pathogen has focused on epidemiological and clinical aspects of V. parahaemolyticus gastroenteritis. The ecology of this fast growing and abundant organism, specifically acquisition of nutrients in estuarine environments, has received less attention. V. parahaemolyticus is capable of expressing numerous virulence factors and strains of this species display substantial variability in the virulence factors they carry. Well-understood virulence factors include extracellular proteins, as well as secretion systems that translocate cytotoxic effector proteins into host cells. The latter may enable parasitism on algae. We examined the impact of infection of a ubiquitous marine bloom-forming coccolithophorid microalga, Emiliania huxleyi, with V. parahaemolyticus by monitoring algal chlorophyll a autoflourescence. V. parahaemolyticus and E. huxleyi co-occur in warm marine systems and are likely to interact not only in vitro but also in natural environments. These interactions could significantly influence the quantity of the microalga in the system, algal bloom dynamics, and thus the primary production of the system.

Mislabeling of Atlantic Cod in Spain

**Josh Helgoe**, Marine Science - Senior

Mentor: Dr. Joseph Quattro, Biological Sciences

Purposeful mislabeling of fish or fish products is a worldwide problem that is poorly understood, under-enforced, and under-researched. Often fish are unintentionally mislabeled; however, deliberate mislabeling is more commonly done in order to increase profits or bypass fishing regulations. This study serves as insight into this problem by analyzing mislabeling rates of the popular fish Atlantic cod (Gadus morhua) through eight Spanish cities. Samples labeled as ‘cod’ were purchased directly from supermarkets, restaurants, and fish markets. These samples were preserved in 95% ethanol and shipped to USC prior to DNA extraction. DNA barcoding approaches were used to identify individual tissue samples (labeled as cod by the distributor) to species. Briefly, mitochondrial COI sequences were amplified from individual tissue samples, sequenced then compared to a large COI Fish Barcode of Life sequence database to determine if the purchased fish were Atlantic cod as they had been labeled. Initial results suggest a relatively low rate of mislabeling (5%, 4 of 77 samples assayed). The mislabeled samples were positively identified as Nile perch (Lates niloticus), saithe (Pollachius virens), and two samples positively identified as haddock (Melanogrammus aeglefinus). I discuss these results considering the phylogenetic relationships between Atlantic cod and identifications based on DNA barcodes as well as the source of individual mislabeled fish products.

Genetic Effects of Low-Dose Ionizing Radiation on the Chaffinch (Fringilla coelebs) in Chernobyl

**Michael Owens**, Biochemistry and Molecular Biology - Junior

Mentors: Dr. Andrea Bonisoli-Alquati, Biological Sciences
Dr. Anders Møller, Laboratoire d’Ecologie, Université Paris-Sud
Dr. Timothy Mousseau, Biological Sciences

The meltdown of the Chernobyl Nuclear Power Plant in 1986 resulted in numerous deleterious ecological effects on the area’s wildlife. Currently, a 30-km radius area around the disaster site (known as the Chernobyl Exclusion Zone, CEZ) remains contaminated with low-dose ionizing radiation at a level that is orders of magnitude higher than surrounding areas. Studies have indicated that the avian populations of the CEZ have higher incidence of partial albinism, abnormal sperm motility, and decreased brain size, among other effects. Previous investigations have probed the genetic effects of the Chernobyl disaster using gene expression microarrays. These studies (conducted using the common chaffinch, Fringilla coelebs) identified a large number of genes whose expression levels differed between contaminated and clean individuals. To investigate the cause of these abnormal expression levels, we tested for copy number variation in a number of chaffinch genes using quantitative real-time PCR, using DNA samples from birds within and outside the CEZ. Two gene pairs were selected, along with another single gene, and copy numbers were compared to β-actin. Each pair consisted of one gene whose expression levels were raised and one gene whose expression levels were decreased. Pairs were selected based on proposed interactions between the two genes in question, as found during a literature review. Preliminary findings suggest that the expression patterns of these genes are not correlated with their copy number. This indicates that the molecular effects of the Chernobyl disaster are not mediated at the pre-transcriptional level for these genes.

Microfossil Indications of Ancient Mesopotamian Ecology

**Blythe Padgett**, Anthropology - Senior

Mentor: Dr. Jennifer Pournelle, Environment and Sustainability

Geological sections in the Tigris-Euphrates River delta of southern Iraq, sampled by the Sealands Archaeology and Environment Program, radiocarbon-dated as bracketing the entire period of known human occupation in the region, reveal largely homogenous marsh sediments with few visual stratigraphic indicators. However, previous work suggests centennial–millennial scale eustatic and climatic variation that should be detectable from variations in sediment composition. Aquatic foraminifera species are sensitive to variations in water salinity and dissolved oxygen, and thus serve as proxies for ecosystem health as well as discriminators among palustrine, estuarine, and marine environments. In this study, I will extract and classify foraminifera microfossils preserved in those sediments, in order to establish the sequence, timing, and geographic extent of marine inundation and marsh formation. It is hypothesized that prior to 6000 BCE, the area was submerged under the head of the Arab-Persian Gulf, but by c.4500 BCE, falling sea levels and deltaic progradation created a lush, freshwater marsh system that was exploited for agricultural and pastoral production, construction, fisheries, and boat-based trade, enabling and contributing to the
growth of ancient urban centers. However, due to human interventions over the past two decades, this area is now mostly barren desert, with only a small population. We will seek to show whether archaeologically attested periods of economic prosperity over the past six millennia can be positively correlated periods of healthy marsh ecology, in order to indicate critical ecological mitigation that should be considered as part of ongoing efforts to revitalize the region.

**Interning with NOAA and the Hollings Experience**  
*Mallori Williams*, Environmental Science - Senior
As I entered the University of South Carolina as an Environmental Science major my freshman year, I quickly realized that it would be difficult to narrow down my field of study and make specific plans for my future. I learned about the Ernest F. Hollings Scholarship through email from the Office of Fellowships and Scholar Programs, and I attended the informational workshop. The scholarship appealed to students in the marine and environmental fields who also had goals that correlated with the National Oceanic and Atmospheric Association's mission. The application process forced me to seriously consider my career goals, and after taking several semesters of courses and researching career opportunities, I realized that environmental health was the perfect fit for my interests. The staff in the OFSP office helped me revise my personal statement and polish my application, and I was successful in obtaining the scholarship. In addition to receiving academic funding for my junior and senior year, I was also able to participate in a 10-week internship with the NOAA offices in Charleston, Sc. I spent my summer developing an online survey that examined the diets of fishermen in Brunswick, Ga to determine if they were at risk for high polychlorinated biphenyl consumption. Working with NOAA scientists on an environmental health project only confirmed that I was going into the right field, and has motivated me to pursue my Master’s of Public Health with a concentration in Environmental Health. The application process for the Hollings Scholarship allows students to think about their future early within their collegiate career and receiving the award provides experience and networking opportunities that are invaluable for the future. The staff in the Office of Fellowships and Scholar Programs are always available to help students and are the most helpful assets during the application process.

**The Role of Fresh Water and Salt Fluxes in Southern Ocean Deep-Ocean Warming**  
*Victoria Young*, Marine Science - Senior  
Mentor: Dr. Subrahmanyam Bulusu, Earth and Ocean Sciences
The Southern Ocean plays a major role in global ocean circulation, a system of surface and deep currents, linking all oceans and one of the fundamental determinants of the planet’s climate. Because the Southern Ocean around Antarctica is the only location where the ocean can circulate freely all the way around the globe without continental barriers, it’s a huge part of the ocean cycle. Despite this recent increase in our understanding of the Southern Ocean system, there is still uncertainty in the fluxes and transport of fresh and salt water within this region. Difficulties arise when studying the fluxes and transports within the Southern Ocean due to lack of research focusing on the following: the sources of freshwater inputs into the Southern Ocean system, the circulation of the ocean, and the vertical stratification. Satellite-derived salinity from the Aquarius salinity mission (September, 2011-present) and Simple Ocean Data Assimilation (SODA) Reanalysis (1950-2010) are used to estimate freshwater and salt fluxes. Our results indicate that recent changes in freshwater and salt fluxes are a major component of the deep-ocean warming in the Southern Ocean. In particular, the role of changes in these fluxes in causing surface cooling and increasing deep oceanic storage of heat in the Southern Ocean is investigated.
Relationship Between Sedentary Time and Body Fat Percentage in College Students

**Savannah Bailey**, Exercise Science - Sophomore; USC Lancaster
Mentors: Dr. Sarah Sellhorst, Exercise Science; USC Lancaster
Dr. Elizabeth Easley, Exercise Science; USC Lancaster

Increased levels of body fat lead to negative health outcomes. A contributing factor to increased body fat percentage is sedentary activity. Purpose: The purpose of this study was to see if sedentary time on the weekend, on a weekday or a combination of both leads to a higher body fat percentage. It was hypothesized that a combination of sedentary time on the weekend and weekday have a stronger correlation to a high body fat percentage. Methods: The population of this study were full time students from a small, rural, commuter college campus aged 18-25. The participants completed a survey for time spent sedentary on an average weekend and weekday. The participants also completed a DXA scan to determine their body fat percentages. Results: Eighty-one students (19.4 yr; 28.7% body fat) participated in this study. Correlational analyses found no significant relationships between body fat percentage and weekend (r=0.187, p=0.094) sedentary time, weekend (r=0.174, p=0.124) sedentary time or a combination of both (r=0.203, p=0.072). Conclusion: No relationship between sedentary activity and body fat percentages were found. This finding was unexpected based on previous studies. The self-report surveys may have proved to be an inaccurate way to measure sedentary time because the participants may have misunderstood instructions. They also may not have an accurate perception of their sedentary time.

Student Athlete Response to Injury

**Brett Ball**, Criminal Justice - Senior
Mentors: Dr. Toni Torres-McGehee, Physical Education and Athletic Training
Dr. Kendra Cusac, Psychology

Sports injury can be traumatic for many athletes because it is an important component of their self-identity. In addition to the physical pain of an injury, athletes struggle psychologically; however little is known about their emotional response, recovery, and need for social support (Klent, 2006). There is not sufficient data and services to meet the psychological needs of student-athletes in southeastern universities in the United States. The purpose of this innovative study was to gather information concerning the need of a support group based off the feedback from student athletes who have suffered season and/or career ending sport related injuries. It was hypothesized that students with severe injuries would be interested in actively participating in an online support group to assist with their coping with an injury(s). Through each university’s faculty representatives an online survey was distributed via email to each student athlete. The survey sample size (n=127) results revealed that athletes reported feeling helpless, frustrated, depressed and angry post severe injury. In addition to coping strategies, athletes reported the top three to be talking with someone 64.5%, 59.1% sleep more, and 37% wanted engage in additional physical rehabilitation. 17.4% reported that they saw a counselor, psychologist, or attended a support group after injury; however 58.7% athletes reported they would like to be involved in an organized support group with other athletes who have similar injury experiences. The data supports the need for innovative strategies for creating an online support group to meet student-athlete needs.

Orthopedic Research and Shadowing Experience

**Jake Driver**, Exercise Science - Sophomore
Mentors: Dr. Thomas Gross, Midlands Orthopedics
Dr. Patrick Hickey, Capstone Scholars Program

As an aspiring medical student I had no conception regarding the range of activities and the multitude of components that come together to support the modern day medical practice. Additionally, I had no perception of the unique needs of the patient populations served by a medical practice nor the amount of time and dedication that must be taken to be able to fulfill those needs. To develop an awareness of how a medical practice is managed, I spent the last year working with Dr. Thomas Gross and the entire Midlands Orthopedics team. Through the support of a Magellan Apprentice Research Grant, and under the mentorship of Dr. Gross, I was able to become involved in a myriad of medical office activities that helped me to develop a more accurate vision of how a medical practice operates. One of the highlights of this experience was my weekly interactions with a post-surgical patient population. Through use of follow up questionnaires, based on post-operative progress, I was able to collect data, enter the information into a data analysis program, and most importantly was able to see the end use of this data as Dr. Gross utilized the information to validate the successes of his surgical procedures. This experience has given me an in-depth awareness of the dynamics of the physician/patient relationships, and in doing so has impacted my path here at USC as I now see the need and value of advanced education, communication and organizational skills, and a strong work ethic.

Impact of College Major on Body Fat Percentage

**Emily Freeman**, Chemical Engineering - Sophomore; USC Lancaster
Mentors: Dr. Elizabeth Easley, Exercise Science; USC Lancaster
Dr. Sarah Sellhorst, Exercise Science; USC Lancaster

It is a common assumption that students in a health-based discipline should have more knowledge about the risks that are associated with obesity. Purpose: The purpose was to determine if there was a difference in the body fat percentages between health-related majors and non-health-related majors. Methods: Eighty-two full time students aged 18-25 (38 male, 44 female) from a small, rural, commuter college campus participated in the study. Students were categorized into two groups based on major (health-related, non-health-related). Percent body fat was obtained through a DXA scan (IDXA LUNAR). Results: A 2x2 between subjects ANOVA was performed on body fat percentage as a function of sex and major. Sex differences were significant F(1,78)=40.691, p<0.001; however there was no significant difference across major F(1,78)=2.363, p=0.0128 nor was there an interaction effect by major/sex F(1,78)=0.640, p=0.426. Conclusion: No difference was found in body fat percentage between health-majors and non-
health majors. Future studies should evaluate students during their senior year, when they have taken higher level health classes and have stayed in their major for an extended period of time. With the population changing from lower-level students to upper-level students, the results may show a difference between the two groups at that point.

**Correlation between Reach Kinematics and White Matter Integrity in the Brain after Stroke**

**Michael O’Donnell**, Exercise Science - Senior  
Mentor: Dr. Jill Stewart, Exercise Science

Damage to white matter structures due to stroke can affect movement ability in the arms. The direct effects of cortical spinal tract (CST) and corpus callosum (CC) integrity on reach kinematics are unknown. The purpose of the current study was to examine the correlation between reach kinematics and the integrity of two white matter pathways: the CST (primary motor output pathway) and the CC (pathway that connects the two hemispheres). Eleven individuals with mild motor impairment due to stroke and 6 age-matched controls reached to targets at three distances (8, 16, 24 cm). Kinematic data for peak velocity, peak acceleration, and movement time were compared between arms and between groups. Diffusion tensor imaging was used to determine structural integrity, measured by fractional anisotropy (FA), of the CST and the motor and premotor regions of the CC. In the stroke group, reaches with the weaker arm had lower peak velocity, lower peak acceleration, and longer movement time compared to controls (p0.05). There was no significant correlation between reach kinematics and CST or motor CC integrity. For reaches with the weaker arm, premotor CC FA correlated with movement time (r=-0.639, p=0.034). For reaches with the less impaired arm, premotor CC FA correlated with movement time (r=-0.769, p=0.006) and peak acceleration (r=0.673, p=0.03). The structural pathways between the two premotor cortices, areas commonly reported to support motor recovery after stroke, may play an important role in the control of skilled arm movements in individuals with mild motor impairment.

**Visual and Bimanual Motor Learning Effects in a Virtual Dynamic Task**

**Christopher Perry**, Exercise Science - Graduate Student  
Mentor: Dr. Troy Herter, Exercise Science

Learning a motor skill occurs across time with repeated practice. For optimum performance at a task, more efficient movements and increased planning must occur. Improvements in motor learning are well documented, but little is known about visual system adaptations to skill learning. The purpose of this study is to analyze visuo-motor adaptations in a dynamic bimanual motor task. Eighteen participants practiced a novel bimanual task (Object Hit and Avoid Task) in which virtual paddles were used to hit away Target objects (2 geometric shapes; e.g., circle, rectangle) and avoid hitting Distractor objects (6 geometric shapes; e.g., square, triangle). Subjects completed six repetitions of the task once per week for six weeks. Eye and hand movements were recorded to investigate the influence of visual search on task performance. Task performance increased across all six weeks. Acute increases in task performance were seen in number of targets successfully hit. These improvements were coupled to the number of targets that were visually pursued and number of targets that were successfully hit following pursuit. Chronic increases in task performance were seen in the number of successful distractor avoidances. These improvements were coupled to the percent of targets hit but not visually pursued. Visuo-motor learning occurs in two stages. The acute phase improves motor learning by utilizing high quality visual input associated with overt attention and primary task goals. The chronic phase of visuo-motor learning refines actions of secondary task goals and utilizes lesser quality information associated with covert attention.

**Feasibility and Effectiveness of a Novel Computer-Game Based Intervention for Social Skills in Children with Autism**

**Giovonni Ravenell**, Exercise Science - Senior  
Mentor: Dr. Roger Newman-Nourland, Exercise Science

Authors: Giovonni Ravenell, Trevor Jones, Chelsea Wiliams, Courtney Cauthen, Katie Rush, Roger D. Newman-Nourland  
Autism is complex neurodevelopmental disability that affects approximately 1% of children aged 3-17 in the United States, and costs the United States an estimated $32 billion dollars per year. One of the characteristic features of children with Autism is an impairment in social functioning, which is expressed during interactions with both same-age peers and adult caregivers. The development of effective interventions is an important goal of researchers and clinicians working with this specific population. We are testing the effects of the “Cooperation Station,” which is comprised of six multiplayer mini-games that promote cooperation and teamwork, on children with or without a diagnosis of Autism. Participants will play the games three times per week for 30 minutes. Children with Autism at the South Carolina Autism Academy (N = 8) are currently participating in this study. Social skills are being assessed both prior to and immediately following the 9-week intervention using the Social Responsiveness Questionnaire (SRQ). We expect that the children’s social skills will improve as a result of our 9-week intervention, and that the extent of these improvements will be proportional with the degree of improvements in performance. Positive findings may suggest the justification of the use of cooperative video games as a tool to treat clinical populations with social deficiencies.

**Predicting Post-Stroke Cognitive Recovery using Neuroimaging and Trail Making Tasks**

**Olivia Spead**, Biological Sciences - Senior  
Mentor: Dr. Troy Herter, Exercise Science

In the US, over 1,000,000 survivors of stroke live with chronic disability making stroke one of the leading causes of disability and the largest contributor to neurological disability. Mapping out behavioral deficits to patterns of brain damage may improve our ability to predict each patient’s likelihood of long-term recovery. The goal of this project was to use Voxelswise Lesion Symptom Mapping (VLSM) techniques with quantitative measures of visuomotor and cognitive function obtained from the Trail Making Tests (TMT) to generate statistical maps of brain regions associated with impairments of visuomotor processing and executive function. We hypothesized that damage to constrained regions of the prefrontal and posterior parietal cortices will be predictive of impairments.
affecting cognitive flexibility. To address our hypothesis, we examined 54 subjects 20-85 years of age with cortical lesions resulting from a stroke at least six months prior to testing. Subjects performed variants of TMT-A (numeric) and TMT-B (alphabetic) on an upper-limb robotic device. High-resolution statistical maps showed that lesions of the superior longitudinal fasciculus, globus pallidus, and putamen were associated with impairments in both TMT-A and TMT-B. These findings indicate that damage to these brain areas could be predictive of impairments in cognitive flexibility following stroke.


Natalie Swift, Journalism, Mass Communications Concentration - Senior
Mentors: Dr. Andrea Tanner, Journalism and Mass Communications
     Ms. Courtney Schrock, Health Promotion Education and Behavior
     Dr. Daniela Friedman, Health Promotion, Education, and Behavior

Background: National strategic health plans, defined as a set of strategies aimed at changing a health behavior at a population level, have been developed in the United States (U.S.) for various health issues, including tobacco control and heart disease. In 2010 the National Physical Activity (PA) Plan for the U.S. was developed. Communicating PA guidelines to the U.S. public is included in this plan; however, no studies to date evaluate the quantity and scope of PA communication research being conducted. Purpose: This study identifies strengths, weaknesses, and gaps in PA communication literature as a first step toward designing a more persuasive messaging for PA guidelines. Method: After searching abstracts across two large databases, 64 original research articles were found focusing on PA communication in the U.S. A quantitative content analysis was performed. Results: Most studies were published after 2005 (89%) and few mentioned PA Guidelines (8%) or Plan (2%). Most focused on research about mass communication (64.1%), including Internet (34.9%), newspapers/magazines (23.4%), pamphlets/posters (20.3%), advertisements (17.2%), local TV news (17.2%), radio (12.5%) and social media (9.4%). Studies most often examined how to promote (95%) or educate (40%) citizens about PA. Conclusion: PA communication research has increased significantly since 2005, however, research is not often guided by the PA Guidelines or Plan. There is a need for additional research focused on the use of social media to promote PA. Health practitioners should examine this growing body of literature to determine evidence-based practices for PA promotion.

The Effects of Chemical Exposure on General Health

Megan Weaver, Biochemistry and Molecular Biology - Senior
Mentors: Dr. Teresa Moore, Exercise Science
     Dr. Christine Blake, Health Promotion, Education & Behavior

Today, we live in a world where every product in the home is comprised of, or covered in chemicals, the majority of which we have little understanding of their effects on our health. This study seeks to give a better understanding of the effects of the combined effects of the chemicals that we face on a daily basis. During this study I greatly reduced my exposure to chemicals from food, beauty products, daily health products, and cleaning products, in order to study the effects on my nutrition, energy and general wellbeing. In addition, the practicality of living this lifestyle, concerning ease of access to alternative products and food sources, as well as the effects on cost of living were also considered. While no immediate effects on my mood, energy, or general health were observed during this experiment, a chronicle of the chemicals to which I limited my exposure showed a potential to decrease chances for disease later in life, if such a lifestyle were to be continued. In addition, this lifestyle was a significant source of stress throughout the semester, and did significantly increase my cost of living. Although, this latter effect was minimized throughout the semester as I was able to locate low cost organic foods. Overall this experiment did not show any immediate effects on wellbeing other than increased stress levels, however were such an experiment to be carried out over a lifetime, we might be able to see a decreased incidence in diseases such as cancer.
Tenoforv Plasm Concentrations in Obese, Human Immunodeficiency Virus (HIV)-Infected Subjects

Angelena Cuteri, Pharmacy - Senior
Mentor: Dr. Brandon Bookstaver, Clinical Pharmacy and Outcomes Sciences

Background- To gain optimal effect from antiretroviral therapy (ART), maximal viral suppression is obtained through patient adherence to medications. Along with the increased lifespan, HIV patients are suffering from additional comorbidities, like obesity. There is currently no data regarding concentration of one of the preferred agents, tenoforv, in the obese, HIV population. There is a need for this data to be able to determine if the current universal dose of tenoforv is appropriate for all patients.

Objectives- The objectives of this study are to determine if a difference exists in steady state tenoforv plasma concentrations between obese and non-obese HIV-infected subjects. Secondary objectives include determining if an inflection point exists where body mass index (BMI) or weight becomes a significant predictor of concentrations and if there is a significant correlation between body fat percentage and concentrations.

Methods- In this single-site, pilot study, 24 subjects taking tenoforv of varying BMI’s will be enrolled through the clinic’s database. Subjects will all sign a written informed consent. Inclusion criteria include HIV+ adults who have been taking a tenoforv-containing regimen for at least one month with proven adherence to medication and CrCl 60 ml/min. Potential subject will be excluded who are enrolled in another research study and who are taking other medications known to interact with tenoforv. Each subject will have three blood samples drawn at times to represent their minimum, maximum, and random-time concentration. Using population pharmacokinetic statistics, the concentrations from these subjects will be evaluated to determine if there is a significant trend in concentration level and BMI.

Screening for viral hepatitis prior to rituximab chemotherapy

Alyson Leonard, Pharmacy - Senior
Mentors: Dr. Bryan Love, Clinical Pharmacy and Outcomes Sciences
Dr. LeAnn Norris, Clinical Pharmacy and Outcomes Sciences

In 2008, the CDC released guidelines recommending screening of all patients receiving rituximab to identify patients at risk of Hepatitis B Virus (HBV) reactivation. This study evaluates implementation of this recommendation in veterans, who are at increased risk of HBV. This study also sought to determine the recommendations effect on the screening of Hepatitis C Virus (HCV). Medical records, from 2006 to 2012, were retrospectively reviewed and stratified into two groups: 2006-2008 (Period 1) and 2009-2012 (Period 2). Appropriate screening was defined as HBV testing within 180 days before or 60 days after the first rituximab dose. Baseline characteristics were compared using Fischer's exact test and students t-test. Logistic regression was used to model the odds of HBV screening. The same process was followed for HCV screening. During the study period a total of 102 patients were treated with rituximab. The two groups displayed similar demographics. For HBV during period 1, 22% were screened compared with 32% during period 2 (p=0.28). The only significant predictor of HBV screening was treatment during 2009 (adjusted OR=5.32). For HCV during period 1, 22% were screened compared with 21% during period 2 (p=1.00). There was no significant predictor of HCV screening. Despite the recent guideline there was not a significant increase in the proportion of veterans screened for HBV. HCV screening displayed no significant increase in relation to the release of the CDC guideline. Opportunities exist for pharmacists to educate providers on screening for viral hepatitis prior to immunosuppressive.

Co-administration of oral fluoroquinolones with multivalent cations

Samantha Murrow, Pharmacy - Senior
Taylor Stone, Pharmacy - Junior
Mentor: Dr. Brandon Bookstaver, Clinical Pharmacy and Outcomes Sciences

Fluoroquinolones (FQs) antibiotics are widely used in the hospital setting for multiple indications. The bioavailability of FQs are greatly reduced when they are co-administered with multivalent cation-containing compounds (MVCCs). The purpose of this study is to determine the impact of oral FQs co-administered with oral MVCCs in hospitalized patients at two medical centers. This is a retrospective, non-interventional study. Patients (18 years of age) who received oral FQs for (24 hours), between January 2013-March 2013 will be screened for study inclusion. Patients 18 years of age and cases of non-oral FQs were excluded. Electronic medical records will be used to collect study data. Data collected will include patient demographics, admission location, FQ and MVCC therapy details, time between administration, and time of administration. Patients are then divided into two groups for secondary analyses: co-administration with MVCCs and no co-administration of MVCCs. Co-administration classified as MVCC administered within 2 hours of a FQ dose. The number of doses co-administered during the day shift (7a-7p) was 1.82± 2.89 (mean ±SD) and during the night shift (7p-7a) was 0.66± 1.69 (mean ± SD). Approximately 56% of FQ doses were co-administered with MVCCs during the day shift. Co-administration primarily occurred at standard medication administration times (SMAT) 9AM and 9PM. Results are preliminary as data collection is ongoing. SMATs have since been updated at the institution from 9a to 9p to 6a and 6p. Nursing education and pharmacy departmental efforts will be needed to address this. Further analysis will be conducted as data collection is finalized.

Infusion-related Reactions Secondary to Polymyxin B in Pediatric Cystic Fibrosis Patients: A Retrospective Case Series.

Michelle Pasciolla, Pharmacy - Senior
Kristin Bunt, Pharmacy - Senior
Mentors: Dr. P. Brandon Bookstaver, Clinical Pharmacy and Outcomes Sciences
Dr. Julie Ann Justo, Clinical Pharmacy and Outcomes Sciences

We describe a series of infusion-related reactions occurring after intravenous polymyxin B administration in pediatric cystic fibrosis patients. These cases occurred at a single healthcare center following an institutional protocol change from colistimethate sodium to polymyxin B as the intravenous polymyxin of choice due to a favorable pharmacokinetic profile. Cases were identified by the
Incidence of appropriate stress ulcer prophylaxis in medical and surgical intensive care units at a teaching hospital

Rylee Rankin, Pharmacy - Senior
Mentor: Dr. Phillip Mohorn, Clinical Pharmacy and Outcomes Sciences

Inappropriate use of stress ulcer prophylaxis (SUP) contributes to many negative outcomes in intensive care unit (ICU) patient populations. The objective of this study is to determine the proportion of appropriate SUP use in critically ill patients in the ICU. This retrospective, single-center, observational study evaluated 102 adult patients admitted to the medical or surgical ICU from January 1, 2013 to December 31, 2013. Patients were categorized based on appropriateness of SUP on day 1 according to indications from ASHP. Appropriateness was assessed daily while receiving SUP therapy in the ICU, at transfer from the ICU, and at hospital discharge. The primary outcome was analyzed using descriptive statistics. Of the 102 patients included in the study, only 6.9% of patients maintained appropriate SUP over the entire follow-up period. In addition, 44.1% and 10.8% of patients were continued on SUP inappropriately at ICU discharge and hospital discharge, respectively. SUP was initiated in the majority of patients in the absence of a guideline-recommended indication. This was likely due to a large number of patients receiving SUP on day 1 or 2 of mechanical ventilation. Per ASHP guidelines, SUP is only indicated in patients who have been ventilated for 48 hours. The number of patients inappropriately continued on SUP upon ICU transfer and hospital discharge is concerning given the increased risk for adverse reactions while on SUP. The proportion of patients continued on SUP highlights the need for comprehensive medication reconciliation during transitions of care.

Facebook and Pharmacy: A cross-sectional view of what independent, community pharmacies in South Carolina are posting and how their followers respond

Kaitlyn Pennington, Pharmacy - Senior
Mentor: Dr. Bryan Ziegler, Clinical Pharmacy and Outcomes Sciences

Objective: To assess the use of Facebook by community pharmacies, assess the type of information shared by the pharmacy via Facebook, and evaluate the level of patient engagement. Design: Cross-sectional Setting: Facebook from September 1st- November 30th, 2013 Participants: 49 independent community pharmacies from the state of South Carolina Main Outcome Measures: Posts were categorized and evaluated based on a pre-developed algorithm and protocol. Patient engagement was evaluated using a “participation score” calculation. The main outcome was considered “positive” in posts receiving a participation score 5.

Results: 700 posts from 49 pharmacies were categorized. The average number of posts per pharmacy was 14.6 (range 1-158) posts during the 3-month period. Class A (Advertises the pharmacy or a pharmacy service) - 8/94 (8.5%) achieved the main outcome. Of these, 7 posts (87.5%) included a visual aid or other graphic. Class B (Advertises a specific product) – 2/67 (2.9%) achieved the main outcome. Both (100%) included a visual aid or other graphic. Class C (Advertises an event) – 7/59 (11.9%) achieved the main outcome and 5 posts (71.4%) included a visual aid or graphic. Class D (Disseminates healthcare knowledge) - None achieved the main outcome. Class E (Purpose not otherwise listed) - 48/196 (24.4%) achieved the main outcome and 42 posts (87.5%) included a visual aid or other graphic. Conclusions: Garnering attention via social media seems to be done most efficiently using posts that engage the reader through personal information, according the results of this study. This explains the success of Class E, as most post were directly pharmacy related and included themes such as retirement announcements, photo contests, and staff member highlights. The relative success of classes A and C may also be explained by this same principle, as pharmacy posts that advertised the pharmacy itself or local, pharmacy sponsored events also garnered much attention. Visual aids also seem to help attract attention from followers, as a large percentage of posts meeting the main outcome included visual aids.
Patients were primarily treatment experienced (60%) and Stribild® was initiated for simplification of therapy or due to adverse events from previous regimen in 30% and 17% of patients respectively. Treatment-related non-renal adverse events were reported in 48 patients (17%). The mean increase in SCr from baseline to peak was 0.2 mg/dL. Three patients developed AKI and 20 patients discontinued therapy. Our results support limited severe treatment-related events were reported and that initiating SMX/TMP simultaneously with Stribild® may further perpetuate rises in serum creatinine. It may be suggested that this therapy was also tolerated in treatment-experienced patients and will be used widely within the rural population.

Print Exposure influences Orthographic Knowledge
Duyen (Jenny) Co, Exercise Science - Junior
Mentor: Dr. Krystal Werfel, Communication Sciences and Disorders
The purpose of the proposed study is to determine the influence of print exposure on orthographic knowledge of second graders. Participants are 40 second graders with typical development. After parental consent was obtained, participants completed assessments of print exposure, orthographic knowledge, and literacy skills: CTRT, TWS, OPA, MGRT, TOWRE, and CTOPP. On the CTRT, participants choose which titles of children's books are real books from a list of real and made-up book titles. On the untimed orthographic knowledge tests (OPA), participants choose from pairs of words which word (a) follows English orthographic patterns (e.g., biff vs bbif; OCT-A) or (b) is spelled conventionally (ex: dog vs dahg; MGRT). We will develop the MGRT measure. For the timed OPA tests, we will develop alternate lists of items and program reaction time experiments to test processing speed rather than simple accuracy. On the TWS, participants will write single printed words and nonwords fluently and accurately. Results are still pending.

The Physiology of Affective States
Marian Freeman, Psychology - Senior
Mentors: Dr. Doug Wedell, Psychology
Dr. Svetlana Shinkareva, Psychology
Affective states influence our behavioral and physiological reactions to the outside world and are the building blocks of emotion. The objective of this study was to examine the similarities of physiological responses to visual and auditory stimuli matched on their affective ratings. Unlike self-report measures, autonomic measures do not depend on direct report of the affective state experienced. Autonomic responses have been shown to represent valence (Mauss & Robinson, 2009; Kreibig, Wholem, Roth, and Gross, 2007). However, it is unclear whether valence can be identified in the same way from the physiological responses to both visual and auditory affective stimuli. In Experiment 1 (n=13), 4s silent video and music clips were matched in valence and validated in a behavioral task. Video and music pieces did not differ significantly on valence, while positive, neutral, and negative stimuli were significantly different in valence ratings. In Experiment 2, participants rated their affective responses to affective video and music clips on a grid ranging from positive to negative. The four physiological measures were recorded: Galvanic Skin Response (GSR), Electrocardiography (ECG), electromyography of the zygomaticus major (EMGZ), and electromyography of the corrugator supercili (EMGC). The zygomaticus major is the muscle responsible for smiling, which is predicted to signify positive valence. However, the muscle in the face responsible for frowning is the corrugator supercilii, which is predicted to indicate negative valence. Heart rate deceleration and elevated GSR measures are also expected to indicate negative valence. Physiological data collection and analyses are ongoing.
Communicative Gestures in Infants with Fragile X Syndrome

**Killian Hughes**, Psychology - Senior
Mentors: Dr. Jane Roberts, Psychology
Dr. Jessica Klusek, Psychology

Introduction: Atypical gesture can serve as an early red flag for atypical communication development even before delays in spoken language are evident (Crais et al, 2009). However, little is known about gesture use in infants with fragile X syndrome, a genetic condition marked by communication impairments. Objectives: (1) Differentiate gesture frequency and function in infants with FXS and typical development (TD) and (2) Examine the relationship between gesture use and expressive language development. Methods: Gestures of twelve-month old infants with FXS (n=10) and TD (n=16) were coded from a semi-structured interaction with an examiner, using a coding schema from Watson et al. (2013). The dependent variables included the frequency of joint attention, social interaction and behavioral regulation functions and total gestures. Gestures were consensus coded by two blind raters who had established 80% reliability on the gesture functions prior to coding. Expressive language was indexed with the Mullen Expressive Language Scale. Results: No significant group effects were detected for the overall gesture frequency or the frequency of the three gesture functions, after controlling for developmental level (ps.269). In FXS, joint attention gestures were positively associated with expressive language skills (r=.665, p=.036) while no relationship was detected between expressive language and the other gestures functions (ps.589). Conclusions: Joint attention gesture use is associated with enhanced expressive language skills in infants with FXS. While infants with FXS did not differ from infants with TD in gesture frequency or function, these analyses were limited by small sample sizes and more research is needed.

Individual differences in reading ability and electrophysiological signatures of word recognition

**Ian McGuire**, Biochemistry and Molecular Biology - Junior
Mentor: Dr. Jessica Green, Psychology

This study involved the use of electroencephalogram (EEG) imaging to investigate the relationship between reading ability and neural activity observed during a lexical decision task. A group of 29 participants (20 female) took part in the study. All participants were given a screening questionnaire to indicate their likelihood of having a reading disability (dyslexia) and their reading speed was measured. Dyslexia scores ranged from 0 to 12 (M: 3.97, SD: 3.26) and reading speed ranged from 160.59 words per minute (wpm) to 385.57 wpm (M: 243.92, SD: 59.40). During EEG recording, participants were shown strings of letters and had to discriminate if the letters formed a word or a non-word. All data has been collected and data analysis is currently ongoing. It is hypothesized that the degree of hemispheric lateralization will vary with individual differences in reading ability, such that electrophysiological signatures of word recognition will be left lateralized in strong readers but not in individuals with poorer reading skills.

Evaluating the Effects of Word Formation on Visual Crowding

**Elena Nelson**, Psychology - Junior
Mentor: Dr. Melanie Palomares, Psychology

Competency in reading is a crucial skill acquired during the developmental process. This acquisition of knowledge allows us to become active members of society, as we are constantly surrounded by words and letters in everyday life. The greater capacity for reading allows for the quicker identification of letters and words in any setting. Therefore, there is a strong need to better understand the relationship between reading fluency and the perceptual factors that effect the process of reading itself. This study examined the link between visual crowding and reading abilities. Crowding occurs when neighboring objects disturbs the identification of target stimuli. We asked participants to identify a target central letter flanked by near or far letters. The three-letter array could form words or non-words that were briefly presented (100 ms) at 82.23 degrees viewing eccentricity. Results suggest that letter identification within the context of words was more accurate than letter identification in non-words. In addition, Pearson correlation analyses show that standardized reading fluency scores were positively correlated with letter identification accuracy, specifically within the context of words. These results suggest that visual crowding and reading abilities are related in adults. Future studies in children would elucidate when the word superiority effect as well as the correlation between reading fluency and crowding are established in development.

Anxiety and Pragmatic Language Deficiency in the FMR1 Carrier Population

**Alexis Ruber**, Biological Sciences - Sophomore
Mentors: Dr. Jessica Klusek, Psychology
Dr. Jane Roberts, Psychology

1 in 151 women have the premutation for fragile X syndrome (FXS) on the FMR1 gene [1]. FMR1 carriers report elevated social anxiety [2] and anxiety is thought to play a role in pragmatic language (social language) deficits in FXS [3]. Though little is known about the relationship between anxiety and pragmatic language of FMR1 carriers, there is a significant correlation between social phobia and pragmatic language deficit in parents of autistic children [4]. This study examined social anxiety as a correlate of pragmatic deficits in the FMR1 premutation. The conversation of 30 women with the FMR1 premutation was coded for pragmatic language violations using the Pragmatic Rating Scale (PRS; Landa et al., 1992), with 26 items capturing communicative form, content, and delivery, such as “overly frank” and “too loud”. Social anxiety was measured with the Liebowitz Social Anxiety Scale (LSAS; Liebowitz et al., 1987). The LSAS was not correlated with the total PRS score (r=-0.025, p=0.896). Exploration of relationships with individual PRS items showed a significant correlation between atypical rate of speech and the LSAS (r=0.362, p=0.05). No other significant item-level associations were detected. Elevated social anxiety was associated with atypical rate of speech; however, the “rate” item captured both too fast and too slow speaking styles, limiting interpretation. Rate of speech may be associated with increased anxiety through cognitive-executive impairments also seen in the premutation and associated with anxiety [5]. Future research should explore executive underpinnings of pragmatic language deficiency and anxiety in the FMR1 carrier population.
Hostile Attribution Bias as a Function of Childhood Trauma and Stress
Sherry Solomon, Psychology - Senior; USC Upstate
Mentor: Dr. Stefanie Keen, Psychology; USC Upstate
This project investigated the relationship between hostile attribution bias and a history of adverse childhood experiences. It was hypothesized that exposure to adverse childhood experiences will be associated with an increased likelihood for aggressive/hostile behaviors and cognitions. In addition to scores on the Implicit Association Test (IAT), this relationship should be reflected in responses to various self-report measures of aggression/hostility. To date, data from 20 (out of 50) participants have been analyzed. All participants reported that they experienced at least 3 adverse childhood experiences. A paired-samples t test revealed a significant difference for IAT performance, in which participants were faster to endorse others-hostile versus others-friendly pairings. Correlational analyses revealed non-significant trends between victimization and aggression, and victimization and self-esteem. That is, participants who reported higher victimization scores reported higher levels of aggression and lower levels of self-esteem. In conclusion, while we did find a significant difference between others-hostile versus others-friendly performance on the IAT, we were unable to establish the presence of an interaction between our implicit measure and victimization scores. As this was a first attempt to explore the link between adverse childhood experiences and implicit measures of aggression/hostility, a more in-depth examination of this phenomenon is suggested.

The effect of emotion on averted gaze cue time with human and nonhuman faces
Brooke Troxell, Biological Sciences - Sophomore
Mentor: Dr. Jessica Green, Psychology
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 are processed the same way by attention pathways in the brain and if they produce the same patterns of response times. 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.

Comparison of masking release as a function of masker modulation rates for natural and vocoded speech
Jiaqian Xu, Biological Sciences - Senior
Mentor: Dr. Daniel Fogerty, Communication Sciences and Disorders
The purpose of this experiment is to compare masking release among various rates of fluctuating noise for natural and vocoded talkers. Masking release (MR) refers to the improvement in speech perception when the listener gathers information from the amplitude dips of a competing modulated masker. The vocoded talker condition is used to simulate the speech heard through a cochlear implant since the vocoded speech lacks temporal fine structure cues and requires the listeners to rely on temporal envelope cues. It was predicted that the vocoded condition would result in significantly less MR than natural condition and that more MR would result when there is a mismatch in the modulation spectrum (i.e., the rate of the target is different from the masker). The study design consists of two target conditions (natural and vocoded) each paired with six masker conditions (SSN and 400%, 200%, 100%, 50% and 25% of the rate of natural speech) resulting in a total of twelve conditions. The results show a significant difference between MR for natural and vocoded conditions across all fluctuation rates of the masker except when the masker contains very slow modulations (400% the rate of natural speech). Comparing among the rates shows that mismatching the modulation spectrum of target and masker significantly increases MR for the natural condition. Contrary to previous research, the 400% rate condition reveals that listeners receive significantly more MR with the vocoded talker than with the natural talker.
Physiological Arousal during a Non-Social Task in Cross-Syndrome Autism Spectrum Disorders

**Kelly Baker**, Biological Sciences - Senior

**Mentors:** Dr. Jane Roberts, Psychology  
Ms. Sara McGrath, Psychology

**Introduction:** Autism spectrum disorder (ASD) is characterized by social communication deficits and repetitive behaviors and interests. The biological basis of ASD is currently unknown. Fragile X Syndrome (FXS) is a monogenic disorder characterized by intellectual disabilities and difficulties modulating social and emotional behaviors. FXS is the most common known single gene cause of ASD. Autonomic dysregulation has been thought to play a role in deficiencies seen in ASD and FXS. The autonomic nervous system, composed of the sympathetic and parasympathetic nervous systems, is responsible for maintaining homeostasis. The sympathetic and parasympathetic divisions work in opposite ways to achieve homeostasis. Defense responses by the autonomic nervous system are thought to be evidence of arousal which includes increased heart rate variability. The literature shows that overall general arousal, as seen through increased heart rate variability, is typical of FXS. However, there is mixed evidence of general arousal in ASD, which appears to be divergent due to the diverse populations of ASD studied (varying genetic causes, ages and intellectual levels) rather than specific subsamples. **Objective/Methods:** This project compares heart rate variability in young adults who have intellectual disabilities with idiopathic ASD (ASD-O) to young adults with FXS+ASD during a non-social task. Participants’ baseline heart rate data will include young adults with ASD-O (n=10) compared to FXS+ASD (n=25). This will inform etiological and environmental factors that contribute to physiological responses. It is hypothesized that young adults with FXS+ASD will have significantly higher baseline heart rates with less heart rate variability than adolescents with ASD-O.

**Associations of Child’s Age with Parenting Factors and Weight Status**

**Jamelle Brownlee**, Exercise Science - Senior

**Mentor:** Dr. Dawn Wilson, Psychology

Overweight and obesity rates have steadily increased over the past decades due to inactivity in youth. The rates in ethnic minorities have been higher than non-ethnic children. Minority children are between 1.13 and 1.73 times more likely to be overweight compared to non-minority children. The purpose of this study was to observe how parenting factors affect weight status in children inside Project FIT (Families Improving Together), a randomized controlled trial testing the efficacy of a family-based weight-loss program in African American families utilizing baseline data, it is hypothesized that as age increases, Body Mass Index (BMI) will be positively correlated, and parenting factors (i.e. parent monitoring/limit setting for child’s health behaviors, social support from family and friends for diet, availability of physical activity equipment at home) will be negatively correlated with BMI. Correlations showed there was a trend for a significant association between BMI and age of the child (r=-0.153, p = .08). Furthermore, age was also significantly negatively correlated with parent limit setting (r=-0.168, p=.05), social support for diet (r=-0.175, p=0.04), and home environment (r=-0.182, p=0.04). Further research should observe additional areas such as school factors where youth spend a majority of their time.

**Using a Biobehavioral Model to Identify Infants at Risk for Autism**

**Kristy Dezenzo**, Chemistry - Senior

**Anna Spuhler**, Pharmacy - Freshman

**Mentors:** Ms. Jessica Scherr, Psychology  
Dr. Jane Roberts, Psychology  
Ms. Debra Reisinger, Psychology

**Autism Spectrum Disorder (ASD) is quickly becoming more prevalent in society with every 1 in 42 boys being identified each year (CDC, 2014). ASD is characterized and typically diagnosed based on meeting specific behavioral criteria including impairments with communication and difficulties with social interaction. Atypical visual attention is one of the earliest and robust indicators of risk for autism in infants. This study uses a biobehavioral model to identify early indicators of autism that involves studying physiological and behavioral characteristics. The Laboratory Temperament Assessment Battery (LabTab) is a standardized protocol used by researchers that allows for comparison of results across different laboratories. Various games, also called epochs, are used to elicit temperament such as anger, fear, joyfulness, and attention. This study focuses on attention during a three-minute period of infants playing with toy keys. The participants in this study are either high-risk infants that have siblings with ASD, infants with fragile X syndrome, or “typical” infants that are part of the control group. The physiological data is collected using heart rate monitors, which measure and record respiratory sinus arrhythmia (RSA) values, reflecting the rest and restorative aspect of heart activity. RSA can be used as a biomarker to diagnose ASD to better understand attention and temperament in early development. Based upon previous studies, it is expected that infants at risk for ASD will demonstrate lower RSA and higher heart rate than typically developing infants. Using physiological data as a biomarker for ASD can allow for earlier detection and intervention for infants.

**Relationship Between Frequent Religious Attendants And Willingness To Help Homeless Individuals.**

**Whitney Dorociak**, Psychology - Senior

**Mentor:** Dr. Bret Kloos, Psychology

Homelessness is a significant problem in Richland County, affecting nearly 1,014 individuals in 2014, which suggests Richland County has the largest amount of homeless individuals in the state of South Carolina. Many religious individuals may feel giving to the church compensates volunteering, giving to homeless shelters or homeless individuals. Telephone surveys were completed by Richland County residents in 2014 and in 2014 using random digit dial methodology. Surveys included the Attitude Toward Homelessness Inventory and related questions about perceptions of and experiences with homelessness. Survey respondents indicated how often they attended religious services in the past
thirty days. Survey respondents were also asked about their experiences involving willingness to give to homeless individuals (i.e., done volunteer work, given money to an agency or homeless individuals). Analyses will examine correlations between frequent religious attendance and willingness to help homeless individuals. Research in this area could help understand trends of giving; and how people give to stigmatized populations. This information could be used to help shelters and organizations raise funds for those populations.

Does Playing Sports Enhance Our Ability to Visually Estimate Angles?

**Jillian Graff**, Psychology - Junior

**Mentor:** Dr. Melanie Palomares, Psychology

We rely on our perception of angles in almost every task we complete during the day. Whether we are using proprioception through our kinesthetic movements, or judging the angle around a bend in the road while driving. Although it may seem like we are accurate in most of our estimations, research has found that we are not as good as we think we are. Humans are particularly bad at estimating oblique angles, this is known as the oblique effect. In the current study, we explored a potential correlation between angle estimation with playing sports and math skills. We asked participants to estimate the angle derived from a radius of a circle. Responses were inputted using a keyboard. Results were consistent with the oblique effect. In addition, the data suggest there is a negative correlation between sports playing and angle estimation error. This line of research helps improve the understanding of how humans perceive angles, and how athletic training might affect this skill.

**My Journey in Undergraduate Research**

**Claire Niehaus**, Psychology - Senior

**Mentor:** Dr. Ron Prinz, Psychology

Prof. Nina Moreno, Languages, Literatures, and Cultures

Graduation with Leadership Distinction is a recent initiative at the University of South Carolina to promote integrative learning and I am pursuing the research pathway of this distinction. I have had the great pleasure to work in two different research labs over the past two years and it has turned out to be an invaluable experience that I have developed a great passion for. Through my research I have been able work on a social behavior study of children with ADHD and study parenting interventions (the Positive Parenting Program) in children with extreme behavioral challenges. I have learned to collect data, analyze it, and examine how it fits into the larger picture under the guidance of knowledgeable professors. This poster presentation represents my insights of how my research has helped me connect what I learned in school to something far greater. It details the far-reaching effects my experiences here have had on my future and how undergraduate research has developed a critical thinker with a lifelong thirst for knowledge in me.

The Role of experiencing atypicality symptoms in the relationship between somatization and aggressive behavior among adolescents with anxiety problems

**Jake Smolinsky**, Psychology - Senior

**Mentor:** Dr. Mark Weist, Psychology

Research has examined somatization and aggressive behavior suggesting that higher somatization is associated with more aggression. However, this relationship is not always supported suggesting other variables should be considered. For example, symptoms of atypicality have also been linked to aggression yet no studies have examined the interaction between somatization and atypicality in relation to aggressive behavior. Little is known about these associations for adolescents experiencing anxiety, which is critically important for improving identification and early intervention for this population. The current study will examine somatization and aggressive behavior among adolescents with anxiety problems, and the moderating role of atypicality. Data was collected through the Center for Adolescent Research in Schools and adolescents who met at-risk or clinical criteria for Anxiety using the self-report Behavior Assessment System for Children, Second Edition (BASC-2) (n = 134) were included. Adolescents’ symptoms of somatization (M = 68.19, SD = 12.85), atypicality (M = 62.75, SD = 12.92), and aggression (M = 61.89, SD = 14.40) were measured at a single time point using both child and parent report on the BASC-2. Regression analyses will be conducted in IBM SPSS examining the main effects of somatization and atypicality, as well as the interaction effect of both on aggression. Predictor variables will be centered on the mean, multiplied to create an interaction term, and all three predictors included in the regression model. Results will also be graphed to interpret the effects. We will present these findings and discuss the implications for youth with anxiety problems.

Autism Diagnosis in Males with Fragile X Syndrome

**Christine Sroka**, Psychology - Junior

**Mentor:** Dr. Jessica Klusek, Psychology

Introduction: Fragile X syndrome (FXS) is the most common known single gene cause of autism. The prevalence rate of Autism Spectrum Disorders (ASD) in males with FXS is over sixty percent in a research setting (Klusek, Martin & Losh, 2014). Given that the co-occurrence of FXS and ASD is high, it is valuable to examine the prevalence of clinical ASD diagnoses in FXS males. The objective of the current study is to determine the relationship between the diagnoses of FXS in combination with a diagnosis of ASD and explore mother’s beliefs about their sons’ characteristics. There is controversy whether there is a distinguishable clinical difference between the symptoms of ASD and FXS (Abbeduto, McDufﬁe, & Thurman, 2014). Methods. The mothers of the 41 male participants ages 16-23 with FXS completed the “Autism Spectrum Disorder Diagnosis Questionnaire”, a survey examining the diagnostic information regarding the FXS males, as well as mothers’ opinions on their son’s diagnosis. Results. Approximately sixty-six percent met criteria and thirty-four percent did not meet criteria for ASD. Fifty-two percent of the mothers of the subjects that met the criteria believed their son had ASD. Thirty-five percent of mothers whose sons did not meet the criteria believed that their son had ASD. While their opinions differed, the majority
of mothers believed they had adequate knowledge about how ASD co-occurs with FXS to make informed medical and educational decisions. It is important that research on this topic is completed in order to provide the most effective treatments possible.

**FMR1-Related Gene Variation and Cardiac Autonomic Functioning**

*Alexa Stumpe,* Psychology - Senior  
Mentor: Dr. Jessica Klusek, Psychology

The gene that causes the X-linked genetic disorder, Fragile X Syndrome, when fully mutated is known as the FMR1 gene. In 151 women have premutation alleles on this gene, and it is possible that the body responds to these genetic changes via specific mechanisms, such as those regulated by parasympathetic nervous system (PN). Respiratory sinus arrhythmia (RSA) can be indexed through cardiac activity and provides a measure of vagal tone, which indexes the parasympathetic “rest and restore” autonomic function. We aimed to examine the possible relationship between messenger RNA (mRNA) and baseline cardiac autonomic functioning in women with the FMR1 premutation by means of genetic testing and resting heart rate monitoring. We hypothesized that lower RSA, reflecting reduced parasympathetic vagal tone, would correlate to higher mRNA levels in these individuals. Data was collected from 19 adult women with the FMR1 premutation. Participants’ heart rates were recorded while watching a calming video in order to determine HRV and inter-beat-interval (IBI) at baseline. Each participant was also genetically tested in order to obtain molecular-genetic information related to FMR1 gene dysfunction (mRNA, CGG repeat length, activation ratio). A positive, significant correlation was found between mRNA and RSA ($r = 0.576$). No other significant correlations were detected between the genetic variables and RSA or IBI. This study offers preliminary evidence suggesting elevated mRNA in women with the FMR1 premutation is associated with elevated vagal tone. Future work comparing autonomic functioning to controls would clarify the significance of this finding and the potential role of FMR1 in autonomic regulation.

**Social Cognition and Deception: Effects of Stimuli Presentation on Reaction Time**

*Brittany Wortman,* Psychology - Senior; USC Upstate  
Mentors: Dr. Scott Meek, Psychology; USC Upstate  
Dr. Michelle Phillips-Meek, Limestone College

Current paradigms in the field of psychology often focus only on differentiating between a truthful and a deceptive response without evaluating the cognitive processes involved. Research that has at least considered the process of a deception is limited in how many different factors are incorporated into the design, often limiting themselves to just memory retrieval and response manipulation/inhibition, demonstrated only by differences in reaction time. Very few models examine the impact of social processing in the formation of these deceptive responses. The goal of the current study is to incorporate a social factor into the typical deception paradigm used in the literature to determine if evaluation of social factors changes the deceptive process. Differences in reaction times will be compared when participants listen to a question asked by a human voice or a computerized voice. We anticipate that deceptions that involve meaningful social processing will require more cognitive processing and will result in longer reaction times before response.

**Assessing Attitudes Toward Homelessness: Socioeconomic Status and Opinions of Causation**

*Maria Gebhardt,* Psychology - Senior  
*Jason Pickelsimer,* Psychology - Senior  
Mentor: Dr. Bret Kloos, Psychology

Attitudes toward homelessness affect the way programs are operated and policies are created. An individual’s socioeconomic status may influence their opinion about the reason people become homeless, whether it be due to personal causation or societal causation. Attributing an individual’s becoming homeless to personal causation alone is a victim blaming practice that may perpetuate the issue of homelessness. Participants in this study were residents of Richland County who were selected through random-digit dialing. Participants were administered a survey to gauge their general attitudes toward homelessness, particularly within Columbia. The survey included the eleven question Attitudes Toward Homelessness Inventory (ATHI) as well as several other questions regarding the individual’s opinion on various aspects of homelessness.
Demographic information was gathered from each participant. In the current analysis, responses to two sub-scales of the ATHI - personal causation and societal causation were evaluated and compared to corresponding answers to questions regarding the individual's educational background and total annual income. It is hypothesized that individuals with higher socioeconomic status will demonstrate an increased tendency to indicate personal causation for homelessness over societal causation. If this tendency is found, it could aide researchers and policy makers in creating more successful programs to address homelessness. Further, this research could bring awareness to the need for public education regarding homelessness.

Atypical Heart Defined Sustained Attention as an Early Marker of Autism
Claire Harryman, Biological Sciences - Senior
Mentors: Dr. Jane Roberts, Psychology
Ms. Kelly Caravella, Psychology
Ms. Bridgette Tonnensen, Psychology

Autism spectrum disorder (ASD) is a developmental disorder characterized by social communication impairments. Early diagnosis of ASD has beneficial effects on adaptive social functioning. Although atypical visual attention is a salient indicator of ASD, measuring behavioral symptoms in infants is difficult. Therefore, using a physiological indicator of attention may be more useful in infants, potentially permitting sensitive indices of risk and development. Heart-defined sustained attention (HDSA) is a period of decelerated heart activity, indexing sustained attention. This study examines early patterns of attention in two groups at high risk for ASD: infants with siblings diagnosed with ASD (ASIBs), and infants with fragile X syndrome (FXS). Patterns of HDSA were examined in relation to scores on the Modified Checklist for Autism in Toddlers (MCHAT), a pediatric screening measure for risk of ASD in children aged 16 to 30 months. Results indicated that heart activity collected at 12 months of age was correlated with scores on the MCHAT (18-24 months). In the FXS group, total MCHAT score positively correlated with interbeat interval standard deviation (stdIBI), suggesting that as stdIBI increases, risk for autism increases (r=0.8, p=0.1). In the ASIB group, a nonsignificant trend between MCHAT score and the proportion of sustained attention heart beats (propSA) suggests that as propSA increases, risk decreases (r=-0.38, p=0.31). These data suggest that heart activity may be a sensitive indicator of clinical autism risk as early as 12 months of age. Future work is needed to replicate this finding and to characterize the mechanisms underlying this association.

Behavioral effects of neuronal inhibition of CAMK-containing neurons in the amygdala with the M4 DREADD
George Hartshorn, Biological Sciences - Sophomore
Mentor: Dr. Marlene Wilson, Pharmacology, Physiology and Neuroscience

The amygdala plays a primary role in emotional reactions to fear and fear memories. CAMKII-containing neurons have been shown to mediate long-term memory in fear conditioning and we have found that these neurons are activated by anxiogenic stimuli. DREADDs (Designer Receptors Exclusively Activated by Designer Drugs) are G-protein coupled receptors that can either be excitatory (M3 DREADD) or inhibitory (M4 DREADD) when activated by the inert ligand clozapine-N-oxide (CNO). In this experiment, we used the M4 DREADD to selectively inhibit CAMKII-containing neurons of the basolateral amygdala using a cell-selective promoter of interest (CAMKII). The basolateral amygdala of 37 rats was surgically targeted with either the control viral construct (SCKWG2) expressing only the reporter gene green fluorescent protein, or the M4 DREADD viral construct (SCKWhM4D). Rats were injected with 1 mg/kg CNO 30 min before several tests of anxiety including a Defensive Bury Test in response to predator odor (DB), the Elevated Plus Maze (EPM) test, and Conditioned Freezing (CF). The rats were then euthanized and their brains analyzed using immunofluorescence (IF) or immunohistochemistry DAB (IHC) to determine placement of viral injections and verify viral transduction of M4 constructs. Based on the decrease in neuronal activity, we hypothesized the rats expressing the M4 DREADD will have inhibited neuronal activity and therefore show a decrease in anxiogenic behavior. Preliminary results suggest slight, but non-significant differences in behavior following neuronal silencing in CAMK-positive neurons of the amygdala with the M4 DREADD.

Assessing Factors Associated with Sweetened Beverage Consumption in African American Adolescents
Tiffany Haselden, Public Health - Senior
Mentor: Dr. Dawn Wilson, Psychology

Increased intake of sugar-sweetened beverages (SSB) has been associated with obesity and may be an important factor in reducing risk in African American adolescents. The purpose of this study is to evaluate the associations of parent support for healthy diet, monitoring and limit setting, and servings of SSB in adolescents participating in Project FIT, a randomized controlled trial testing the efficacy of a family-based weight-loss program in African American adolescents and their families. To date, 129 adolescents have participated in Project FIT (67% female, Mage = 13.52 (1.73), MBMI percentile = 96.47 (4.29)). SSB servings were measured by registered dieticians with three random 24-hour dietary recalls usually validated national protocols. We hypothesized that increased support, monitoring, and limit setting would be associated with decreased SSB servings. A regression analysis with age, sex, and BMI percentile as covariates indicated that the overall model predicting SSBs was significant (R2 = .14, F(5,120)= 4.02, p=0.01). Parenting factors were not significantly associated with SSBs. However, older adolescents (B = .15, p 0.05) consumed significantly more SSBs than younger adolescents, and a trend was found indicating that male adolescents consumed greater servings of SSBs than female adolescents (B= 0.40, p = 0.07). Correlation analyses were conducted to further examine associations between SSB and parenting factors. Consistent with our hypotheses, greater limit setting (r = -0.32, p 0.05) and monitoring (r= -0.25, p 0.05) were associated with decreased SSB consumption. Future interventions should incorporate parenting skills as a strategy to reduce SSB servings.
Applying Cognitive Psychology to Logo Design

Lauren Knapp, Psychology - Senior
Mentor: Dr. Melanie Palomares, Psychology

As consumers we are subject to thousands of logos everyday but have we ever questioned what makes one logo more recognizable than another? Or what design aspects create a logo that is innately attention grabbing? In this experiment, we examined recognition rates for commercial logos that have either a biological design (e.g., body part, animal) or non-biological design (e.g., abstract design, object) through the Attentional Blink (AB) paradigm. AB is a phenomenon that reduces recognition rates for the second of two targets in with in 200-500 ms and could be utilized to assess visual attention and its temporal dynamics on the efficacy of marketing and brand messaging. Because research in cognitive psychology suggests biologically relevant images attract attention more efficiently than non-biologically relevant images, we wonder if this holds true for logos. Participants are asked to identify both or the second target logo presented in a Rapid Serial Visual Presentation (RSVP). Participants displayed higher accuracy in recognition of the biologically relevant logos. Several other results make this study extremely useful in the application of cognitive psychology to graphic design and advertising.

Measuring Trust: Behavior versus Information and Childhood Trauma

Stacey Olson, Psychology - Senior; USC Upstate
Mentors: Dr. Scott Meek, Psychology; USC Upstate
Dr. Lynn McMillan, Psychology; USC Upstate

The current study expands on previous researchers’ understanding of the fundamentals of how people make decisions to trust each other. The goal of the present study was to critically examine the roles that behavior and information play in creating initial trust judgments. The study also evaluated whether childhood trauma contributed to trust decisions. Researchers compared ratings of trustworthiness on two targets by one of three ways: a) view a video interview in full tact (audio and picture), b) view a video interview with no audio (behavior only), or c) read a transcription of both interviews (information only). Trust ratings were compared between participants who reported a history of childhood trauma and those who did not report childhood trauma. Analysis of the trust ratings found main effects for condition and abuse, but no interaction between the two variables. The results suggest that participants felt the most comfortable when viewing interviews in full tact, followed by reading the transcript of the interview, and then seeing just the video portion of the interview. Additionally, participants who reported moderate to severe abuse showed significantly lower trust scores than participants who reported low levels of abuse.

The Relation Between Anxiety and Heart Rate in Women with the FMR1 Premutation During Direct and Averted Gaze Tasks

Anna Porter, Psychology - Junior
Mentor: Dr. Jane Roberts, Psychology

Introduction: 1 in 151 women have premutation alleles on the fragile X (FMR1) gene[1]. These carriers are at an elevated risk for anxiety disorders, with 52% meeting criteria for an anxiety disorder[2]. A 2009 Wieser study found that when presented with computer-animated faces, women with high social anxiety tended to have higher heart rate acceleration under direct gaze conditions [3].

Methods: Our study aims to examine the relationship between the social anxiety of fragile X premutation carriers and heart rate acceleration in response to direct or averted gaze during an eye-tracking task. Data from 19 FMR1 premutation carrier women was collected. Social anxiety was measured using the Liebowitz Social Anxiety Scale (LSAS; Liebowitz et al., 1987). Heart rate and eye movements were recorded as a digitized face opened its eyes and either displayed a direct or averted gaze.

Results: No difference was detected between the change in heart rate in response to direct and averted gaze conditions (p = .181). A trend level correlation was observed between the mean change in heart rate during the eyes forward condition and the Liebowitz total score (r = .390, p = .099).

Conclusions: Unlike the Wieser study, our results indicated that higher anxiety was associated with slower heart rate during direct gaze conditions, which could be attributed to a more pronounced orienting response. These differences could be due to differences in how heart rate change was quantified or could indicate population specific effects related to the FMR1 premutation.


Identifying Androgynous Faces in a Crowd

Charlotte Schallenberg, Psychology - Senior
Mentor: Dr. Melanie Palomares, Psychology

Androgyny, the blend of feminine and masculine features, has recently become prominent and coveted in marketing and the fashion world. The popularity of androgyny has sparked research to discover the appeal and differences between how this is judged by males and females. We used images from facial databases and morphed them to create mixtures of 100% female, 75% female, 50% male/female, 75% male and 100% male. With these images, we asked participants to identify the faces as either male or female. We found that when presented with a singular face, there was not a significant difference between men and women when they looked at 50% male/female faces. In the un-flanked condition, both genders labeled the 50% androgynous faces as male, which suggest that male features were dominant in our face stimuli. In the flanked conditions, we found that males were more likely to judge androgynous faces as females while females were more likely to identify the faces as males. These results imply that people likely detect facial characteristics of the opposite gender when attention load is increased.
Perceptions of Healthcare in Housing Secure and Insecure Populations in the Southeastern United States
Connor Brunson, Public Health - Senior
Mentor: Dr. Kelly Lynn Mulvey, Educational Studies

My research attempts to explore the perceptions of healthcare in housing secure and insecure populations, particularly focusing on self-efficacy and the conceptualization of healthcare as a right. Additionally, this study examines attitudes concerning responsibility of care in adult and child samples. In order to examine attitudes and evaluations surrounding health care among diverse groups, participants were recruited from transitional housing shelters, free medical clinics, and afterschool programs in the Southeastern United States. Previous research often presents housing insecurity as a binary movement from complete housing to homelessness. The current study hopes to improve on the current state of literature by applying a broader spectrum of housing insecurity to issues relating to healthcare perception. Given the lack of focus on this population in previous studies, this data will provide insight to their perceptions surrounding healthcare as a human right and self-efficacy for a population that suffers from a lack of access and equitable care. A description of their ideas concerning the healthcare system, as well as their priorities for medical treatment and responsibility for care can potentially serve legislators in creating local policies to address their health-related needs.

Through the Eyes of the People: SNAP Healthy Bucks Photovoice
Hallie Carde, Public Health - Senior
Mentor: Ms. Carrie Draper, Social Work

Photovoice exhibits are unique events that utilize photos taken by community members to bring people together in a meaningful way in order to reflect upon and discuss certain issues or events in the hopes of inspiring positive, community level change. This particular photovoice exhibit showcases photos taken by people or receive SNAP (formerly called food stamps) in the four South Carolina communities. Participants were asked to take and caption photos to illustrate the successes and challenges of the SNAP Healthy Bucks Program – a state administered SNAP healthy incentives program. Each photo's message is as unique as the community member who created it, yet all of the photographs provide insight into the realities of farmers’ market access, and common themes among photos and stories can be identified. Some themes include the importance of adequate transportation to markets; accessible hours of operation and location; and variety of produce available. These photos are intended to facilitate community dialogue and generate ideas of how to increase participation and access to farmers market for low-income South Carolinians. This community driven project is particularly useful in demonstrating the value of community members' perspectives and serves as a visually stimulating way to raise public consciousness about the true facilitators and barriers to farmers' market attendance in our state.
Health Promotion - Obesity and Flu Prevention in Elementary School-Aged Children

Mary Chase, Nursing - Senior
Nicole Eagle, Nursing - Senior
Chloe Beer, Nursing - Senior
Jacqueline Nolan, Nursing - Senior
Sabrina Rumph, Nursing - Senior
Erin Kenny, Nursing - Senior; USC Columbia
Mentor: Dr. Susan Poslusny, Nursing

The purpose of our service learning experience in community health nursing was to assess the overall health needs of children at Brennan Elementary School and develop a health promotion initiative tailored to these needs. Childhood obesity rates have increased dramatically, which can lead to heart disease, the major cause of death in South Carolina. Elementary school curriculums in SC do not include health teaching so we targeted the problem of childhood obesity and its related morbidities as well as flu prevention and infection control in anticipation of the upcoming influenza season. Based on assessment data gathered from each class and evidence in the literature about these health issues, we developed interactive health lessons that were tailored to various age levels. Students engaged in various lessons such as the importance of hand washing, proper nutrition, and physical exercise. Coordinating with faculty at Brennan, we were able to teach these lessons during selected class times. This project demonstrates how academics and community partners working together can reduce risk for childhood obesity and infectious disease transmission contributing to overall health of the community. Risk reduction can lead to a reduction in childhood obesity, heart disease, and overall health risk in South Carolina.

Enhancing Cancer Awareness in the African-American Faith Community to Address Cancer Health Disparities

Kelsie Dirkson, Public Health - Junior
Mentors: Dr. Heather Brandt, Health Promotion Education and Behavior
Ms. Deeonna Farr, Health Promotion Education and Behavior
Mrs. Kimberly Rawlinson, Health Promotion Education and Behavior
Dr. John Ureda, Health Promotion Education and Behavior

Background: The South Carolina Cancer Disparities Community Network (SCDCN) distributes monthly church bulletin inserts to African-American Baptist churches with the goal of increasing cancer awareness and participation in cancer prevention and control activities. Newly formatted church bulletin inserts were developed based on feedback from previous evaluation efforts in 2014.

Purpose: The goal of this study was to evaluate the newly formatted church bulletin inserts.

Methods: Three inserts were developed for Prostate, Breast, and Cervical Cancer Awareness Months, which incorporated changes recommended by African-American church contacts during the previous evaluation. A survey was developed and mailed to church contacts (n=135) and congregation members (n=760) to determine distribution processes, content appropriateness, and perceived effects of the inserts. Survey data are being managed Excel and will be analyzed using SAS 9.4.

Results: Surveys have been received from 28 church contacts and 161 congregation members as of March 23, 2015. Responding church contacts were female (100%) and 46% were aged 60-69; members were 74% female with an average age of 55. All (100%) church contacts and 62% of members wanted more cancer facts and more stories about people who have received cancer screening/treatment. Additional data for Discovery Day will include a comparison of church contacts’ ratings of effectiveness, appearance, content, and cultural appropriateness of old and new inserts using a paired t-test.

Conclusion: These surveys will provide useful information about how church contacts and congregation members view the inserts. This information is important because it will aid in developing more effective methods to increase cancer awareness and promote preventive health practices.

Transcultural Nursing

Elyssa Easterling, Nursing - Senior
Kathleen Kelley, Nursing - Senior
Mentor: Dr. Deb McQuilkin, Nursing

This presentation will be a poster presentation about NURS 506. This is the study abroad trip that was taken in May 2014 with USC College of Nursing. The following topics will be discussed:

- The health care system in the United States vs Germany
- The difference in the nursing scope of practice between Germans and Americans
- Differences in the hospitals between Germany and America
- Similarities with Nurses in America and Germany
- The culture of Americans vs Germans and how that effects healthcare
- Places visited and experiences gained while on the trip to Germany

The Provider’s Perspective on the Relationship Between Quality of Life and the Cosmetic Procedures: Botox and Dermal Fillers

Anna Edwards, Nursing - Senior
Mentor: Dr. Tena Hunt-McKinney, Nursing

The study explored potential linkages between quality of life (QOL) and cosmetic procedures for at-risk populations as defined by dermatology experts. This work begins to address the absence of evidence needed by practitioners and patients to guide decision-making about appropriate use and psychosocial outcomes of cosmetic procedures in groups conceptualized as at-risk by providers. A literature-driven questionnaire guided the semi-structured interviews with 5 expert providers. Provider experts were defined as individuals practicing in the field of cosmetic dermatology and have been convenience-sampled from practitioners in the state of South Carolina. Data collection methods include note taking and digital recording of interviews. Each interview lasted 20-30 minutes. Initial recording analysis utilized codes derived from the interview questionnaire and research questions. Additional codes were generated as researchers independently listened to the audio data. The data was analyzed by at least one of the study mentors and the student scholar. Researchers then met to compare coding, discuss themes and differences in interpretation. Recordings were reviewed and recoded as needed for clarification. Reflexivity was addressed as researchers recorded their thoughts and insights about the data and research process. Results are pending.
Hepatitis C Virus management in an Infectious Diseases Clinic in Columbia, SC
Magdalen Henderson, Nursing - Senior
Mentor: Dr. Sabra Smith, Nursing
An estimated 3.2 million persons in the United States have chronic Hepatitis C virus infection and most infected persons are asymptomatic. The purpose of this poster is to do a descriptive analysis of an HCV/HIV co-infected cohort in an urban Infectious Diseases clinic in Columbia, SC. 75%-85% of people infected with Hepatitis C virus develop chronic infection and are at increased lifetime risk of cirrhosis, liver failure, and hepatocellular carcinoma. HCV is a leading cause of morbidity and mortality among persons living with HIV/AIDS (PLWHA). Widespread use of highly active antiretroviral therapy (HAART) has resulted in a dramatic decline in AIDS-related mortality and complications associated with chronic HCV. A database compiled at the Infectious Disease Clinic will provide a summary of demographics, care and treatment outcomes for HIV-HCV co-infected individuals from 2005 to 2014. The majority of patients are infected with HCV genotype 1a. Approximately 76% of persons in the database are co-infected with HCV and HIV and only 16.7% of all HCV infected persons in the database have attempted treatment. Since the advent of directly acting antivirals (DAAs) in 2013 there has been a radical transformation in the treatment of HCV. Interferon-free regimens include NS34A protease inhibitors, NS5A inhibitors, and NS5B inhibitors and have Sustained Virological Responses (SVR) upwards of 90 percent in both HCV mono-infected as well as HIV/HCV co-infected patients. Through identification of the changes in treatment, this overview can offer healthcare providers and patients a better understanding of the best treatment options for HCV.

Prevalence and Health Effects of Intimate Partner Violence Among HIV+ Women
Yu Min Ni, Nursing - Senior
Mentors: Dr. Sabra Smith, Nursing Dr. Abbas Tavakoli, Nursing
Background: Intimate partner violence (IPV) is a recognized national public health issue that includes physical abuse and unwanted or forced sexual contact by a partner. Numerous studies have documented the negative health consequences of IPV. There is evidence that IPV has a negative effect on the self-management of HIV, which is now a chronic disease. The purpose of this study was to use descriptive statistics and correlations to measure the prevalence of IPV and the possible effects of IPV among HIV+ women. Method: We recruited a convenience sample of 200 HIV+ women at a Ryan White-funded clinic in Columbia, SC. The prevalence of IPV was assessed using the Severity of Violence Against Women Scale (SVAWS). The SVAWS is a 46-item Likert scale that assesses experiences with IPV over the last 12 months. In addition to a summary score of total IPV, the SVAWS also contains subcategories of types of IPV. Participants were also asked to report their most recent HIV viral load in order to gauge the management of their HIV. Results: The Spearman correlation was used to examine the association between total levels of IPV, each subcategory of IPV, and viral load. There were no significant positive linear relationships between viral load and violence subscales. The Spearman correlation for different subscales of violence and the HIV viral load ranged from -0.01 to 0.1. Larger and randomized samples of HIV+ women would provide more clarity of this possible association.

Nicaragua: An Encounter with Developing Country Healthcare
Laura Satterthwaite, Biological Sciences - Freshman
Rachel Rayhab, Nursing - Sophomore
Maria Liapis, Exercise Science - Sophomore
Mentor: Dr. Patrick Hickey, Capstone Scholars Program
With a group of 35 students from the Capstone Scholars program, we went on a weeklong alternative spring break trip to Masaya, Nicaragua to administer healthcare to several local communities. The purpose of this trip was to expand our knowledge of medical culture in a third world country, as well as to develop our understanding of standard healthcare practices. This trip gave pre-health students the opportunity to enhance medical knowledge and skill through hands-on learning. We teamed up with International Service Learning in Nicaragua to set up the health and dental clinics, and collected donations before the trip in order to accommodate the wide range of essential medical supplies and treatments. As a result of this experience, we learned about the lessened standard of living in these communities and how it affects the health care and well being of the people living there. Common health issues in Nicaragua were discussed, and we were taught how to develop an accurate prognosis as well as how to provide the best care.
Combating food insecurity with dignity, compassion, and education

Lindsey Barbare, Social Work - Senior
Mentor: Dr. Daniel Freedman, Social Work

According to the Feeding America Network, there are approximately 46.5 million people in the United States that turn to food banks for assistance meeting their basic nutritional needs. Unfortunately, these citizens with food insecurity must often make the difficult decision about using their resources towards acquiring only one or two of the following necessities: Food, medication, mortgage/rent, utilities, education, etc. The mission of Harvest Hope is to provide for the needs of hungry people by gathering and sharing quality food with dignity, compassion, and education. Harvest Hope is just one of the many food banks across America that is part of Feeding America—a organization that distributes millions of pounds of food each year to families across the country. This presenter has had the privilege of serving individuals with food insecurity at Harvest Hope over the past year. As such, this presentation will describe multiple aspects of Harvest Hope including 1) services offered 2) effectiveness of services, 3) service gaps or limitations, 4) suggestions for improvement.

Examining Relationships between Caregivers’ Adverse Childhood Experiences and Child Abuse Allegations in Current Household

Senna Desjardins, Nursing - Senior
Mentor: Prof. Kate Chappell, Nursing

Annually, more than 10,000 allegations of child abuse or neglect (CAN) occur in South Carolina. Adverse childhood experiences, like abuse, parent divorce, or family mental health issues, have been linked to numerous concerning health outcomes including obesity, depression, and drug addiction. This study focused on investigating the relationship between parenting caregivers’ adverse childhood experiences and occurrences of maltreatment within the family. Over seventy caregivers, recruited at two Child Advocacy Centers in SC, completed the ten-item Adverse Childhood Experiences (ACE) survey to determine adverse experiences in childhood. A caregiver’s ACE score was totaled based on number of ‘yes’ answers from the survey. It is not fully understood what impact a caregiver’s ACE has on the type of CAN within the family. The data will be analyzed with the assistance of mentors who are experts in child abuse prevention and care as well as statistical analysis of social science data. Using methods appropriate to maintain power given sample size and evaluate these types of data, analysis will determine if statistically significant relationships between caregiver ACE scores and current CAN allegations in the household exist. Also, the relationship between specific caregiver ACE items and current CAN allegations in the household will be examined. These results will provide ongoing development of knowledge applicable to CAN prevention and increase awareness about effects of a caregiver’s past on current family functioning. These findings can inform development and refinement of targeted prevention programs for caregivers and children with higher risk of particular types of abuse or neglect.

treatment option. Throughout this trip, we were challenged to communicate with the locals who only spoke Spanish, and were encouraged to converse directly with them without translators. Having direct contact helped to develop a more solid relationship, offering comfort and trust between doctor and patient. This trip introduced students to life not only outside the U.S., but also to that of a developing country. We were exposed to a cultural lifestyle completely different from what we know here in our community at USC. This exposure opened the eyes of every member of the trip, showing us that while the services we provided are generally simple and often without thanks in America, were received with unyielding appreciation from every patient treated. There will be three student sharing personal stories from each of the three Nicaraguan communities.
triggered by the global economic crisis, the media sector crisis caused by digital convergence, and the transformation of the media business model. The focus of this study is to recognize the struggles faced by the mass media in Spain to overcome these challenges. This particular study is based on developed evidence-based practices, results from other investigations, a research study conducted in Spain, and interviews with members of the El Mundo editorial staff. Younger people in Spain have not, in fact, dismissed the value of traditional media, such as the newspaper, for more modern media, like the Internet. The vast majority believes that the media has changed negatively in the last five years, a problem that can only be solved by incorporating reader feedback, increasing online presence, and creating an image of honesty and transparency. These proposals could help revive print journalism, which is inextricably linked to Spanish democracy.

**Cooking is EASY: Research and blog intervention to educate college students on long-lasting cooking skills**

*Jaclyn Schultz, Biological Sciences - Senior*

College students often have unhealthy eating habits and limited cooking abilities. This research evaluates the habits, attitudes, abilities and experience of college-aged males and females, ages 19-23, regarding cooking healthy meals for themselves, making healthy choices when eating out, and developing cooking knowledge and skills. The overall goal of this project was to conduct focus groups with college students and use the research findings to create a cooking blog to educate them about cooking healthy meals for themselves. Specifically, two focus groups were conducted with University of South Carolina students of various majors and ages. A total of 16 students participated (male = 8, female = 8). An interview protocol was created based on the nutrition literature focusing on college students and included questions on participants’ eating habits, cooking skills, and health of food consumption. Qualitative research findings indicated that students do not cook for themselves because of lack of time, the hassle of grocery shopping, and the difficulty of making it financially beneficial when only cooking for one person. Using this formative research, the author created a cooking blog titled Tastefully Simply, where content is posted 2-3 times per week. Recipes and posts are geared towards college students cooking for one person, who want to cook quickly using a minimal ingredient list of inexpensive items. Keywords used are “easy,” “quick,” and “everyday.” The blog has a broader niche than many existing sites with specialty diet advice and more recipes with the intent of building long-lasting kitchen skills and recipe knowledge.

**The Effect of the Financial Crisis on Spanish Mass Media: The Case of El Mundo**

*Natalie Pita, International Business - Sophomore*

Mentor: Dr. María Mabrey, Languages, Literatures, and Cultures

Pedro J. Ramírez was dismissed from his position as editor of El Mundo, a top Spanish newspaper he founded himself, in January 2014. This study uses the example of El Mundo to analyze the corruption and influence of economic outlets on the Spanish mass media. Spain has been one of the hardest-hit countries by the financial crisis of 2008-2013, and the media is currently facing a triple crisis.
to determine whether each participant’s preferred social interaction will be an effective reinforcer. By Discovery Day, we will be six weeks into our study, and I will be able to present the findings of the video based preference assessments on all the participants, as well as any further information we have gathered from our study.

Prisons Across the World
Adrianna Shoemaker, Sociology - Sophomore
Mentor: Dr. Mathieu Deflem, Sociology
I will be presenting my findings from a comparative sociological study of imprisonment in eight different nations. These nations will include the United States, Turkey, Belgium, South Africa, and Hong Kong, amongst others. My central research question concerns the extent of mass incarceration among the selected countries and trying to find out what some of the conditions are of observed differences. My findings will be supported by selected chapters from my mentor, Dr. Mathieu Deflem’s new edited book on Punishment and Incarceration: A Global Perspective. Besides mass incarceration, my research also involves analysis of more specific topics, such as juvenile incarceration in Turkey and the imprisonment of terminally ill prisoners in the United States. Using a comparative framework, I will explain the findings presented in the selected chapter, but I will also include my own analysis from my research. This analysis will concern the trends and dynamics of mass incarceration practices throughout the world.

Be the Voice: Child Advocacy at CASA
Samantha Versace, Social Work - Senior
Mentor: Mrs. Jennifer Mcardle, Social Work
CASA is a national organization designed to advocate for the best interest of abused and neglected children by providing each child brought into the custody of The Department of Social Services (DSS) with a CASA Guardian Ad Litem. In 2013, Richland County CASA had a total of 917 children served, 479 new children served, 416 children exiting CASA, and 1,162 court hearings. My role as a social work intern and Guardian Ad Litem with CASA has augmented my generalist practice skill set and professional identity. As a Guardian Ad Litem I am responsible for; coordinating visits with each child at least once a month until the case is closed; conduct investigative interviews with all parties involved in the case to gather pertinent information; compile gathered information into a court report that states recommendations, which promote the best interest of the child(ren); and appear in court on behalf of the child. Field experience is an integral component of social work education, as it is where students expand upon the competencies, and theories discussed in class and apply them in a practical setting. Therefore, interning at CASA has cultivated my professional development and enabled me to build confidence in my practice skills and professional identity. Completing my field placement at CASA has not only provided me with the opportunity to be the voice for a child, but also helped me to find my own.

Young Children’s Attitudes Towards STEM Careers
Calli Fletcher, Chemistry - Junior
Jerica Knox, Psychology - Sophomore
Mentors: Dr. Kelly Lynn Mulvey, Educational Studies
Ms. Kathleen McGrath, Educational Studies
Dr. Matthew Irvin, Educational Studies
Recent research has demonstrated that few women enter college intending to major in the STEM fields or graduate with a STEM undergraduate degree compared to men (National Science Board, 2012). One potential reason for this disparity is academic gender stereotypes that are perpetuated long before young adults make decisions about college major and occupational pursuits. The current study investigates young children's STEM-related stereotypes and evaluations and seeks to identify differences by age, gender and parental attitudes. The aim is to determine how early children begin to associate traditionally male-stereotypic careers with making a lot of money and working with things, and traditionally female-stereotypic careers with helping others and working with people. The study also aimed to understand children’s evaluations of exclusion from a certain career based on social factors, such as gender and ethnicity. Participants completed a survey that measured the stereotypes which they held about different careers and their evaluations of exclusion of a non-stereotypic individual from a career. Findings suggest that gendered expectations regarding career choice begin in early childhood and that these expectations lead children to differentially evaluate exclusion from different careers. For instance, findings suggest that boys are less likely to support girls who want to become a doctor than are girls. Findings also suggest that younger children (3 – 5 years) may adhere more rigidly to gender stereotypes about career choices than older children (6 – 8 years). The findings will be discussed in terms of the literature on occupational values and stereotypes within the STEM field.
A Study of the Market for a Proposed Upper Level Music Advocacy and Career Development Course at the University of South Carolina

Charles Harding, Marketing - Senior
Mentor: Dr. David Cutler, Music

The purpose of this study was to examine the interest of students attending the University of South Carolina in a proposed upper-level music advocacy and career development class, as well as music advocacy itself, and their belief in USC being the right fit for the school. A survey was developed and administered to 352 music majors to gauge said interest. Results from this survey showed that there was a high curiosity among music majors in this class and an overall staunch belief that USC is the right fit for this course, generally citing the school’s strong music program. Music education majors were the most attracted, out of all music majors, to the idea of the proposed class. This, along with strong interest in music advocacy itself among all music majors and non-majors, shows a general desire and need for an upper level music advocacy and career development course at the University of South Carolina School of Music.

Adolescent Intentions, Obstacles, and Supports for Secondary School Completion in Italy and the United States

Morgan McCaskill, Management - Senior
Mentors: Dr. Doyle Stevick, Educational Leadership and Policies
Dr. Beth Powers-Costello, Millersville University of Pennsylvania

The goal of this project was to explore differences and similarities between Italian and American students’ intentions to complete secondary school. This project also investigates the role of support from parents, teachers, and peers to determine how each of these factors influence students’ intentions to pursue post-secondary education. I conducted the first phase of this Magellan Apprentice funded project in South Carolina with students who were within two years of graduation. In the months following, I conducted the same study at Liceo Statale Rinaldo Corso in Correggio (Reggio Emilia), Italy. The data collection methods were twofold. I surveyed students about their intentions to complete secondary school, plans for after graduation, and perceived levels of support received from parents, teachers, and peers. I also inquired about their parents’ education. I held focus group discussions with students about each of these topics to gain further insight. The study revealed that students from South Carolina perceive their parents to be most supportive of their education, while they feel the least amount of support from peers. 84.5% of students ranked their parents as being “very encouraging” of graduation, while 59.4% and 44.5% gave this rating to teachers and peers, respectively. The same study conducted in Reggio Emilia, Italy showed that students also feel their parents are most encouraging of their education, and they believe that parents are the biggest influence on their post-secondary plans. The data revealed that 91.8% of Italian and 97.4% of American students who were surveyed planned to graduate from high school.

Teaching music globally: Tips for success in long-distance lessons

Adrianquirroga, Music - Senior
Mentor: Dr. Scott Price, Music

In recent years, there has been an increased interest in the use of video-conferencing technology to supplement, and even replace, face-to-face music instruction. Video-conferencing technology has the potential to improve and increase access to quality music instruction around the world, especially in underserved communities. The purpose of this project was to determine practical pedagogical strategies for long-distance piano teaching. Weekly lessons were taught over Skype video-conferencing for a period of five weeks. These lessons were given from the University of South Carolina School of Music to nine students in La Paz, Bolivia. The students are regular students at the Centro Musical J. S. Bach, a private community music school in La Paz. Scheduling and logistics were coordinated with Ruddy Franco, Director of the Keyboard Division at the aforementioned school. This poster presentation will identify practical pedagogical strategies suitable for long-distance piano teaching as well as potential pitfalls and strategies to overcome them. Topics covered will include techniques for dealing with rhythm, articulation, dynamics, sound production, technique, interpretation, and ear training, within the context of a long-distance lesson. Tips and suggestions for dealing with technology problems and setup will also be provided.

Transitions from Early Intervention to Preschool in South Carolina from Provider’s Perspectives

Virginia Sawyer, Psychology - Senior
Mentor: Dr. Heather Googe, Educational Studies

The Individuals with Disabilities Education Act ensures a free and appropriate education for children from birth through 21. Young children ages 0 to 3 receive services under Part C of this Act and children 3-21 receive services under Part B. This study is seeking to identify strengths and weaknesses in the transition period between Part C services and Part B services for children in South Carolina. The transition period can be a difficult process to navigate for both parents and providers. By examining what individual providers of Early Intervention (Part C) consider strengths and weaknesses within the transition period, we can recommend strategies to improve the process. By examining the strengths and weaknesses of this process from the providers’ standpoints this study is seeking to find ways in which to make this process easier for both Early Intervention and preschool programs, and therefore, for the families themselves. This will be beneficial in improving the education for children who have been a part of Early Intervention services.
Does Eye Color Matter in Color Overlay Choice?
Ashley Waddington, Rehabilitation Counseling - Graduate Student
Jenna Sahli, Rehabilitation Counseling - Graduate Student
Previous research has supported that colored overlays increase the speed of reading and improve reading comprehension for individuals with and without disabilities (Uccula, Enna, & Mulatti, 2014). We hypothesized that eye color would be correlated to color overlay choice. The participants were students at University of South Carolina, students at Columbia College and non-student adult individuals at the Soda City Market. We surveyed 128 participants’ reasoning for choosing the specific color of overlay while simultaneously noting the eye color of each participant. There were eight colored overlay choices provided for the first round of surveys and 21 colored overlay choices provided for the second round of surveys. The results of the survey did not support our hypothesis that eye color corresponds to the color choice of colored overlays. Future research should focus on saturation of the colored overlays, overlay size, and whether color blindness has an effect on perception of color. We believe with further research that applications could be developed based on our results with eye color and could be implemented in primary, secondary, and postsecondary schools.

A Head Start: Tackling Childhood Hunger Before Grade School
Taurie Thomason, Elementary Education - Junior
Mentors: Ms. Martha Scott Johnson, Student Life  Ms. Robin McCants, Vital Connections
In South Carolina 28% of children under the age of 18 suffer from food insecurity. In Columbia, 20% of children are living in food insecurity. Through over 100 hours of service at Vital Connections as a Community Service Ambassador, I have been able to bring awareness to the issue of childhood poverty and mobilize student volunteers to affect childhood hunger. Vital Connections is a non-profit early care and education center whose focus is providing services for at-risk families who are living in poverty, struggling with substance abuse, and are at-risk for child abuse and neglect. As the volunteer and event coordinator I operate the weekly snack pack program and assist with coordinating events. To bring volunteers to the center I collaborated with a student organization, No Kid Hungry. Each week members from No Kid Hungry pack snack packs for children to take home for the weekend. Over the course of the academic year I have mobilized over 15 volunteers who have packed over 945. As the assistant event coordinator, I manage resources and research areas of need. During the spring semester I set up a school supply drive for Vital Connections teachers because they were in need of supplies that would make their jobs easier. Through volunteering I have learned about the effects of childhood hunger and the power of education in breaking the cycle of poverty. This experience has led me to share my passion with others to make a greater impact on childhood hunger and poverty.

Homelessness and Education
Taylor Tuozzolo, Social Work - Senior
This presentation will address the different barriers children who are experiencing homelessness have in regards to his or her education. Research has helped me find thus far that in the United States one in forty-five children experience homelessness each year (National Center on Family Homelessness, 2015). Furthermore, the U.S. Department of Education states, “While eighty-seven percent of homeless youth are enrolled in school, only seventy-seven percent attend school regularly” (Education for Homeless Children and Youth, 2007). For this project, I did intense research to educate myself on the facts exist on how homelessness can impact education. I plan to participate in a drive at my internship, Communities in Schools at Columbia High School, by collecting goods for a homeless shelter and creating Easter Baskets for the children at the shelter. In April, I will be presenting at the monthly staff meeting to educate the administration and staff about the issue of homeless youth and how it can impact their education. I plan to address different techniques to help the staff better work with these students. Also, I plan to address the issue of school attendance and how staff/administration in schools can advocate for these students. Furthermore, I am planning to contact the Richland School District One Homeless Liaison to discuss how the school district is addressing this issue and what kind of things I could get involved with at a community level to help advocate for this social issue.
**Encountering New Paths**  
*Casey Brooks*, Psychology - Senior

During the fall semester of 2013 I had the opportunity to study abroad in Florence Italy, attending Florence University of the Arts. Although I knew no Italian, I saw it as an opportunity to learn another language and also to learn more about the world around me and to grow personally. There are so many different cultures, languages and ethnicities that exist outside of the borders of the U.S and I wanted to learn about them through experience and relationships. Being overseas my daily life was much different than back at home, the familiar is often comforting, but being open minded and prepared allowed me to try so many new things. While abroad I had the chance to volunteer and help set up a local garden based on the principles of sustainability. I learned about the practice of meditation which was an opportunity I never had back in the states. I met people from around the world who I learned different lessons and gained knowledge from. What I discovered from studying abroad was that although the U.S may value different things than Europe and other cultures, our differences and similarities bring us together and allow us to grow as humans. Studying abroad has prepared me to do volunteer work overseas in the future and also presented me with the most memorable and remarkable 4 months of my life thus far. I have never met someone who did not feel as if their life had been changed for the better from studying abroad. For me Studying abroad was an irreplaceable experience, through presenting my educational and cultural discoveries, I hope to encourage other students to study abroad as well.

**Every Nurse a Leader: My Experience at Carolina**  
*Shannon Burke*, Nursing - Senior

When I began my college career, it was easy for me to choose my major. I have always known that I wanted a career in Nursing because I love healthcare and helping people. When it came to activities I wanted to become involved with outside of my major, I was not so convinced. I decided to be an Athletic Tutor simply to have an on-campus job. I stayed, however, because of how rewarding the experience has been and what it has taught me about being both a learner and a teacher. My motivation for becoming an Orientation Leader was to step outside of my comfort zone and take a position that would require me to be more extroverted. Through the experience, I learned about teamwork and gained confidence in my own leadership abilities. As I reflect on my time at Carolina and all of my experiences within and beyond the classroom, I have come to understand more about myself and my own professional values. I have seen the benefit of routine, gained essential communication skills, and learned about confidence and humility. My presentation will elaborate more on my insights and where I hope that they take me in my career as a nurse.

**Political Communications - From the Classroom to the Statehouse**  
*Melissa Davis*, Public Relations - Senior

Spurred by a love of “The West Wing”, I began my study at the University of South Carolina intent on one day rising to the ranks of the fictional White House Press Secretary C.J. Cregg. After declaring a major in Public Relations and devising my own curriculum for a political communications cognate, I set out on the three most academically rewarding years of my life. While gaining familiarity in the principles of mass communications and public relations, my studies provided me the opportunity to explore the fields of Speech and Rhetoric, as well as Political Science. As I prepare for graduation in May, I leave not only with the knowledge and instruction provided by my traditional coursework, but the experiences afforded by my leadership in Student Government and my engagement in the professional workforce from a Washington, D.C. lobbying firm to a Columbia-based non-profit. Through pursuing Graduation with Leadership Distinction, I have had the opportunity to reflect on the interplay between my studies and beyond-the-classroom experiences, and have gained insight into my strengths as a leader and a communicator that I hope to share through my presentation.

**Graduating with Leadership Distinction: Assurance Internship with Dixon Hughes Goodman**  
*Jorge Guerrero*, Accounting - Senior

During the summer of 2014, I worked in the auditing department of a regional public accounting firm in Greenville, SC called Dixon Hughes Goodman. Dixon Hughes Goodman is a full service CPA firm that provides auditing, tax, consulting, forensic accounting, and many other accounting services for their clients. I was an audit intern for two months in the Greenville office and my main role was to learn and perform by myself (to the best of my ability) audits of our client’s 401k and Pension Retirement Plans. I did this internship primarily to gain experience in the auditing profession as well as to see what it’s like to work in public accounting. While auditing our client’s 401k and Pension Plans’ financial statements I was primarily responsible for performing income allocation testing, performing inquiries of our client’s employees to verify certain financial figures for accuracy, and performing any other tasks asked of me by the staff at the office. I was also involved in one financial statement audit where I was asked to audit our client’s accounts payable in a testing procedure called a “search for unrecorded liabilities” (SURL). I found that working in public accounting requires long hours at certain points but that public accounting also has its perks, such as getting to go to baseball games with your coworkers, going to lunch with the clients, or just enjoying the flexibility of working from home or adjusting your work hours to fit your schedule. What this means to me is that public accounting is definitely where I want to start my career. It requires hard work and dedication but is flexible and somewhat relaxed in certain settings.
I Said Yes to the Internship!

**Kristin Hendricks**, Fashion Merchandising - Senior

If you think the brides you’ve seen on the show Say Yes to the Dress are entertaining, just wait until you hear about my experience interning at the store behind the show! From trying to find their perfect silhouette or just the right fabric to keeping the family calm, there was never a dull moment. I not only learned about bridal fashion on a level I never would’ve dreamed, but I also learned to work with people from all backgrounds and cultures!

**Beyond the Curriculum: Maximizing my Potential through My Social Work Degree**

**Haley Landreth**, Social Work - Senior

Where does the magic happen? Outside of your comfort zone. Through my social work education, this is where I have realized I gain the most. I was fortunate enough to have the opportunity to travel abroad to Hanoi, Vietnam. Even though saying I was terrified is an understatement, I was able to learn more about myself than I ever had. I was able to Observe Vietnamese Social Services in Child Welfare, Gender Studies, Military Veterans, Mental Health, Autism Centers, and Religious Temples. This allowed me to experience various several social service agencies I had not been presented the opportunity to explore. This semester I created a 3 Credit Independent Study reflecting the social work perspectives and skills gained while being able to collaborate with the Vietnamese helping professionals. By carrying out these tasks, I was definitely required to go out of my comfort zone and added extra demands to my workload. That being said, it was worth it! It’s about discovering what is beyond the classroom to gain real-life experience. Furthermore, the National Association of Social Worker’s Spring Symposium has been such a beneficial 3-day workshop I attended in 2014 and 2015— a truly amazing event filled with such influential social workers. By Graduating with Leadership Distinction, I have been able to reflect upon my professional development and what a Bachelor’s Degree from USC has truly given me. Furthermore, what I have given myself through my social work education and what I hope to continue doing in my future.

Self-Discovery through Professional and Civic Engagement

**Anne Parham**, Political Science - Senior

In four years at the University of South Carolina, I have learned the value of stepping out of your comfort zone and taking advantage of the opportunity to grow. The myriad unique opportunities I have had here, including giving tours to thousands of prospective families as a University Ambassador and guiding first-year students in their transition to college as a U101 Peer Leader, as well as professional experiences outside of campus, have shaped me as a leader. In this project, I will analyze these experiences, in addition to topics in some of the most influential courses I have taken at USC, reflecting on how they have made me a globally aware and self-assured individual. The positions to which I dedicated my time at USC forced me to develop key skills that have not only made me more confident as a young professional as I head to law school in the fall, but also have made me a marketable candidate for jobs I am interested in, a poised public speaker, and an effective leader in enacting change. Through this project, I will show that the positions I have held and the skills I have learned are vital and will be invaluable as I move forward into the legal profession.

To Be The Change, You Must Advocate For It

**Ashlynn Polanco**, International Studies - Senior

I am an International Studies major and during my undergrad career I took the initiative to explore the options I had for interning within the realm of politics. The internship experience I chose for the purpose of my e-portfolio is my current one working for South Carolina Appleseed Legal Justice Center. I was chosen to do the South Carolina Semester Program through the University of South Carolina’s Honors College. SC Appleseed is a non-profit organization that advocates for different public policy issues that affect the low-income civilians of South Carolina like healthcare, immigration, domestic abuse, and education. I work as an immigration policy intern where I have the main task of researching the new executive actions of the president such as DACA (Deferred Action for Childhood Arrivals) and DAPA (Deferred Action for Parental Accountability.) This consists of documents translations from English to Spanish and gathering information eligible applicants must know once enrollment begins. I also work with a coalition of young undocumented students often referred to as dreamers. This group is called young immigrants in action and they are a grassroots organization advocating for different problems they face such as not receiving in state tuition. During my time with SC Appleseed I have gained the insight in working in the realm of public policy and I realized that this is truly where my heart and passion are. I want to advocate for immigration reform and work with changing the current laws of our country.

The 24 hour challenge

**Shannon Rogers**, Advertising - Senior

Mentor: Prof. Karen Mallia, Journalism and Mass Communications

Leading a team for 4Ward at CreateAthon@USC 2014, challenged me as an advertising student and as a person. How to you brand and market a healthy lifestyle focused non-profit? On top of that, how do you do it in 24 hours? My relational skills, leadership and career skills were all put to the test. I, along with a team of 6, sacrificed sleep and sanity to empower 4Ward to take the next step in changing lives. In a small way during those 24 hours my life changed too. I saw classroom principles play out in a real scenario. I learned things about myself I never knew before. I learned about building and maintaining relationships in a whole new way. Leading a small team of people I had never met before was not easy, or always smooth sailing, but the experience strengthened my leadership skills.

Business and the Environment

**Jessie Suttle**, Finance - Senior

My freshman year of college I was accepted into the Greek Emerging Leaders program, which is a semester long program that educates on effective leadership. Because of this I decided to take a leadership role in my sorority and was encouraged to apply to join the Carolina Judicial Council (CJC). As a sophomore, I was elected to be the PanHellenic Delegate within my sorority and I was chosen to be a part of CJC. Within these experiences, not only did I learned the importance of hard work, effective communication, respect, and being able to work with a diverse group of people, but I grew personally and made lasting friendships.
Supporting Pediatric Cancer Research

Chrysta Carricato, Public Health - Senior
Mentor: Ms. Christine Raper, Health Promotion Education and Behavior

My presentation focuses on my experience from volunteering with the Curing Kids Cancer organization. Childhood cancer rates have continued to increase over the past few decades. Technology improvements have increased the survival rate of children diagnosed, but it varies among the type of cancer. This organization was established in 2004, and has managed to raise over six million dollars for pediatric cancer research. On April 18, Curing Kids Cancer & the Columbia Fire Department are hosting the 2nd Annual Fire Truck Pull at the Columbia Fire Department & Museum at 1800 Laurel Street Columbia, SC. Teams will see who can pull a fire truck in the fastest amount of time. All proceeds will benefit the Cancer and Blood Disorders Clinic at Palmetto Richland Children’s Hospital. My presentation will focus on my gained experience in pediatric cancer research, and will promote awareness of this critical issue.

Discovering the World Around You

Courtney Cooper-Lewter, International Studies - Senior

I have always had a love for Hispanic culture. Early on in life, I went to a Spanish Immersion school and that began my passion for the Spanish language. After moving away from that school, I maintained my connection through service experiences, studying abroad and classes. The most impactful experience for me was studying abroad in the Dominican Republic. In the Dominican Republic, I learned so much about myself by being out of my comfort zone. I learned that I am much more adaptable than I ever thought before. I also learned that America is perceived very differently from the outside. In my experiences abroad, there were a lot of ups and downs with battling my American identity. Even more so in studying abroad and the service I have done for Hispanic immigrants in South Carolina, I have learned the importance of connections with people. As a future immigration reform lawyer, I needed the experiences of being a foreigner with language barriers and how connections with people can change the whole outcome of a situation. I also needed the experiences of dedicating my time without hesitation to make sure individuals felt more secure in their environment. Any aspect of culture, including language, food or music, can make individuals who are feeling marginalized feel as if they have a place in a new society.

Creating an Environment for Growth

Courtney Cooper-Lewter, International Studies - Senior

Throughout my four years at the University of South Carolina, I have learned that I am passionate about my Carolina Community. Early on in my collegiate career, I found that the most effective way to transform a new environment to a new home is through the commitment to the new community. Creating that commitment, allows for the development of characteristics of a good leader like the power of your voice, listening and professionalism. As a University 101 Peer Leader, the power of voice...
Outside Looking In: International experience leads to fresh perspectives

Lawrence Lucas, Biomedical Engineering - Senior

Studying abroad in Buenos Aires, Argentina not only expanded my knowledge and interest in other cultures but also led me to more closely examine my own culture and environment at home. After returning to Columbia, I enrolled in a Spanish for healthcare course that extensively covered the experience of Hispanic migrants to the United States interacting with the healthcare system here and helped teach future healthcare providers how to best treat these patients. I was able to synthesize and apply what I learned abroad with what I learned in the classroom while volunteering for health fairs through the SC Hispanic Outreach organization and working with the Good Samaritan Clinics of Columbia. This connection between out of classroom work and in-class learning has demonstrated the importance of diversity and the practical value of open-mindedness and self-reflection.

Graduation with Leadership Distinction: Lessons Learned in a Global Classroom Environment

Jenn Frazee, International Business - Senior

My presentation for Discovery Day is the final component of my comprehensive portfolio that I have created to graduate with Leadership Distinction. Through USC Connect I have spent time reflecting on my experiences inside and beyond the classroom and am seeking GLD in the Global Learning pathway. During my undergraduate career at the University of South Carolina I have been able to concurrently pursue a degree in International Business and study abroad in Turkey, Costa Rica, Italy and China. All of my international experience has allowed me to gain a relevant understanding of what culture and cultural differences actually mean, and their significance to success both personally and professionally. My portfolio details the most valuable lessons that I have learned through my internationally-oriented coursework and my global experiences beyond the classroom, as well as how I will use these lessons in my life post graduation. I will use Discovery Day to highlight my findings and their personal significance.

Peer Leadership: A Growing Experience

Stephen Hartzog, History - Senior

Peer Leadership positions play a key role in the development of well-rounded, civically engaged, responsible citizens. My most rewarding and beneficial experience while at the University of South Carolina has been my involvement in Peer Leadership positions. Serving as both a University 101 Peer Leader and a Supplemental Instruction Peer Leader has defined my college experience improving my leadership skills, my interpersonal skills, the ability to effectively facilitate information, and instilling in me a passion for helping others. Through the experiences and knowledge I have gained as a Peer Leader, I have learned to effectively adapt to a variety of situations, to communicate efficiently, and to utilize my skills to be an effective leader and role model. My presentation will elucidate how the person I am today is a result of the skills, knowledge, and lessons I have gained from my Peer Leadership experiences.

New York University Langone Medical Center Health Career Opportunity Program

Colleen Maguffin, Exercise Science - Senior

I am passionate about pursuing a career in physical therapy because of my younger sister with special needs, and this was my initial experience that solidified my career choice. I have been involved in a Health Career Opportunity Program at New York University in summer 2014 where I completed a 140-hour internship. For two weeks, I assisted the physical therapy team at NYU Tisch Hospital in acute care PT. I shadowed and assisted with treatment of patients on all floors of the hospital, the cardiac unit, organ transplant unit, oncology unit, ICU, as well as the NICU and PICU. I further took part in discussions and attended lectures on a variety of topics. Lectures consisted of professionals in physical therapy, occupational therapy, speech therapy, horticultural therapy, rehabilitation medicine and more. As a result, I was educated on and exposed to a variety of different topics in the medical field. While each field focused on different aspects of an individual’s health, they came together as a team to treat each patient. The program exposed me to new information that was directly relatable to the treatment and service of others. Taking part in this program gave me access to the resources of the largest private University in the US and allowed me to explore the diverse cultural community and connect with professionals in all departments. I hope to further apply this knowledge to the field of physical therapy to treat individuals on a case-to-case basis.

An Athletic Training Internship Experience at ESPN Wide World of Sports

Chelli Nottoli, Athletic Training - Senior

Over Summer 2014, from May 11-August 8 I participated in an athletic training internship at ESPN Wide World of Sports in Orlando, Florida. I was 1 of 16 interns chosen from over 200 applicants all over the United States for the summer session. Venues at the ESPN Wide World of Sports Complex are Champions Stadium (where the Atlanta Braves do their spring training), HP Field House, Jostens Center; Olympic size track and field complex, 18 multipurpose sports fields, 6 softball fields, 5 Major League baseball fields, 1 youth sized baseball field, and tennis courts. During my internship my job was to assist full-time staff at the complex with primary medical coverage of amateur, semi-professional, and professional sporting events. I also
Influencing Peers through Leadership
Ashley Cady, Tourism Management - Senior
Mentor: Prof. Collin Crick, Hospitality, Retail, and Sport Management
Throughout my career at USC, many of my professional and classroom experiences have cultivated a deeper understanding of what it means to be a leader. Through different positions of on-campus roles, my leadership style has evolved and grown. My hospitality and tourism classes have furthered this development through my grasp of marketing techniques, professional development, and business communications. During the summer of 2013, I worked as an Orientation Leader on campus. Through this professional experience, I began to understand the impact your personal attitude and projection will have on those you are leading. Here, I learned the importance of critical listening and empathy when helping others. In fall 2014, I was a peer leader in an HRSM section of University 101. This experience further molded my leadership style and understanding of how to help others. I learned the importance of helping others help themselves, over solving problems yourself. Other professional experiences I have had, such as my internship in marketing and human resources at Aiken Electric Cooperative, have also added key insights into this development. This presentation will describe in detail the process of learning that took place in order to shape me into the leader I am today.

Growing Globally: How Studying Abroad Has Changed My Perspective on Learning and Life
Marissa Hickman, Spanish - Senior
During the spring of my junior year, I studied abroad at the Universidad de Sevilla, located in the Andalucian capital of Seville, Spain with Academic Programs International. I chose Spain for two significant reasons. First, as a Spanish major, I felt it to be highly beneficial to immerse myself in a Spanish-speaking country in order to improve my Spanish speaking, listening, and writing skills. Although I had actively been learning the language in a classroom setting for over nine years, I felt as though I was lacking the true real-world experience that could only be found abroad. The second motivating factor behind my decision to study abroad in Spain was the desire to travel the world and learn from new cultures. Studies abroad is unique, because it’s structured in such a way that the vast majority of teachable moments are completed outside of the classroom. Although I learned a great deal in my classes at the university, the most impactful experiences abroad occurred when I actively immersed myself into my surroundings by observing and interacting with the world around me, or when I encountered moments that tested my ability to handle difficult situations. After my time abroad in Spain came to an end, I left the country a stronger, more self-assured individual, and a more globally-conscious citizen. I plan to continue my global learning by returning to Spain as an English teacher or by working with a program provider to assist American students abroad. Studying abroad has ignited in me an insatiable desire to see, grow, and explore the world, and I hope that by sharing my experience with others, I can inspire more people to join in the journey and pursue an education abroad themselves.
Leadership Growth through Personal Development

Niraali Naik, Biological Sciences - Senior
Over the past four years, I did a variety of things; I worked in an office, served as the President of a student organization and co-taught a section of UNIV 101, among other things. I did not see the connections between my experiences until I began the Graduation with Leadership Distinction process. I am in the Civic and Professional Engagement pathway, and going through this process helped me piece together all of the important lessons I’ve learned about the value of interpersonal relationships, leadership and community building, as well as organization and communication. I learned many theories in the classes I took and was able to see them in action when shadowing and volunteering. The different opportunities I’ve had really helped me connect what I learned in class, in my social life and as a leader, and put it all together to help me develop skills that will be very useful both in my career and in my personal life.

Reflection Is the Connection

Jacqueline Nolan, Nursing - Senior
Graduating with Leadership Distinction is an honor that asks you to “connect” all the pieces that have made up your experience at the University of South Carolina. With this presentation I will be delving into what it really means to “connect.”

Through much thought, it comes down to one key word – reflection. I have been asked to reflect in my classes and in my beyond the classroom experiences. It has been an interesting and rewarding experience to see how reflection can mean so many different things and be applied in so many different ways, yet it remains to be something so essential to truly making a connection between experiences. As undergraduates, it becomes easy to over commit yourself to class, extracurricular activities, jobs, and even your social life. It happened to me. Understanding the essential reason to reflect has shown me why reflecting can make all the difference in making all the “stuff” meaningful. A wise friend once told me, “Why does any of it matter if we are just going through the motions?”

Through my own reflection, I have been able to truly understand why leadership has become a passion that fuels me to do more and be more. Reflection is the connection that ensures you don’t lose the passion that drives you to continue to your goals and make decisions that can define your life. This presentation will attempt to show you why reflection has led me to appreciate my experiences, learn from my experiences, and most importantly enjoy my experiences.

From a Follower to a Leader

Erin Norell, Business Administration - Senior
Growing up the idea that “leaders are made, not born” never resonated with me. I was always intimated by the leadership skills of others around me because I assumed their confidence and ability came naturally. I never allowed myself the opportunity to develop my leadership skills, thinking they were something I was born without; however, there were times that I was dissatisfied with being a follower. I knew that I had ideas and perspectives that could help solve issues, but never knew how to embrace them. I needed a catalyst to launch me into leadership, and thankfully I would find many in college. Over the past three years at Carolina I have discovered and experienced numerous pathways and opportunities that have helped to shape me into a leader. In my presentation I will demonstrate through experiences and research that with passion, drive, and the right opportunity, leadership abilities can blossom. From my experiences in Greek life to my academic course work I have discovered that leadership is not something you are born with, it is something that you develop.

What Cardiac and Pulmonary Rehab at Palmetto Health Richland has taught me, why is it important, and what is next?

Sarah Pellegrini, Exercise Science - Senior
I interned at Cardiac and Pulmonary Rehab at Palmetto Health Richland Hospital this spring semester to fulfill my direct contact patient care hours in pursuing my goal of attending Physicians Assistant School after graduation. Cardiac and Pulmonary Rehab works with patients who have suffered major cardiac events and pulmonary conditions to help stabilize and reverse the physiopathology and psychopathology of the diseases through the use of diagnosis, therapy, emotional support and education, developed exercise programs, nutritional information, and stress management. I worked to reduce risk factors for future health problems in these patients by emphasizing the importance of lifestyle, nutrition, exercise, and medication and I experienced using the knowledge I have learned in my classes to deal with these real life situations. I learned that dedicating your time to helping someone change for the better is as rewarding to you as it is to them. Having patience, understanding, expressing empathy, and showing someone that they have the self efficacy and confidence needed to do something is possible and I believe I have accomplished that during my time here thanks to what I have learned as an Exercise Science major and Public Health minor. Experiencing this internship with patients who truly needed my help and relationship was the proof I needed to truly believe PA school is the right pathway for me because I am committed to helping people change their health for the better.

Cybersecurity Engineer: My Decision to be a Modern Day Superhero

Christopher Sanders, Computer Engineering - Senior
Mentor: Ms. Erin Long, Housing
Throughout my entire college career, I have been learning how to be a computer engineer: Having been exposed to the many career paths that I could take with my degree, I chose to take an internship with Duke Energy at Robinson Nuclear Plant working with the digital processing systems department. Working at the plant, I searched for every opportunity to learn about different career pathways. I then became interested in cybersecurity. Cybersecurity is providing protection of critical information and computer systems. Learning about cybersecurity fascinated me and made me want to pursue it as a serious career and my internship enlightened me to how serious and critical the profession will be to the world. This is how my internship taught me how to be a superhero.


College Summit
Kaneisha Wheelock, Social Work - Senior
College Summit is a national non-profit organization dedicated to transforming the lives of low-income youth by connecting them to college and career. Annually the organization serves 36,000 students in ninth through twelfth grade. As a Rap Director trainee, I’ve had the honor of working numerous summer workshops using peer leadership, custom curriculum, personal statements, self-advocacy, practice college applications, and peer support to help get these high school students from disadvantaged backgrounds to college. As a Rap Director trainee eligible for certification in the summer of 2015, I am charged with the task of helping the Peer Leaders (students) of the workshop recognize the power they have of their lives and challenge their perspectives. My efforts towards certification includes a process of inward journey and outward service. This is expected of me because it is what the organization is asking of the Peer Leaders. It is not enough to only help ourselves, we must learn how to help others as well.

The Cooperative Ministry Internship
Jahmaun Sessions, Political Science - Senior
Mentor: Mr. Thomas Sellers, Student Success Center
This spring, Spring 2015, I currently have an internship through the South Carolina Association of Non-Profit Organizations (SCANPO) with The Cooperative Ministry (TCM). The Cooperative Ministry provides emergency assistance to those in crisis, providing direct assistance, counseling, guidance and prayer. Founded by five local churches 1982, TCM desires to honor God by reflecting divine compassion for those less fortunate. TCM goal is to increase the economic self-sufficiency of people experiencing poverty in the Midlands through crisis assistance and sustainability programs. Programs TCM offers include a clothing bank, furniture bank, emergency food pantry, food pantry vouchers, financial assistance, the CAR program, free tax preparation, etc. As a first-generation low-income college student at the University of South Carolina, the internship was of great interest to me. TCM gives me first-hand experience with helping people in need. People that I can actually say I somewhat relate to. Working with the Cooperative Ministry, I have had the opportunity to counsel individuals, learn the daily logistics of the non-profit organization, and am currently helping to develop a web page to add to their website. TCM is improving my social skills, oral communication skills, and computer skills I did not even know I possessed. Furthermore, being that I plan to work in politics one day this opportunity is an eye opener and has sharpened my mind on what exactly underprivileged people are in need of. I even am considering investing in my own non-profit in the future. Non-profit organizations, in my opinion, are here to make the world or at least the community a better place.

Interning with the South Carolina Lieutenant Governor’s Office
Katherine Stewart, Anthropology - Senior
This past spring, I interned with the South Carolina Lieutenant Governor’s Office. The Lieutenant Governor presides over the South Carolina Senate and is head of the Office on Aging. As an intern for the Lieutenant Governor’s staff I fielded phone calls, researched and tracked bills relevant to the interests of the Office on Aging, handled constituent concerns, interacted with media, assisted in helping events run smoothly, and even participated in judging the office’s statewide writing contest. My internship not only gave me firsthand experience with South Carolina’s political system, but also allowed me to gain professional experience and become more organized, outgoing, and better at handling and diffusing confrontation and anger through regular interactions with unhappy constituents. Participating in this internship further sparked my interest in politics and public policy and has led me to consider pursuing a post-graduate degree in public policy or political management.
I could make a positive impact on first year students while helping them avoid the mistakes that I made my freshman year. As a peer leader it was my responsibility to be a liaison between my co-instructor and our students. I was responsible for certain class periods in which the lessons would be more relatable coming from the mouth of fellow student versus a professor. I learned there are several different ways to lead a group and some ways are definitely more effective than others. I also learned that empathy is really important and sharing a connection with those that you lead is important to your success as a leader. This experience taught me a lot, gave me confidence and showed me that I have the potential to be a great leader. I saw first hand how I was able to positively influence the lives of first year students and that was inspiring. As a result, I want to be able to hold a position in my field where I can successfully lead others and help them learn their own unique leadership style.

**Congressi Superamus, Divisi Cadimus**

**Ahmed Abu-Selmia**, Exercise Science - Senior

**Sigma Lambda Beta International Fraternity Inc.** is a Latino fraternity with multicultural membership. Sigma Lambda Beta was founded up the principles of Brotherhood, Scholarship, Community Service, and Cultural Awareness. It was founded to nurture and further a dynamic, values-based environment which utilizes our historically Latino-based fraternity as a catalyst to better serve the needs and wants of all people. On January 13th 2015, the Zeta Epsilon chapter was charted. The first chapter in the state of South Carolina. The entity was founded November 3 2013 by 8 brothers. The chapter hosts various events that embody the fraternity’s principles. The chapter has hosted blood and clothing drives, the Hispanic heritage month carnival, and professionalism seminars.

**My Experience as an Occupational Therapist Intern**

**Heather Boatwright**, Exercise Science - Senior

Occupational therapy is constantly growing has become a globally sought after career. Therapy is becoming more dependent upon evidence-based practice because OT’s want to practice therapy methods that are shown to be effective. Occupational therapists are not as commonly known but they are, in my opinion, one of the most important therapists because they help patients with activities of daily living. My internship at Kershaw Health has provided me with the essential knowledge I need to pursue graduate school and this profession. This internship has allowed me to experience the routines of the therapist in a high-risk, short-term inpatient setting. As an intern at RACE rehab, I was able to assist the OT in administering therapy, instructing them on their exercise routines, assisting in transfers, and observing new patient evaluations. One of the most important lessons I learned was how to properly and effectively communicate to the patients before, during, and after therapy. Effective communication is the key to effective treatment! Through this experience I was able to gain specific skills needed to pursue a career in occupational therapy as well as understand their importance and role in the healthcare world.

**How Being a University 101 Peer Leader Shaped Me as a Carolinian**

**Deirdre Buchta**, Management - Senior

Programs such as University 101 Peer Leaders allow Carolinians to grow into effective leaders while also providing success to first year students. Peer Leaders focus on first year students and making sure they are successful as possible their first year and beyond. University 101 teaches students important concepts they will not only be able to use during their college career but after as well. In addition, it helps them find their niche in Carolina and increases retention for those who return to college their second year. I decided to become a peer leader because I thought it was important to help fellow Carolina students. I believed...
really influenced my time here at Carolina. When I was on Freshman Council I learned so much about leadership and gained so much confidence, and when I finished my first year at college I knew I wanted to give that same experience to students. That’s why when I was approached about being a co-advisor I didn’t hesitate in saying yes. Being at the front of the room versus watching was an entirely new experience. It challenged me every week to bring my absolute best to better serve these young individuals. At the end it was incredibly rewarding to see the same growth in maturity and confidence that I had experienced in them. These were traits every person on Freshman Council possessed, but together we were able to empower them to take control of their own leadership and college careers. I hope that I left the same desire to serve and lead that I had when I was done. Looking forward I want to continue mentoring and hopefully leading project teams in my profession.

Graduation, Leadership and Nursing
Rachel Eklund, Nursing - Senior
My graduation with leadership distinction pathway was focused on Professional and Civic Engagement. My objective for this project is to display and explain how leadership experiences, volunteer opportunities, clinical rotation, and internships helped enhance my college experience at the University of South Carolina. My key insights included open-mindedness, realism, and teamwork. In the classroom and beyond the classroom experiences shaped me as a mature nursing student, hoping to pursue a career in intensive care after graduation. My Graduation with Leadership Distinction project connects my academic concepts and real world experiences. Serving as a Capstone Ambassador, Alpha Lambda Delta Honor Society officer, and a Student Nurses’ Association leader, my leadership skills grew tremendously while planning events for these student organizations and being captain of over fifteen different intramural teams. My mission trips to Nashville, TN and New Orleans, LA also encouraged me to use my leadership skills for volunteering. Aside from my leadership opportunities, I was able to mature in the professional world through my nursing internships. I learned about “real world” nursing from these experiences and they have also influenced my decision to pursue intensive care. In addition, my internships sparked my interest in the cardiovascular system, specifically on preventing cardiovascular disease in Americans. Overall, my volunteer opportunities, leadership positions, and nurse internships all helped me grow into a mature adult at the University of South Carolina. I was able to learn and apply classroom-based concepts into local hospitals, student organizations, and other cities in the United States.

Community impact through student engagement
Michael Harman, Business Economics - Senior
College students face a battery of questions when meeting new people: “What’s your major?” “What do you plan to do with that?” “Why that?” However, these questions only seek to understand a minute portion of our actual experiences at Carolina. As campus leaders, our experiences amount to much more than a future job or fleeting interest—I am interested in the impact my unique set of experiences has on my community. To explore this, I will pull lessons, ranging from Student Government to the South Carolina Pride Movement, from my time as a Student Body Executive Officer and Community Activist to discuss specific insights into peer leadership. I will think critically about the role Student Organizations play on our campus from an economic perspective. And finally, I will coordinate these experiences into an acute argument for Student Leadership. Through this project, I actively conclude my undergraduate chapter and begin a new. However, this process—creating a substantive round-up of my experiences—bridges the gap between past and future. I am fascinated by the role each individual's engagement works to construct our campus. In this project, I hope that you too will understand the brick I leave in our campus.

The Effect of Sorority Recruitment on Women in Leadership
Paige Jones, Marketing - Senior
At the University of South Carolina, 21% of students are affiliated with Greek organizations. Each summer, the Panhellenic Recruitment Staff, made up of members of different Greek organizations, comes together to organize a formal recruitment where potential new members have the opportunity to get to know the chapters on a deeper level, eventually leading them home on bid day. As new members ourselves, we set out to define our collegiate experience through our potential as Greek women. Just three short years later, we had grown as leaders tremendously and found ourselves guiding new members through the recruitment process to share our experiences and shine light on the leadership opportunities in sorority life. Through our own experiences, research gleaned from the University of South Carolina and Florida State University Fraternity & Sorority Life offices, and surveys from individual chapters, this presentation will evaluate the development of leadership skills during the sorority recruitment process and the Greek experience as a whole.

The Development of a Leader: GLD in Professional and Civic Engagement
Katie Jerald, Management - Senior
During my four years at the University of South Carolina, I have been fortunate enough to be selected and elected as a leader in two on-campus organizations: University 101 and Sigma Alpha Omega. Both organizations allowed me to develop key leadership skills and learn more about myself in regards to working with others and servant leadership. I was selected as a Peer Leader and a Senior Peer Leader through University 101 Programs. Both peer leading opportunities taught me invaluable lessons about what it means to be a good leader, including the importance of critical listening and teamwork. As the elected President of Sigma Alpha Omega, a registered student organization, I was charged with the task of overseeing chapter operations for up to 85 members. This opportunity taught me how to lead large groups, work alongside a team of other leaders, and to appreciate the value of criticism. My experiences taught me how to better serve others as a leader and aided in my preparation for post-undergraduate schooling and a career in Higher Education and Student Affairs.
Making Miracles with USC Dance Marathon
Leslie Knight, Public Relations - Senior
Mentor: Ms. Jami Campbell, Student Life
This year I had the privilege to serve as USC Dance Marathon’s Executive Director. As an organization, USCDM raises funds and awareness for Palmetto Health Children’s Hospital, our local Children’s Miracle Network Hospital. I am proud to advocate for a cause that impacts and improves the lives of 80,000 local children every year. The Executive Board raised the stakes this year in challenging our campus and community to help us raise half a million dollars, a sixty percent increase from the previous year. Through this challenge, I have learned how to effectively lead a group of 106 diverse students and motivate them every day to rally behind a cause that is improving our community. USCDM is the opportunity at USC I am most thankful for. I am part of a group of college students who selflessly give every day to be a part of something so much greater than ourselves. As the largest fundraising student organization in the state, we aim to show the kids, our campus and community that anything is possible. My experience has taught me that our for the kids mentality truly is forever and much more impactful than just four years. The experiences Dance Marathon has provided me has influenced my future career goals and aspirations. I now hope to earn my Masters in Communications and one day work for a CMNH hospital to make miracle making my lifelong profession. I dance for more birthdays. I dance because I believe all children are limitless. I dance for change. I dance to give local kids the opportunity to make their dreams come true.

Academic Support through Cross College Advising
Kristy Lagarde, Public Health - Senior
The Student Success Center at USC offers a variety of student services to academically support the undergraduates at this institution. In my time at USC, I have had the opportunity to serve in Peer Leadership positions with two of the SSC services: Cross College Advising, and Supplemental Instruction. As a Cross College Advisor, I guided students through major exploration and the change of major process in addition to providing referrals for other campus offices and student services as needed. As a Supplemental Instruction leader, I attended a calculus class and held 3 review sessions per week to facilitate collaborative learning amongst my classmates. I chose these peer leadership experiences because I have a passion for working with and mentoring students and because I wanted to give back to the university in a way that I had received help in the past. SI and CCA were both services that I utilized during my freshman year at USC, and they helped me determine my career path and find my place as a student. Through these leadership experiences, I better understand the importance of relating to students in order to foster academic success. I have become a more patient problem-solver, and I refined my ability to communicate with others in a professional and impartial way. I plan to utilize the skills I have perfected as a peer leader in my future career as a public health professional.

Beyond the Classroom Experience
Keandria Rhode, Exercise Science - Senior
My family has always taught me that education is a very valuable tool. I will be the first in my family to graduate from a four-year university. Throughout my time here at Carolina, this has encouraged me to stay focused and to finish strong. One of the most important things that I have learned while here is how important it is to study outside of what is presented in the classroom. During my time here, I have done this by becoming a Changing Carolina Peer Leader and completing an internship. I have used what I learned in my psychology and Exercise Science classes and applied them to both of these beyond the classroom experiences. I have found that combining these experiences has enhanced my understanding of many of the concepts we learned in the classroom. Once I graduate, I plan to use all that I have learned to lead those in my community. I will do this by implementing an exercise and nutrition class for youth.

Healthcare in Leadership
Krista Robbins, Biological Sciences - Senior
Throughout my undergraduate career I have taken the necessary steps to foster my learning and promote personal growth. These experiences have provided me with the necessary tools to ensure future success as a compassionate physician. My endeavors include serving as Secretary of my sorority, Sigma Alpha Omega, as well as holding the position of Awareness Chair for a non-profit student organization named Cure. In addition to these campus-based leadership roles, I have also had the opportunity to work with various healthcare practitioners as a medical scribe in both Urgent Care and Internal Medicine/Primary Care settings. Throughout the past four years, these experiences have allowed me to recognize and appreciate various leadership skills necessary to be a strong leader. These interactions have also taught me how transferrable these character traits are to daily living. Some of these skills include agreeableness, adaptability, teamwork, and implementation. I plan to incorporate these qualities into my future endeavors as a physician and as a contributing member of society. What once began with my desire to become a physician has now transcended to an endless devotion to constantly grow as an individual, and become the best possible version of myself.

Leading through Guiding
Lindsey Rumfelt, Psychology - Senior
Mentor: Dr. Lara Anderson, Languages, Literatures, and Cultures
During my time at the University of South Carolina, I was given the opportunity to participate in numerous leadership roles. What I did not realize at the time was that the opportunity for character growth lied within these roles as well. My first leadership role was serving as a peer leader for University 101, which I applied for at the urging of an older friend and past peer leader. Originally, I thought it would be a great resume builder but it turned out to be an experience I thoroughly enjoyed. During my first semester as a peer leader, applications to be an orientation leader for the following summer opened and I jumped at the chance. I’d been having a wonderful experience with first year students so far, and thought I would work well with incoming students as well. Combined with
other leadership positions in other student organizations, both of my student leadership roles have, in a way, raised me to become the adult I am today. Finding that each role came with other benefits, such as building communication skills, as well as time management skills, gave me a lot of time to reflect on the person I was becoming and being satisfied with who I grew into be.

Healthcare Variations Across the Globe
Kathleen Schaefer, Exercise Science - Senior
I had the eye-opening opportunity to internationally volunteer as a health care worker in medical clinics in August of 2014 and January 2015. My experiences were made possible by the organization Timmy Global Health, and our area of need was in the Amazon River Basin in Ecuador. I chose to participate due to my passion in global health, as well as my love of travel. I learned so much about healthcare while there, and also lead to my awareness of the healthcare disparities that are happening all over the world today. I am now able to compare the differences in healthcare and overall health in a 3rd world country such as Ecuador, to a 1st world country such as the United States. My learning did not end upon leaving Ecuador, and still continues as I pursue my degree and learn more about healthcare in general. My brigades to Ecuador have sparked a new interest in my world, which is the discovery of healthcare practices in other cultures. It has made me want to help make a difference and bring good quality healthcare to those who cannot easily access it. I believe that my experiences in 3rd world country health settings have not only enriched my career as a student, but will also enhance my abilities in my future career in the healthcare field.

Finding Community and What I Found in It
Courtney Whitaker, Retailing - Senior
As Vice President of Community Service for Kappa Delta Sorority I was responsible for planning and executing our large philanthropy week “Shamrock”. The goal of Shamrock is to raise awareness and money for Prevent Child Abuse America. Shamrock consists of different daily events including a Greene Street Awareness Day, a dodge ball tournament and a Gala with a silent auction. These and various other events helped us to reach our financial and publicity goals. In addition, I managed 350 women’s community service hours and activities through effective communication and organization. I had to ensure I was communicating effectively with the chapter, our advisors, and the community at large. Engaging in the community is important to being an active member of a community. Doing so allows you to become attached and invested in its success. Service has always been a value in my life, and when I came to the University of South Carolina, I made sure to find a way to the leave an impact on the Columbia community. From this experience I have learned to communicate effectively, strategically think through difficult situations, and manage and lead a large organization. Looking forward, I plan to stay active in the next community I get the opportunity to live in.
Evaluating mPing Transposition in Mimulus lewisii

Autumn Busbee, Biology - Senior; USC Aiken
Mentor: Dr. C. Nathan Hancock, Biology/Geology; USC Aiken

A variety of techniques are used to expand what is known about plant genomes and the genes that control important traits. Mutagenesis has historically been a useful technique used for the modification and identification of plant genes. Transposable elements, which are small pieces of DNA that are able to move within a genome, can be used for mutagenesis in a technique called transposon tagging. When a transposon is inserted in a gene, it can disrupt gene function, often resulting in a detectable phenotype. mPing is a transposable element that was discovered in rice and is mobilized by the Open Reading Frame 1 (ORF1) and Transposase (TPase) proteins. mPing has been shown to transpose and induce mutations in rice and soybean. Due to the success of mPing in rice and soybean, we sought to determine if mPing would mobilize within the genome of Mimulus lewisii, an up and coming model organism due to its phenotypic plasticity. M. lewisii plants were transformed with two separate constructs, one with an mPing-GFP reporter and the other encoding ORF1 and TPase. These lines were then crossed and the F2 progeny was analyzed for the presence of ORF1, TPase, and the mPing-GFP reporter using PCR. The inheritance of the two constructs and whether or not mPing was mobilized was analyzed.

Regulation of Expression of the Wrap53 Gene in Response to DNA Damage

Sarah Erlandson, Biological Sciences - Senior
Mentor: Dr. David Reisman, Biological Sciences

Wrap53 is an antisense gene relative to p53 and plays an important role in the cell’s response to DNA damage. The p53 gene is responsible for regulating the cell cycle and activating the genes necessary for cell cycle arrest or apoptosis in response to DNA damage. In greater than 60% of cancers, the p53 gene is mutated, leading to the loss of the DNA damage response and the uncontrollable cell growth that causes tumors. Translation of the p53 mRNA into protein is in part controlled by the mRNA of its antisense gene, Wrap53. Recently, it was reported that the level of the Wrap53 mRNA transcript increased upon treatment of U2OS cells with DNA damaging agents. Increased Wrap53 mRNA is hypothesized to stimulate p53 translation. The goal of our research is to determine the mechanism of this induction, which was investigated at the transcriptional and post-transcriptional levels. To test the activity of the Wrap53 promoter, a luciferase reporter was used in cell lines treated with various DNA damaging agents. To determine the post-transcriptional stability of the Wrap53 mRNA, U2OS cells were treated with a DNA damaging agent and transcription was inhibited by actinomycin D-mannitol. Cells were collected at different time points and the change in the levels of Wrap53 mRNA was determined using qRT-PCR. These experiments will give us a better understanding of the Wrap53 gene’s involvement in the cell’s response to DNA damage and will add to the current knowledge of the pathways responsible for keeping tumors in check.
**Analysis of human CST localization following DNA replication stress**

**Francesco Maoli**, Biological Sciences - Senior

Human CST is a single-stranded DNA binding protein complex composed of CTC1-STN1-TEN1. CST localizes to the telomeres, a repetitive region found at ends of linear chromosomes that helps protect the genomic DNA, and was shown to function in telomere replication. Previous studies also found that CST helps to rescue stalled DNA replication through the activation of dormant or late DNA replication origins. These dormant origins are simply replication origins that do not replicate under normal conditions. When replication stress (such as repetitive DNA sequences, collision with proteins bound to the DNA, or depletion of nucleotide pools) causes replication to stall, these dormant origins are activated to rescue the stalled DNA replication. Failure to rescue stalled replication can lead to DNA breaks and genomic rearrangements, which can promote human disease. Our current model suggests that CST helps rescue stalled replication through the activation of these dormant replication origins. However, it is currently unclear whether this occurs through direct interaction at the site of stalled replication or through indirect signaling to activate the dormant replication origin. In this study, we aim to test whether CST localizes to sites of stalled replication. To accomplish this, we are constructing an mCherry-STN1 fusion protein that will allow us to visualize STN1 localization in the cell via fluorescence microscopy following the induction of replication stalling. We predict that STN1 directly localizes to sites of replication, which would suggest that CST plays a direct role in DNA replication restart.

**Identifying sequences responsible for the high transposition rate of a Tourist MITE**

**Daymond Parrilla**, Biology - Junior; USC Aiken

Mentor: Dr. C. Nathan Hancock, Biology/Geology; USC Aiken

Transposable elements are DNA sequences that have the ability to move from one location to another in the genome. These elements can be used as tools for mutagenesis and gene discovery. The focus of this study is the transposable element mPing, a 430-bp deletion derivative of the natural occurring Ping element that exhibits high transposition activity and can reach a high copy number in rice. In comparison, mPong, an artificial deletion derivative of the natural occurring Pong element exhibits low transposition activity. The question we are trying to address is which regions of the mPing element control its transposition and allow it to be so much more active than other elements. By comparing chimeric constructs of mPing with mPong we were able to identify a region in the first half of the element (90-215bp) that could potentially promote transposition in mPing. Similarly, by screening a library of mutagenized mPing elements, we identified high and low activity mutants, each having approximately 7 base changes from the original mPing. Analysis of one of mutants that has high activity (mmPing20) suggests that the region between 260-360bp may inhibit mPing's transposition. To analyze these regions further, we performed assays on elements in which these regions have been deleted. These constructs also provide a platform to help answer the question of what role these regions play in the transposition success of MITEs.

**Exploring the Role of Asymmetric Division in Stem Cell Lineage Commitment**

**Maria Piroli**, Biomedical Engineering - Senior

Mentors: Dr. Ehsan Jabbarzadeh, Chemical Engineering
Dr. Greg Harris, Chemical Engineering

Mesenchymal stem cells are capable of dividing symmetrically to produce two identical daughter cells or asymmetrically to produce two non-identical daughter cells. In asymmetric division, one of the two daughter cells remains a stem cell with the other daughter cell committing to a distinct cell type. This asymmetric division can be caused by intracellular and extracellular cues. Extracellular cues can be signals from nearby cells or the microenvironment while intracellular cues, such as LGN and PAR polarity proteins, can cause polarity within the cell, distributing RNA transcripts and proteins to a single daughter cell guiding lineage commitment. In this study we use micropatterning tools to explore how asymmetry of the cell affects differentiation of mesenchymal stem cells into adipogenic or osteogenic lineage. We micropattern distinct shapes and sizes of adhesive area for cell binding by using UV lithography on glass coverslips. The distinct shapes are designed to control symmetric and asymmetric cell shape and in turn promote symmetric and asymmetric division. Cells are cultured on micropatterns and provided soluble cues for differentiation and analyzed for lineage commitment due to asymmetry. Our results suggest that controlling shape and protein polarity of the cell is a key factor to harnessing and directing lineage commitment of stem cells.

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**Defining Your Path: Applying for National Fellowships**

**Elizabeth Moore**, Biomedical Engineering - Junior

The Barry Goldwater Scholarship provides funding to undergraduates who are studying science, technology, engineering, or math and are dedicated to pursuing research careers in those fields. The Harry S. Truman Foundation provides graduate school funding for juniors intending to pursue careers in public service. These two awards are seemingly very different, but by applying for both simultaneously, I discovered my interests and goals at the intersection of the two. Both competitions require written applications, as well as a campus interview, but more importantly require you to evaluate your path to your career goals. By looking at my goals and interests through two different lenses, I was able to clarify my career path and better understand what I would like my future to be. By applying for national fellowships, I learned how to further articulate my passions and goals, further preparing me for future applications and interviews.
Role of miRNA-155 on Inflammation in the Hepatic Tissue of a High Fat Diet Model

Cara Pritchett, Biological Sciences - Senior
Mentors: Dr. Angela Murphy, Pathology Microbiology and Immunology
Dr. Kandy Velazquez, Pathology Microbiology and Immunology

As the prevalence of obesity increases worldwide, obesity-related health problems including insulin resistance, type 2 diabetes, coronary artery disease, cancer and degenerative diseases are becoming a significant public health concern. A known pathophysiological mechanism that can link high-fat-diet (HFD) -induced obesity to disease risk is macrophage-induced inflammation. MiRNA-155, a noncoding RNA oligonucleotide, has been shown to regulate the macrophage inflammatory response, and it may emerge as an important therapeutic target for prevention of macrophage-induced inflammation in obesity. This study examines the role of miRNA-155 on macrophages in the liver, using a mouse model of HFD-induced obesity. The experimental groups were as follows 1) wild-type fed low-fat-diet (WT-LFD), 2) WT-HFD, 3) miR-155-/-LFD and 4) miR-155-/-HFD. The mice followed their respective diets for 20 weeks until sacrifice at 24 weeks of age. Body composition analysis (percent fat, fat mass & lean mass) began at 4 weeks (baseline) and continued every 4 weeks to determine fat composition throughout the entire experimental period. The hepatic tissue was collected, weighed, and lipid accumulation, inflammation and macrophage number were determined using histological staining methods (Oil Red O, H&E and F4/80). Data are currently being analyzed to determine changes across groups.

Using Organic Acids as a Means of Controlling Mineralization of Electrospun Polymer Nanofibers for Bone Tissue Engineering

Joshua Walters, Biomedical Engineering - Senior
Mentor: Dr. Esmaiel Jabbari, Chemical Engineering

Many ailments can result in the loss of large portions of bone, such as cancer or trauma. This resulting defect which can result in mal-union of the bone unless the tissue is replaced. Autologous grafts – grafts taken from another site within the patient – are considered to be the “golden standard” due to their compatibility with the immune system and ability to provide an environment favorable for healing; however, this option is imperfect because there is a limited amount of tissue that can be taken from other sites and it causes donor-site tissue morbidity. Alternative sources include allografts and xenografts, which are respectively taken from cadavers and animals. These sources are more accessible and do not harm the patient, but they do not achieve the same clinical standard as autologous grafts. This creates a demand for synthetic biomaterials that can mimic the properties of an autologous graft while having the increased availability of other graft sources. By mimicking the target tissue’s histology with synthetic materials, biomaterials that meet this demand can be produced. Bone tissue is made up of collagen fibers mineralized with Hydroxyapatite crystals, and this can be imitated by using electrospun polymer nanofibers mineralized with Calcium Phosphate. It has been shown that mesenchymal stem cells seeded on this composite biomaterial express osteogenic and vasculogenic markers. In order to improve the bio-mimetic properties of this biomaterial, this project focuses on the use of organic acids to control the mineralization of nanofiber sheets for bone tissue engineering.

Building constructs for cathepsin K-mediated expression of eGFP or mCherry to study bone resorption in the developing zebrafish

Brianna Snelling, Biology - Junior; USC Aiken
Mentor: Dr. April DeLaurier, Biology/Geology; USC Aiken

The goal of this project is to use transgenic reporter lines to study osteoclast activity in the developing zebrafish so as to better understand how the processes of bone formation (by osteoblasts) and resorption (by osteoclasts) shape the skeleton. Fluorescent reporter lines that label specific cell populations allow the study of the role of cells in tissue patterning during development. This project aims to use eGFP and mCherry as reporter genes under the control elements of cathepsin K to study osteoclast activity in the developing embryo. A construct containing regulatory elements of cathepsin K driving eGFP, along with a transposon element Tol2 has been constructed (ctsk:EGFP-iTol2), and generation of a construct containing mCherry (ctsk:mCherry-iTol2) in the place of eGFP is in progress. Once both constructs are completed, they will be microinjected into separate 1-cell stage zebrafish embryos to generate germ lines expressing EGFP or mCherry in osteoclasts. Using these osteoclast reporter lines along with lines created previously that label osteoblasts (sp7:EGFP), we will observe how osteoclasts and osteoblasts work together to shape bones during development and maintain homeostasis of bone matrix in the adult fish. Understanding how the skeleton is formed in development and maintained throughout life in zebrafish has implications for studying developmental diseases and osteoporosis in humans.

Eye Size Sexual Dimorphism and Interspecies Variation in Daphnia

Stephen Walterhouse, Biological Sciences - Senior
Mentor: Dr. Jeff Dudycha, Biological Sciences

Vision provides a means by which organisms can construct a representation of their environment that provides useful information. However, it is not always clear what information is useful. The genus Daphnia is comprised of small planktonic crustaceans that have a single compound eye. The size of this eye is potentially determined by a tradeoff of the benefits of information acquisition against energetic and predation risk costs. Daphnia have mostly translucent bodies, decreasing their chances of detection by predators, and visual systems that are energetically expensive. Whatever purpose they have for taking in light is expected to benefit them more than the costs. Daphnia vision might be used in predator avoidance, locating mates, or foraging. Here, I make comparisons of eye size between females and males in 34 species of North American Daphnia to determine if there are consistent patterns of eye size variation that might offer clues about the function of Daphnia vision.
Optimizing In Vitro Fertilization Procedures in Zebrafish
Madelyn Wasden, Biology - Sophomore; USC Aiken
Mentor: Dr. April DeLaurier, Biology/Geology; USC Aiken
There are currently over 20,000 mutant and transgenic zebrafish lines used to study genetics, toxicology, human medicine, and so much more. Due to constraints on space and resources, not all lines can be maintained as adult fish, so sperm is frozen and lines are retrieved by in vitro fertilization (IVF). By not having an in vitro process that yields consistently successful fertilization, many of these lines are at risk. I aim to increase the success and consistency of the in vitro protocol, specifically the sperm freezing and thawing process, for our lab so that we may be able to continue Dr. DeLaurier's invaluable work and research with zebrafish. I will begin by applying principles of cryobiology to the protocol as well as errors in gamete handling and pooling. After identifying problem areas in the protocol that are affecting fertilization, I will begin isolating each method and testing it for success. By process and elimination I hope to narrow down the various elements and steps of the sperm freezing and thawing process that are crucial to egg fertilization. Once I have established a protocol that has proved successful, Dr. DeLaurier and future lab members will have a standardized system by which to further these mutant and transgenic lines.

Retroviral delivery of anti-HIV tat siRNAs
Emily Webb, Biology - Junior; USC Aiken
Mentor: Dr. William Jackson, Biology/Geology; USC Aiken
The Human Immunodeficiency Virus (HIV) is a retrovirus that infects CD4+ T lymphocytes causing progressive destruction of the immune system and its functions. Eight to ten years after initial infection, if treatment is not available, HIV infection results in the Acquired Immunodeficiency Syndrome (AIDS). Because current treatment options are not curative, it is necessary for further investigations into ways to combat HIV. Recently, there have been a number of studies concentrating on the use of small double-stranded RNA molecules, particularly short-interfering RNAs (siRNAs), to silence viral genes through RNA interference (RNAi). RNAi is an innate pathway that results in post-transcriptional gene silencing which is initiated by siRNAs and is facilitated by the RNA-induced silencing complex (RISC). A major focus in our lab is to take advantage of this pathway to target a HIV gene that encodes an essential regulatory protein known as 'tat'. The presence of tat is not only required to up-regulate viral transcription, but is also crucial for successful HIV replication. In order to target tat, our lab designed four anti-HIV tat siRNAs that each targets a specific site within the HIV tat gene. These anti-HIV tat siRNAs were converted to double-stranded DNA and cloned into a vector under the control of the RNA polymerase III H1 promoter. Currently our research has focused on optimizing delivery of the anti-HIV tat siRNAs using a self-inactivating retroviral vector, p1744.

Developing mPing-based Activation Tags
Tiana Chandler, Biology - Sophomore; USC Aiken
Mentor: Dr. C. Nathan Hancock, Biology/Geology; USC Aiken
Transposable elements (TEs), also known as "jumping genes," are DNA sequences that move from one location on the genome to another. A TE discovered in rice, mPing, has been shown to transpose at high rates, creating mutations and generating genome diversity. mPing is being used for plant genome mutagenesis and gene discovery. This element has been shown to jump into regions just upstream and downstream of genes. This insertion preference is optimal for activation tagging, where an insertional sequence that contains promoter elements can cause transcriptional activation of nearby genes. Activation tagging is a powerful gain-of-function approach to reveal the functions of genes because overexpression of genes can reveal their function. Our goal has been to modify mPing into an activation tag by adding enhancer elements from strong promoters. We made a number of mPing-based activation tags and tested their transposition rates in yeast transposition assays. These experiments showed that inserting various enhancer sequences into mPing causes a major decrease in the transposition rate. This is probably due to the increase in TE size and inhibition of transposition complex formation. This negative effect can be countered by using a hyperactive version of mPing recently discovered in the lab.

Modeling Biomechanics of Atherosclerotic Plaque in the Aorta Using 3D Image Reconstruction and Finite Element Analysis
William Decker, Biomedical Engineering - Senior
Mentor: Dr. Susan Lessner, Cell Biology and Anatomy
Atherosclerosis is a chronic disease in which the arteries become partially occluded due to plaque formation, which can result in heart attack or stroke due to a blockage in blood flow or plaque rupture. Plaques which are vulnerable to rupture can go undetected beforehand because they produce no symptoms. The influence of geometry and mechanical properties on atherosclerotic plaque stability in arteries is currently not fully understood. One high risk area for plaque formation is the bifurcation of the carotid artery. CT scans and duplex ultrasound flow velocity data were collected from four different patients at Greenville Health System, and the plaque specimens were subsequently acquired during carotid endarterectomy surgery. The CT scans were then used to create accurate three-dimensional models of the carotid bifurcation lumen geometry using imaging software ITK-SNAP and Geomagic. These geometric models could then be used for finite element analysis in the software COMSOL. The models underwent fluid flow analysis of the vessel lumen to calculate shear stresses experienced by the carotid plaque and carotid wall in vivo. Wall shear stress data will be correlated with mechanical properties of the plaque and with gene expression analysis to look for shear-sensitive genes associated with mechanical weakness of the atherosclerotic plaque.
Optimization of a retroviral vector to express eGFP

Jennifer Deily, Biology - Senior; USC Aiken

Mentor: Dr. William Jackson, Biology/Geology; USC Aiken

A retroviral vector is a retrovirus that has been modified to express genes of interest. Reverse transcription of the retroviral vector results in a dsDNA provirus that is integrated into the host's genome in a stable fashion. This is advantageous because it allows a gene of interest to be endogenously expressed in the host cell. The goal of this project is to develop an efficient retroviral vector to express enhanced Green Fluorescent Protein (eGFP), a reporter gene which is useful as an indicator of recombinant retroviral delivery. pSuperRetroNeo+GFP (pSRNG) is a retroviral vector which is currently used in our lab to express anti-HIV siRNAs and eGFP; however, pSRNG is inefficient at generating recombinant retroviral particles. p1744 is another retroviral vector we have in our lab which is more efficient at generating recombinant retroviral particles; however, it expresses the β-galactosidase (β-gal) reporter gene. The use of β-gal as a reporter requires cells to be lysed or fixed in order to detect expression. This project will use p1744 as a template for modifications to produce a retroviral vector that is both efficient at producing recombinant retroviral particles and expresses eGFP.

Kinetics of Ascorbate Oxidation in Serum: A Biomarker of Endogenous Oxidative Stress

Audrey Howard, Biological Sciences - Senior

Mentors: Dr. Norma Frizzell, Pharmacology, Physiology and Neuroscience; Dr. John Baynes, Pharmacology, Physiology and Neuroscience

Oxidative stress contributes to pathology in many age-related chronic diseases, including diabetes, and cardiovascular and neurodegenerative diseases. There are several assays available to measure the antioxidant potential of blood serum, but these assays measure protection against exogenous oxidant challenges rather than ongoing endogenous antioxidant activity. Ascorbate (Vitamin C) is the front-line antioxidant in serum, and is converted to dehydroascorbate (DHA) during inactivation of reactive oxygen species that mediate oxidative damage in tissues. DHA is unstable in plasma and is rapidly hydrolyzed to 2,3-diketogulonic acid (DKG). To assess exposure of tissues to ambient oxidative stress in blood, we proposed to measure the increase in DHA and DKG in serum during incubation under physiological conditions for up to 24 hours in vitro. Using the method of Henning C, et al. (J Biol.Chem, 2014), serum DHA and DKG were derivatized to the o-phenylenediamine adduct, recovered by precipitation of plasma protein, and the supernatant was analyzed by positive ion electrospray ionization-liquid chromatography/mass spectrometry. Our work is still in progress, however we have been able to detect both DHA and DKG in serum with good peak shape and signal-to-noise ratio. We hope to report on changes in DHA and DKG with time of incubation of serum in vitro. If successful, our assay will provide a unique tool for assessing endogenous oxidative stress in blood and changes in oxidative stress with age, and in disease and in response to therapy.

Using the CRISPR/Cas9 system to understand the function of the PHF21A complex in Danio rerio craniofacial development

Khadijah Jihad, Biology - Senior; USC Aiken

Mentor: Dr. April DeLaurier, Biology/Geology; USC Aiken

Potocki-Shaffer is a human genetic disorder that results in mental retardation and delayed development. The goal is to make novel zebrafish mutants for the kdm1a, zmym2 and zmym3 genes to understand their function singularly and working together with PHF21A during craniofacial development. Previous research has indicated that defects in these genes underlie Potocki-Shaffer syndrome and craniofacial abnormalities. PHF21A encodes for a plant finger protein and its expression seems consistent with the function of craniofacial and neurofacial development. Constructs for targeted mutagenesis of kdm1a, zmym2 and zmym3 will be generated using the CRISPR-Cas system. CRISPR (Clustered Regularly Interspaced Short Palindromic Repeats) is a system that first evolved in bacteria as a defense mechanism to silence foreign viruses and plasmids, and can now be used as a tool for targeted mutagenesis in vertebrates. The CRISPR system involves making guide RNA (gRNA) to target specific genes and co-injecting gRNA constructs along with Caspase (Cas9) mRNA into 1-cell stage embryos, where gRNA binds to the gene, recruiting Cas9, which induces permanent double-strand breaks in DNA. gRNA constructs targeting zebrafish kdm1a, zmym2, and zmym3 genes have been generated, and will be injected into 1-cell stage embryos. Prospective mutants will be raised to adulthood, outcrossed, and F2 mutant larvae will be screened for phenotypes. Ultimately, the goal is to understand the singular and combined requirements for these proteins in regulating downstream expression of genes required for craniofacial development.

DNA Methylation and its Role in Repair Post UV Damage

Elizabeth Mitten, Biochemistry and Molecular Biology - Senior

Mentor: Dr. Kevin Sweder, University of Syracuse

Although still a relatively new area of research that is not clearly understood, epigenetics has become within the last decade a topic of much interest in the scientific community. One sub-area of particular interest is the putative role of epigenetic modifications in the repair of DNA, where the addition of certain functional groups to DNA or histones may be involved in recognition of DNA damage. In this study, we decided to look at the role the methylation of DNA might play in repair of UV-induced DNA damage. HeLa cells were cultured and a fraction exposed to UV radiation to induce DNA damage. The UV-irradiated HeLa cells, along with the remaining unirradiated cells, were then collected at times 0 hours, 4 hours, 8 hours, and 24 hours, and an extraction for methylated DNA was carried out to compare methylation levels during the 24-hour time period. DNA levels in both the control group and the irradiated group were then measured using qPRC. Preliminary data suggests there is an increase in DNA methylation following UV damage, suggesting a correlation between DNA methylation and DNA repair. Understanding the mechanism of DNA repair gives us the potential to be able to diagnose and create treatments for people with diseases due to deficiencies in their DNA repair.
The Effect of Organic Acids on Mineralization, Mechanical, and Degradation Properties of Aligned Functionalized Polymer Nanofibers

Shawn Patel, Biomedical Engineering - Junior
Weston Grove, Biomedical Engineering - Junior
Ryan McCormick, Biomedical Engineering - Sophomore
Mentor: Dr. Esmaiel Jabbari, Chemical Engineering

Bone is composed of organic and inorganic components, which give both flexibility and mechanical strength. The organic phase mostly consists of collagen-1 fibers, while the inorganic phase mostly consists of carbonated hydroxyapatite crystals. Loss or damage of bone tissue can occur through physical trauma, tumor removal, or other pathologies and can be treated by implantation of autologous tissue or donor tissue, or by construction of tissue engineered scaffolds. Tissue engineering (TE) is an alternative to grafting and the scaffolds can be tailored to specific properties. In this study, aligned polymer nanofibers and calcium phosphate crystals were used to mimic the structure of bone. The nanofibers were made by electrospinning into sheets followed by submersion in 10 times concentrated simulated body fluid (10xSBF) to deposit the calcium phosphate (CaP) crystals onto the polymer fibers. The aim of this study was to study the effect of adding organic acids in SBF on CaP mineralization, mechanical properties, and degradation of the nanofiber sheets. The acids used were salicylic acid (aspirin), ascorbic acid (vitamin c), and hydroxycitric acid (HCA) while the mineralization (CaP content) was measured by measuring the change in mass of the nanofiber sheets before and after SBF submersion. Degradation was tested by immersing the mineralized nanofibers in SBF and incubating for several days and mechanical properties were measured using compression testing. Based on the data, it was found that HCA yielded the highest percent mineralization, a larger elastic modulus, and had a greater percent of mass remaining after the degradation test.

The Three-Dimensional Morphological Effects of Captivity

Hannah Selvey, Biological Sciences - Senior
Mentor: Dr. Adam Hartstone-Rose, Cell Biology and Anatomy

Many captive animals are fed diets that are drastically different in mechanical properties than their wild diet. Most captive pantherines are fed a nutritionally supplemented diet consisting almost entirely of ground meat. While many zoos supplement this diet with bones, the fact remains that large captive felids are fed diets that require substantially less masticatory effort than those of their wild counterparts. We compared linear measurements and 3D geometric morphometric landmarks of captive and wild lions and tigers using Principal Component (PC) analysis. The most influential variable in the sample (PC1, 21.5% of the variation) separates the two species, but the second most influential contributor (PC2) to the overall skull shape was driven by captivity status. In fact, captivity status drives nearly twice as much of the 3D variation as sexual dimorphism (14.8% vs. 8.0% for PC2 vs. PC3). Thus the shape is influenced nearly twice as much by whether the animal was captive or wild than by whether it was male or female. If a causal relationship can be demonstrated between dietary mechanical properties and morphology, people who oversee the diets of captive carnivores should consider modifying these diets to account for not only nutritional but also the mechanical properties of a carcass-based diet as well. In addition to the husbandry implications, our analyses show the ways in which captive specimens are different than their wild counterparts – findings that have implications for morphologists when considering anatomical samples.

Effects of Immune Cell Movement After the Implantation of a Gene Coated Scaffold in a Colorectal Cancer Specimen

Heather Struckman, Biomedical Engineering - Freshman
Mentor: Dr. Michael Gower, Chemical Engineering

This is a proposal for biomedical research at the University of South Carolina during the summer of 2015 under the supervision of Professor Michael Gower. The overall objective of this project is to control the movements of immune cells within a mouse using tissue engineering scaffolds and see if this technology is useful for treating colorectal cancer. The first aim is to implant scaffolds into the cancerous and noncancerous mice and study the type of cells that enter into the scaffold, the effect on the immune cells in the colon and the difference between the immune reactions between the two mice. This is to determine if a scaffold implanted into the skin or abdominal fatty tissue can control the number of immune cells and tumors in the colon of cancerous mice. The second aim involves the implantation of gene coated scaffolds to amplify the immune response in both cancerous and noncancerous mice. The second aim is to control the immune response and tumor formation to a higher degree by releasing a chemokine from the scaffold using gene delivery. We hypothesized that the immune environment in the tumor can be controlled by a scaffold implant, allowing the chemotherapy to be more effective at attacking the cancer cells.
Identifying the gene underlying a jaw mutation in zebrafish

Kayce Vanpelt, Biology - Junior; USC Aiken
Mentor: Dr. April DeLaurier, Biology/Geology; USC Aiken
A line of mutant zebrafish discovered in a forward genetics screen was determined to have defects of jaw cartilage including fusions, and abnormal shaping of elements. Previous research has narrowed the location of the mutation to be between 29.1 Mb and 30.9 Mb on chromosome 19. Several genes within the aforementioned frame have already been sequenced, but none of the gene sequences have shown significant differences from the wild type (non mutant) zebrafish sequences. Further sequencing has been performed by designing primers to amplify candidate genes, and those results are being analyzed for possible mutations. If data analysis shows nearly identical sequences between mutant and wild type zebrafish, a reverse genetics approach will be taken by employing the CRISPR/Cas9 system as a mutagenesis tool. This study has the potential to reveal an entirely new gene or gene pathway involved in skeletal joint formation that could be applied to human disease research.

Experimental Setup and Commissioning of a Test Facility for Gain Evaluation of Microchannel-Plate Photomultipliers in High Magnetic Field at Jefferson Lab

Eric Bringley, Chemical Engineering - Junior
Mentor: Dr. Yordanka Ilieva, Physics and Astronomy
At the Jefferson Laboratory (JLab) a research and development (R&D) project for a Detector of Internally-Reflected Cerenkov light (DIRC) for the upcoming Electron Ion Collider is underway. One goal is the development of a compact readout camera that can operate in high magnetic fields. Small-size photon sensors, such as Microchannel-Plate Photomultipliers (MCP-PMT), are key components of the readout. Here we present our work to set up and commission a dedicated test facility at JLab where the gain of MCP-PMTs is evaluated in magnetic fields of up to 5 T, and to develop a test procedure and analysis software to determine the gain. We operate the setup in a single-photon mode, where a Light-Emitting Diode delivers photons to the photocathode of the sensor. The PMT spectrum is measured with a flash Analog-to-Digital converter (fADC). We determine the PMT’s gain by fit of the single-photoelectron spectrum from the fADC with a model consisting of an exponential background and a convolution of a Poisson distribution with Gaussian distributions of the pedestal and multiple photoelectron peaks. Our work shows that the setup allows gain determination with an uncertainty of 12%. The facility is now established and will have a long-lasting value for sensor tests and beyond-nuclear-physics applications.

Photodimerization of chromone inside phenylethynylene bis-urea macrocycle nanotubes

Logan Donevant, Chemistry - Senior
Mentor: Dr. Linda Shimizu, Chemistry and Biochemistry
Sahan R. Salpage, Logan S. Donevant, Mark D. Smith, and Linda S. Shimizu
Chromone and its derivative are naturally occurring compounds in edible plants, such as Bishop’s Weed fruit and Dill fruit, that are regularly included in the human diet. These molecules have antioxidant properties because of their ability to neutralize reactive oxygen species and terminate free radical processes. In 2010, Machado and Marques wrote on the structural diversity of chromone and its derivatives along with their antioxidant properties.1 The photodimerization of chromone has been reported by Sakamoto and associates; they observed two photodimers, the anti-HT and trans-fused HT, which were observed in 1:1 ratio with a total of 40% conversion.2 Our group looks at photochemical reactions within small spaces or channels. These channels are made by self-assembling macrocycles, which stack one on top of another to give solids with straw-like structures. Here, we present studies of the uptake of chromones within the channels of self-assembled phenylethynylene bis-urea macrocycles.3 We observed good conversion and high selectivity when chromone was photolyzed within the channels of our solid host. A total conversion of 70% occurred, and a high selectivity of 87% was observed for the anti-HT dimer along with a 13%

**Recyclable Magnetic Manganese Oxide Coated Nanoparticles**

*Kelly Hall*, Chemistry - Senior; USC Upstate
Mentor: Dr. Anselm Omoike, Natural Sciences & Engineering; USC Upstate

Magnetite nanoparticles were coated with manganese oxide by two modes of addition of KMnO4 and MnSO4•H2O. The first mode of addition involved adding KMnO4 before MnSO4•H2O, and the second mode reversed the order of addition. The coated nanoparticles were characterized using transmission electron microscopy (TEM) and Fourier transform infrared spectroscopy (FT-IR). Characterization results revealed that the magnetic manganese oxides were spherical in shape (12±2 nm in size) and amorphous. The effect of mode of reagent addition on the ability of the coated nanoparticles to degrade bisphenol-A (BPA) was determined using high performance liquid chromatography (HPLC) fitted with a fluorescence detector. Nanoparticles coated by the first mode degraded nearly all BPA in solution within two days and appear to be reusable, but nanoparticles coated by the second mode did not degrade a significant amount of BPA. The mode of reagent addition when coating the nanoparticles does seem to affect the ability of the coated nanoparticles to degrade BPA.

**Synthesis and Characterization of Amphiphilic ABC Triblock Terpolymer**

*Jefferson Langston*, Chemistry - Junior
Mentor: Dr. Morgan Stefk, Chemistry and Biochemistry

Microphase separated block copolymers (BCPs) have attracted much attention due to their ability to form self-assembled nanostructures such as spheres (S), cylinders (C), lamellae (L), double gyroid (GD), and alternating gyroids (GA). There is much promise from recent developments that nanostructured materials can exhibit unique mechanical, optical, electrical, and magnetic properties that are of wide interest for use in nanoscale devices. We present the synthesis of a novel block copolymer designed as a novel structure directing agent to achieve tunable network morphologies. Poly(ethylene oxide-block-styrene-block-hexyl acrylate) was made by a series of controlled radical polymerizations. The resulting polymers were analyzed using proton nuclear magnetic resonance spectroscopy (NMR) & gel permeation chromatography (GPC). The thermal behavior of these polymers was also studied with differential scanning calorimetry (DSC).

**Constructing a Small Peptide Drug Library Using Combinatorial Synthesis**

*Kimberly McRae*, Biochemistry and Molecular Biology - Sophomore
Mentors: Mr. Dan Menasco, Chemistry and Biochemistry
Dr. Qian Wang, Chemistry and Biochemistry

Using small peptides labeled with hydrophobic tags is an innovative way to target specific proteins for degradation. The addition of hydrophobic tags (HyT) emulate an unfolding protein and signals to the cell to either refold or destroy that protein. The objective of this research was to take advantage of this mimicking system and hopefully determine that hydrophobic tagging can be used to destroy a self-regulating enzyme, Thymidylate Synthase (TS), with no known enzyme-mediated method of degradation. In order to do so, a series of peptide-RTX complexes modified with various hydrophobic tags to determine which nucleophile would be more effective in cleaving a fundamental bond, thus, yielding the greatest amount of the modified drug. Using an alkanesulfonamide ‘safety-catch’ linker, 38 short peptides of 2 gamma glutamic acids were created and the chemotherapy Raltitrexed (RTX) was attached. After which, this complex was labeled with several different hydrophobic tags of varying logP values and the percent yield was calculated.

**Self-assembly of magnetic shapes using perpendicular recording media templates**

*Tanner Pearson*, Physics - Senior
Mentor: Dr. Thomas Crawford, Physics and Astronomy

Magnetic recording is used to create patterned magnetic field templates that direct the self-assembly of nanoparticles into user-designed shapes. Colloidal suspended magnetite nanoparticles are drawn out of solution and onto the media surface by magnetic field gradients that are localized to the ~ 1-2 nm transition regions separating oppositely magnetized regions of the medium. Importantly, for perpendicular recording, the bit magnetic moments are oriented perpendicular to the medium surface, and this allows for arbitrary 2D patterns to be recorded. As a demonstration, we have created custom 2D structures including closed shapes and curved features, using a scanning contact write/read tester. Interestingly, the field gradients in perpendicular recording create assemblies that are as wide as 100-500 nm while remaining only 1-3 nanoparticles thick. We will discuss the dependence of pattern size, shape, and quality on nanoparticle diameter, suspending medium, assembly time, and critically, the specific field gradient geometry found in perpendicular recording media. Finally we will assess the potential to mass produce and suspend custom mesoscale shape colloids using this templating technology.
Structural characterization of 1-deoxy-D-xylulose-5-phosphate reductoisomerase from Vibrio vulnificus

Makenzie Perdue, Biological Sciences - Senior
Mentor: Dr. Maksymilian Chruszcz, Chemistry and Biochemistry

Exposure to Vibrio vulnificus, a gram-negative bacterium that dwells in estuaries, ponds, coastal waters, can lead to gastrointestinal distress, septicemia, and blistering dermatitis. The currently available antimicrobial drugs are ineffective at combating all environmental V. vulnificus isolates. Five metabolites have been identified which are essential for the survival of V. vulnificus, including 1-deoxy-D-xylulose-5-phosphate (DX5P). 1-deoxy-D-xylulose-5-phosphate reductoisomerase (VvDxr; dxr) is responsible for converting DX5P into 2-C-methyl-D-erythritol-4-phosphate (MEP) in the terpenoid backbone synthesis pathway, via cofactor NADPH. In order to facilitate the design of new Dxr inhibitors, recombinant VvDxr was overexpressed, purified, crystallized, and several structures, including both apo- and ligand-bound forms of VvDxr, were determined. Structural analysis, as well as biochemical characterization of VvDxr and its interactions with Dxr inhibitors, will not only allow for a detailed view of the enzyme’s mechanism, but also allow for the potential development of antimicrobial agents against this bacterium and other bacteria utilizing the MEP pathway.

An Experimental Study of the Forensic Luminol Test for Detection of Bloodstains

Katherine Witherspoon, Chemistry - Senior
Jennifer Martin, Chemistry - Senior
Samantha Ervine, Chemistry - Junior
Mentor: Dr. Stephen Morgan, Chemistry and Biochemistry

Luminol has been used for bloodstain detection by forensic investigators for over 60 years. When luminol (3-aminophthalhydrazide) is sprayed onto areas suspected of containing blood, luminol reacts with the heme moiety of hemoglobin to give a faint bluish-white chemiluminescence observable in the dark. Studies on the sensitivity of the luminol technique have inconsistently reported a wide range of detection limits. In 2006, Webb, et al. recounted detection of five-million times dilute blood using luminol, whereas the FBI had determined luminol to be non-indicative for bloodstains over one-hundred times dilute. The reason for the large range in reported detection limits stems from a lack of experimental control. Though evidently important, bloodstains are often prepared in a way which cannot guarantee reliable replicate analysis, and luminol is usually sprayed on bloodstains in an uncontrolled fashion. We have invented and submitted for patent a technique which allows reproducible creation of bloodstain samples. Using this sample preparation technique, we have designed experiments with controlled blood and luminol application for the first time, thus allowing the ability to quantifiably observe the effect different dilutions of bloodstains have on the chemiluminescent blood- luminol response. A Nikon D80 CCD camera was used to capture light emitted from the blood-luminol reaction. Pixel intensities from raw images were used to quantify the response, allowing a limit of detection of luminol for bloodstains in the hundred thousand times dilute region to be discovered.

Computing

Automating small business processes through an Electronic Data Interchange

Vincent Belken, Integrated Information Technology - Senior
Dernell Hilton, Integrated Information Technology - Senior
Thomas Beatty, Integrated Information Technology - Senior
Mentor: Dr. Karen Patten, Integrated Information Technology

Businesses are seeking to automate processes. This saves them time and money by having computers handle information in a quicker and more reliable way. This project looks towards the internet for solutions to help a small business to match many small suppliers to small manufacturers. Using Wordpress, the client is quickly able to add products, match the sellers to the buyers, and view analytics about the merchandise being moved. The result of this project is the increased efficiency and productivity for many small businesses within South Carolina.

IBM Big Data and Analytics Workshops

Anthony Betina, Integrated Information Technology - Senior
Rashawn Fulmore, Integrated Information Technology - Senior
Randal Hugee, Integrated Information Technology - Senior
Sheldon Bennett, Integrated Information Technology - Senior
Mentor: Dr. Karen Patten, Integrated Information Technology

Big Data and Data Analytics are emerging technology trends affecting global business today. To provide USC faculty members the opportunity to become more familiar with these emerging technology trends, the Integrated Information Technology Department teamed together with the IBM Academic Initiative to deliver these workshops over Spring Break. My project team was responsible for all the pre-workshop technical software preparation, publicizing and registering USC faculty attendees, and coordinating and supporting the actual workshops.

iiT Capstone Project – Plan and Host the “Create IT Discovery Day” for Columbia-area High School Students

Chieh-Yu (Jessica) Chang, Integrated Information Technology - Senior
Derrick Rose, Integrated Information Technology - Senior
Keven Sleeper, Integrated Information Technology - Senior
Mentor: Dr. Karen Patten, Integrated Information Technology

The annual “Create IT Discovery Day” for high school students is an event sponsored by IT-oLogy, TM Floyd & Company, and the Integrated Information Technology program of USC. IT-oLogy is a non-profit collaboration of businesses, academic institutions and organizations dedicated to growing the Information Technology (IT) talent pipeline, fostering economic development and advancing the IT profession. The goal of our iiT Capstone Project was to work together with IT-oLogy to put on an event that would inform high school students about the careers in IT. We taught the students about current technologies and career possibilities within each field, and provided them hands-on activities to explore the opportunities in IT. By informing the students about jobs in the IT world, the goal of this Capstone Project was to encourage those students attending the
workshop to join the iIT major or other related majors in USC. Our Capstone Project team planned and developed a series of technology workshops including Scratch, Raspberry Pi, Circuit Basics, and a campus tour. We also designed a USC Student Panel that consisted of iIT and Computer Science students, and had the current students talk about the differences and similarities in both majors. Around 50 high school students attended the five-hour sessions. Based on verbal student feedback, these attendees found the day really interesting and enjoyable. We are looking forward to presenting our Capstone Project poster at the 2015 Discovery Day.

AITP National Collegiate Competition 2014 – Atlanta
Nicole Gilland, Integrated Information Technology - Senior
Mentor: Dr. Karen Patten, Integrated Information Technology
AITP (Association of IT Professionals) has chapters all over the US; every year the chapters convene to compete for national titles in different events. We competed for the first time in 2014; my fellow officers and I spent hundreds of hours preparing for this event. We focused on participating in this event to showcase our degree program and club. We are competing in 2015 in Omaha, Nebraska.

STEP Grant Project Website
Kimberly Kimbrell, Integrated Information Technology - Senior
Clare Nelson, Integrated Information Technology - Senior
Brandon Derrick, Integrated Information Technology - Senior
Mentor: Dr. Karen Patten, Integrated Information Technology
USC's Science Education STEP Project is part of a Grant Program to develop teaching resources for middle school science teachers in science, technology, engineering, and math (STEM) disciplines. The STEP Website includes resources and content developed by USC to be accessed by middle school teachers in South Carolina. The website serves to allow access to key content on an “as needed” basis, to obtain accurate information about new science practices, and observe "live enactment" of targeted instructional strategies. This is a project centered on science teacher professional development (middle school grades). This semester, the IIT Capstone Project Team for the STEP Project Grant is tasked with increasing the speed and functionality of the current website as well as updating content and uploading new content to the site. Upon analyzing the old website, our team made the recommendation of switching the web host provider as well as a new content management system (CMS). Our goal is to provide a user friendly website that can be easily updated and managed both by the STEP Project Grant Owners as well as future USC IIT students tasked to work on this project. Currently, our IIT Capstone Project Team has completed the hosting and CMS switch and are designing and updating at the direction of the STEP Grant Project Owners. Dr. Daniel Norris’ ITEC 544 class is developing instructional videos as resources for the teachers. These videos will be uploaded to the new website by our Capstone Project Team. Additionally, we will provide instructions for the sustainment of the website as well as the ability to interpret the website analytics in an effort to determine the usefulness of the website.

Heritage at Lowman Computer Workshops
Grady Rogers, Integrated Information Technology - Senior
Turki Aldossary, Integrated Information Technology - Senior
Aldrin Ravenell, Interdisciplinary Studies – Senior
Mentor: Dr. Karen Patten, Integrated Information Technology
The Heritage at Lowman, owned by Lutheran Homes of SC, is a continuing care retirement community in White Rock, SC. The Heritage has an overall wellness initiative, BeWell (Bringing Everyone Wellness Enrichment for Lasting Life). BeWell and the iIT Program at USC have jointly developed computer education program for the individual residents at the Heritage at Lowman, managed and coordinated each semester by an IIT Capstone Project team. This ongoing program, in its seventh year, is part of this overall wellness initiative to enrich the continuing care environment of retirees. Our IIT Capstone Project goal is to teach Heritage residents computer skills and programs. During this spring semester, four PC and digital application workshops were developed and delivered to teach basic and advanced digital knowledge and to train the residents how to use new technologies in today’s society, both Internet-based and non-Internet-based. Thus far, we successfully developed and delivered one basic workshop (setting up and navigating Facebook) and coordinated the development and delivery of four more advanced workshops (Setting up a new PC/Laptop, Browser 101, PC Protection, picture transfer), delivered by IIT undergraduate student volunteers. The grand finale includes a graduation ceremony for residents as a recognition of their success and our appreciation.

Evaluation and Improvement of WISER Software Suite for Rapid Identification of Chemical Exposure
Alyssa Shofner, Computer Science - Sophomore
Daniel Vu, Computer Science - Senior
Bethany Janos, Biomedical Engineering - Sophomore
Mentor: Dr. Homayoun Valafar, Computer Science and Engineering
Mass casualty incidents depend on rapid assessment of victims through various triage models. Our research proposes a new model of chemical exposure identification that, when combined with new mobile technologies, can significantly improve the information acquisition time and the efficiency by which patients are triaged. Improved efficiency will allow emergency responders to more effectively handle larger number of patients during a mass casualty incident (MCI). Our first approach consisted of evaluating the existing WISER software under practical MCI conditions based on usability and insufficiencies. The National Library of Medicine developed WISER (Wireless Information System for Emergency Responders) that allows emergency responders to identify a list of possible chemical exposures based on the observed patient symptoms. The evaluations reported in this work are based on actual data that was acquired during the 2005 chlorine spill in Graniteville, SC. Our second approach is based on challenging the basic paradigm of chemical identification from exact list of signs and symptoms. Our modified approach is named Vector Projection (VP) and focuses on representation of patient signs and symptoms in a hyper-dimensional space that allows the likelihood of different chemical exposures to be ranked rather than the elimination of substances. Aiding VP we have proposed a client-
server model of data aggregation that allows for a consensus in decision making by examining the entire set of available patient data. Implemented through mobile technologies, the new model will allow a more robust identification of chemical exposures and will accommodate missing information and exposure to multiple agents. Acknowledgements: This study was supported by the National Institutes of Health/The National Library of Medicine (R01 LM011648-01)

Adapting a Smart Soccer Ball to Detect Head Trauma

Theodore Stone, Computer Engineering - Sophomore
Nathaniel Stone, Computer Engineering - Sophomore
Connor Bain, Computer Science - Senior
Mentor: Dr. Srihari Nelakuditi, Computer Science and Engineering

Head trauma in sports has recently become a topic of great importance. A concussion is a serious injury for young players and professionals alike - one that often goes unnoticed during a game. Over the last few years, many sports have begun to study how best to detect concussions during gameplay. In some sports, for example football, sensors can be affixed to existing player equipment like a helmet in order to detect dangerous head trauma. However in other sports such as soccer, no such convenience exists. The Adidas miCoach Smart Ball is a size 5 regulation weight soccer ball containing sensors capable of measuring impact forces on the ball. Marketed as a means to improve one’s kicking prowess, the Smart Ball operates in conjunction with an iOS app to provide rudimentary speed and spin data from single, stationary kicks. Our goal was to adapt the Smart Ball to be able to provide a means to measure head impacts throughout a soccer game. By developing our own application to communicate directly (via Bluetooth Low Energy) with the Smart Ball, we were able to gain access to the raw sensor data generated by the sensor package in the ball. This raw acceleration data will be the basis of our future work on learning how to detect concussions using the Smart Ball. Challenges to overcome include quantifying this data as well as refining our retrieval process.

An Integrated Software Package for Analysis of Structure and Dynamics of Biomolecules from RDC Data

Earron Twitty, Computer Science - Senior
Mentor: Dr. Homayoun Valafar, Computer Science and Engineering

Residual Dipolar Couplings (RDCs) have emerged as a powerful source of data. RDCs primary use is the study of structure and dynamics of biomolecules in solution. This is attributed to their ability to provide structural information at atomic resolution, while also containing sensitivity to motions ranging from time scales of picoseconds to milliseconds. REDCAT has been accepted in the community of researchers as a powerful tool for validation and evaluation of macromolecular structures from RDC data. REDCRAFT software package has been developed as a novel approach to study of structure and dynamics of proteins from orientational restraints. The combination of these tools can easily extend the basic capabilities of each tool individually and therefore has the potential to address needs of the community of researchers. In particular, the combined software package will be the only approach that will enable study of structure and dynamics of routine and challenging proteins from RDC data. The main scientific objective of this integration is to provide an analysis tool to address some of the long standing challenges in structural biology such as study of internal dynamics of macromolecules, or structure elucidation of challenging proteins. To that end, we extended the core capabilities of the REDCAT by integrating REDCRAFT software packages under one integrated, easy to maintain, and functional environment. An integrated RDC analysis software package enables simultaneous study of structure and dynamics of aqueous and membrane proteins.
Connectivity of Pressing Sequences for a Bicolored Graph

Jeffrey Davis, Mathematics - Junior
Mentor: Dr. Joshua Cooper, Mathematics

We investigate the Pressing Game Conjecture arising from computational phylogenetics, attempting to show that so-called successful pressing sequences of bicolored graphs is explorable by two-point edits alone. By a celebrated result of Hannenhalli and Pevzner, this implies that the space of sortings-by-reversal of a signed permutation is connected by minimal local alterations. Therefore, a Markov chain making such changes randomly converges to a uniform distribution, yielding an algorithm for sampling asymptotically uniformly from the space of possible rearrangement histories that link two genomes. Our techniques involve analysis of matrices over a field with two elements, and the subsequent theory may have some independent interest.

Applications of the Dinitz Conjecture to Sudoku Puzzles

Eric Miller, Mathematics - Freshman
Mentor: Dr. Joshua Cooper, Mathematics

The Dinitz Conjecture (later proved by Fred Galvin) states that for any n x n square with each cell containing a set Ai,j of at least n elements it is possible to choose elements ai,j from Ai,j such that the chosen elements in every row and in every column are distinct. When this configuration is arranged graphically it is called a latin square. Knowing this, is it possible to assert the same theorem with a square following the additional qualifications of a Sudoku puzzle? We start by arranging a n=4 (or 4 by 4) Sudoku puzzle, with a total of 4 x 16 = 64 possible elements as an upper bound. Then we show how we found the upper bound of possible combinations for each cell, and used logic to narrow down the possibilities to a number that is possible to be computed using a personal computer. We then expect, once finding a sufficiently low number, to run it through an algorithm written in Python to find how many, if any, of the possible puzzles are unsolvable. While the work is currently in progress, we expect the Dinitz Conjecture to be upheld in this case, and for all possible Sudoku puzzles arranged in this special configuration to be solvable. We will attempt to use the knowledge gleaned from this problem to see if any common n=9 (or 9 by 9) exhibits the same properties, and ultimately whether or not any n=N (or N by N) square does.

FPGA-Based Real Time Simulator for Renewable Energy Power Grids

Matthew Milton, Electrical Engineering - Senior
Mentor: Dr. Andrea Benigni, Electrical Engineering

In the development of new power systems and grids, it is often desired to prototype and validate the functionality of the system design through the use of real-time circuit simulation. Due to the high frequency dynamics of power electronic systems in renewable energy supplied grids, it is desired to calculate system attributes and states such as voltage and current in time steps below 1μs to accurately capture the behavior of the simulated system in actual time. Current computer software-based real-time simulation solutions can only realistically achieve 7-10μs time steps due to limitations and latency of computer processors. To achieve lower time steps, system models can be implemented in digital hardware on Field Programmable Gate Arrays, or FPGA. A FPGA is hardware that consists of multiple digital logic circuit blocks which can be programatically reconfigured and linked together to produce new circuits. Due to the configurability, parallelization, and nanosecond-ranged hardware latency of FPGA devices, FPGA devices are suitable as simulation platforms. This project involves creating a new FPGA solution tailored for real-time simulation of power systems that can be used in renewable energy power grids. The project works by implementing the Resistive Companion method of circuit simulation in logic design on a FPGA, but the simulated system and internal component attributes and states are calculated and updated in parallel rather than sequentially, using a mixed implicit-explicit integration scheme. With this FPGA-based simulator, future renewable energy power grids can be developed and knowledge on real-time power system simulation can be expanded.

Mathematical Modeling of Influenza Infection

Cristian Salmeron, Computational Science - Senior; USC Beaufort
Mentor: Dr. Kasia Pawelek, Mathematics; USC Beaufort

Influenza virus infection continues being major public health problem. The impacts of spontaneous behavior change in connection to within and between-hosts dynamics are not fully understood. Mathematical models were developed to investigate the impact of behavior change on influenza dynamics. Our results show that the public’s perception may be altered by media and disease symptoms lowering and delaying the epidemic peak providing enough time to obtain a suitable vaccine. This study improves our understanding of the spreading dynamics of influenza virus infection in the population and also provides insight into the impacts of media on these disease dynamics.
**Arsenic Poisoning on SRC Catalysts**

**Keith Shields**, Chemical Engineering - Senior  
Mentors: Dr. Bihter Padak, Chemical Engineering  
Mr. Benjamin Galloway, Chemical Engineering

Selective catalytic reduction (SCR) is a common emissions control method implemented by energy generation units to reduce nitric oxides (NOx) emissions released during coal combustion. However, it is widely known that SCR catalysts are prone to poisoning from heavy metals, present in coal combustion, such as arsenic. In an effort to combat this issue, a number of studies have been conducted to understand arsenic poisoning and its effects on (SCR) catalysts. Still, little progress was made in explaining the mechanism behind arsenic poisoning. The objective of this experiment is to understand these mechanisms and the effects they have on catalytic performance. In this experiment, a commercial vanadium catalyst and a novel Cu-SSZ-13 catalyst were used. Samples of these catalysts were exposed to gaseous arsenic, which absorbed onto the surface of the catalysts. These samples were then analyzed using XRD, SEM, EDX, DRIFTS and XPS. Lastly, the samples were tested for performance to see if the arsenic had any effect on the catalyst’s ability to convert NOx emissions. While there were no morphological changes to the catalyst, XPS confirmed the presents of arsenic oxide species on both the commercial and novel catalyst.

**Synthesizing Highly Functional Polyester Fabrics by Incorporating Copper Nanoparticles**

**Olaoluwa Shorinwa**, Mathematics/Computer Science - Sophomore; USC Aiken  
Mentors: Dr. Bethany Fralick, Engineering; USC Aiken  
Dr. Chad Leverette, Chemistry; USC Aiken

The ability of nanoparticles to influence the properties of polymers has led to a dramatic growth in the field of nanotechnology. Nanoparticles impart highly desirable properties to textile materials without affecting the stiffness, weight, and morphology (physical properties) of the textiles, boosting the allure of nanoparticles to the materials industry. Composite textiles exhibit special properties such as improved thermal conductivity, self-cleaning, and antibacterial properties—much needed textile attributes in today’s world. These textiles provide improved protection to health workers, as well as the general community, due to their antibacterial properties. Nanoparticles also impart UV blocking properties to textiles, resulting in fabrics that protect the human skin from sun burns, cancer and genetic mutation. In this project, copper nanoparticles are synthesized within a polyester matrix to improve the mechanical, antibacterial, and thermal properties of the polyester fabric. The copper nanoparticles are produced by chemical reduction, a cost effective method, using ascorbic acid and cethyl trimethyl ammonium bromide (CTAB). The surface morphology of the incorporated copper nanoparticles is examined using scanning electron microscopy. X-ray diffraction (XRD) is employed to determine the size of the copper nanoparticles. XRD patterns are used to verify the purity of the synthesized copper nanoparticles. Antimicrobial properties are determined against Gram-positive Staphylococcus aureus microbes and Gram-negative Escherichia coli using the agar diffusion technique. Further, the tensile stress and strain of the composite fabric are evaluated using a tensile testing instrument. Future research will constitute optimizing the incorporation of nanoparticles in polymer matrices through computer modelling.

**The effect of contaminants from structural components on PEMFC performance**

**Charles Staub**, Chemical Engineering - Junior  
Mentor: Dr. John Weidner, Chemical Engineering

Polymer electrolyte membrane fuel cells electrochemically convert H2 gas and oxygen from the air to produce electricity and water. However, fuel cells can become contaminated over time by leachates derived from balance of plant components, reducing the fuel cell’s performance. Two types of low cost structural plastic materials — a polyphthalamide and a polyamide — were studied. Leachate solutions obtained from accelerated aging of these plastics in water were a mixture of organics, inorganics, and ions and were introduced to a working fuel cell to determine their effect on the fuel cell performance. A sulfate anion solution, present in the plastic leachates, was also studied to determine the effect of the individual components. Diagnostic performance tests were performed to determine the contaminants effect on different elements of the MEA. The cheaper and dirtier polyamide leachate was found to have a significantly larger impact on the fuel cell performance than the polyphthalamide leachate. Furthermore, the polyamide leachate compounds occupied more catalyst sites and increased the catalyst layer ionomer resistance more than the polyphthalamide leachate compounds. The effect of sulfate (534 ppm) on the cell performance was found to be minimal. Due to the higher poisoning effect observed for the polyamide leachate, compared to the polyphthalamide leachate, it is advisable to use polyphthalamide plastics as structural materials in a working fuel cell system.

**Is the Reversible Necklace Poset a Symmetric Chain Order?**

**Emily Theus**, Mathematics - Senior  
Mentor: Dr. Jerrold Griggs, Mathematics

The Boolean lattice consists of all subsets of the set \{1, 2, 3, ..., n\}, partially ordered by inclusion. When represented as strings of 0’s and 1’s, the elements of the Boolean lattice can be considered equivalent to one another under certain relations; the reversible necklace poset considers elements equivalent under both rotation and reflection. We are interested in seeing whether the reversible necklace poset has a symmetric chain decomposition (SCD) which would imply a number of poset properties that hold for the Boolean lattice itself. K. Jordan (2010) proved in her dissertation that the elements of the necklace poset, which only considers equivalence under rotation, has a SCD using a modified form of Greene-Kleitman bracketing. The conjecture is that the reversible necklace poset also has a SCD. Proving this would be a major step towards answering a much larger question posed by R. Stanley (1980) about whether all posets of this general type have SCDs. Using methods adapted from Jordan’s proof, we have verified the conjecture for all values of \(n\) up to 9. Posets with the normalized matching property are guaranteed to have SCDs. While we know that in the general case, the reversible necklace poset does not possess this property, we are considering the possibility that prime values of \(n\) do have this property.

We are also experimenting with the use of circular bracketing, block code, and other methods in hopes of providing a proof that holds for all primes or even the general case.
Phenotypic Variation of Vibrio Vulnificus after Exposure to Treated Wastewater Effluent

Charlotte Eckmann, Marine Science - Junior
Mentor: Dr. Sean Norman, Environmental Health Sciences

Vibrio vulnificus is a human pathogenic bacterium naturally found in coastal waters. V. vulnificus can adapt to its environment by taking up extracellular DNA (eDNA) and incorporating it into its genome through horizontal gene transfer (HGT) in times of environmental stress. It has previously been shown that treated wastewater released into coastal waters supplies eDNA containing antibiotic resistance genes. The purpose of this experiment is to determine if, under stress from antibiotics, V. vulnificus will incorporate these resistance genes from wastewater. V. vulnificus was grown in a 96-well plate in either diluted wastewater or media (to serve as a control), both with and without the presence of antibiotics. The concentrations of the antibiotics used were previously determined by growing V. vulnificus in the presence of different concentrations of each antibiotic and choosing the concentration that suppressed growth enough to provide the selective pressure needed for HGT to occur. The growth of V. vulnificus in the presence of antibiotics in media (without wastewater) was compared to its growth in the presence of antibiotics in wastewater to determine if there was evidence of incorporation of resistance genes.

Nutrient Limitation in Stormwater Detention Ponds in Coastal South Carolina

Colleen Cohn, Environmental Science - Senior
Mentor: Dr. Erik Smith, Earth and Ocean Sciences

Stormwater detention ponds are widely used in Coastal South Carolina to help mitigate flooding and control runoff from urbanization. Runoff in developed areas can dramatically influence the nutrients that are available to phytoplankton in bodies of water and can lead to eutrophication in those water systems. Management of eutrophication usually revolves around controlling the limiting nutrient of the system, usually nitrogen or phosphorus. Ongoing research is reexamining the assumption that phytoplankton growth in freshwater environments is typically phosphorus limited while that in marine environments is nitrogen limited. Previous research suggests that stormwater detention ponds act like natural freshwater lakes, with phytoplankton abundances strongly correlated to phosphorus concentrations. However, direct experimental measures of nutrient limitation in freshwater detention ponds are lacking. In order directly determine the nutrient limitations occurring in stormwater detention ponds, a series of bioassay experiments was conducted on twelve ponds that varied in their level of surrounding density of residential development. Results indicate that ponds from areas of low to medium density residential developments often responded to both nitrogen and phosphorus additions. Ponds from high density residential developments often showed no response to the addition of nitrogen or phosphorus treatments. Results of this study suggest the importance of managing the runoff of both nitrogen and phosphorus from developed landscapes to minimize eutrophication of coastal waters.

Using X-Ray Diffraction to Detect Climate Proxies in sediments from Basrah Governorate, Southern Iraq

Alex George, Environmental Science - Junior
Mentor: Dr. Jennifer Pournelle, Environment and Sustainability

A geological section sampled by the Sealands Archaeology and Environment Program in southern Iraq, radiocarbon-dated as spanning 6ka BP-present, reveals largely homogenous, un laminated fresh-brackish marsh sediments with few visual stratigraphic indicators. However, previous work in the region suggests centennial–millennial scale climatic variation may be detectable from variation in sediment composition. In arid environments, evaporitic minerals, especially calcium carbonates, accumulate in surface soils. Variations in quantity and structure of these minerals can therefore be used proxies for detecting climatic variation. X-ray diffraction is a technique that utilizes x-rays to determine the molecular composition of a substance. An x-ray beam is fired at the substance over a range of angles (in this case, 5-60°). The angles at which the rays bend, or diffract, give information about the sample’s composition. Six samples collected by the Sealands Archaeology and Environment Program from a marsh sediment section in southern Iraq will be analyzed using this technique. If significant differences are detectable through the sedimentary sequence, this may be used to differentiate sedimentary layers. Further, results will be compared to those found by Al-Sudani and Albadran 2014 at our partner lab in the University of Basrah, in order to validate that both labs are using comparable and replicable protocols and equipment calibration and facilitate data-sharing. Abstract Bibliography

Amphitrite ornata erythrocrueorin functions with substantial dehaloperoxidase activity

Victoria Hearn, Biology - Senior; USC Beaufort
Mentor: Dr. Edward D'Antonio, Natural Sciences; USC Beaufort

Some marine annelids that live in mudflats of benthic ecosystems (e.g. Amphitrite ornata) are amidst relatively toxic naturally occurring compounds, such as bromophenols that serve as putative allelochemical defense compounds. Other polychaete species, such as Notomastus lobotus and Thelpus crispus are responsible in secreting bromophenols and the accumulation over time has polluted the mudflats. Although A. ornata does not produce bromophenols, they are able to detoxify them through the enzyme activity of dehaloperoxidase (DHP). Their intracellular DHP’s are globins with evolved/enhanced peroxidase function. The well-studied A. ornata DHP isoenzymes (A and B) are located in the coelom of the worm; however, no experimental studies have been carried out on the extracellular hemoglobin (erythrocrueorin) as a candidate for DHP activity. In this study, we isolated A. ornata erythrocrueorin and tested it with 3 different 2,4,6-trihalogenated phenols in the presence of H2O2 and the results of which will be presented.

Fish Preference for Different Types of Bait in Winyah Bay, SC

Evans Humphreys, Marine Science - Junior
Mentor: Dr. Jean Ellis, Geography

The purpose of this study were to compare the bait type’s effectiveness at catching biomass in Winyah Bay, SC and observe which bait, cat food or catfish nuggets, was better bait. From the preliminary results, the test would indicate that cat food was better bait than catfish. More sampling will be needed to conclusively decide, one way or another, which is the better bait. This experiment was part of a field research trip for the SEAS club (Students Engaged in Aquatic Sciences), which sponsors the trips as an introduction for many aquatic enthusiasts into easy research techniques and a primer for new students into the Belle Baruch Research Institute.

Role of the retinoic acid receptor

Gregory Isales, Marine Science - Senior
Mentor: Dr. David Volz, Environmental Health Sciences

Within the zebrafish model, previous research reported that developmental exposure to triphenyl phosphate (TPP) – a high-production volume organophosphate-based flame retardant – results in cardiac looping impairments independent of the aryl hydrocarbon receptor. Using a pharmacologic approach, the objective of this study was to investigate the potential role of retinoic acid receptor (RAR) – a nuclear receptor that regulates vertebrate heart morphogenesis – in mediating TPP-induced developmental toxicity in zebrafish. We first revealed that static exposure of zebrafish from 5-72 hours post-fertilization (hpf) to TPP in the presence of non-toxic concentrations of an RAR antagonist (BMS493) significantly enhanced TPP-induced toxicity (relative to TPP alone), even though identical non-toxic BMS493 concentrations mitigated retinoic acid (RA)-induced toxicity. Using real-time PCR, we then quantified the relative change in expression of cytochrome P450 26a1 (cyp26a1) – a major target gene for Rainduced RAR activation in zebrafish – and found that RA and TPP exposure resulted in a ~5-fold increase and decrease in cyp26a1 expression, respectively, relative to vehicle-exposed embryos. To address whether TPP may interact with human RARs, we then exposed Chinese hamster ovary cells stably transfected with chimeric human RARα-, RARβ-, or RARY to TPP in the presence of RA, and found that TPP significantly inhibited RA-induced luciferase activity in a concentration-dependent manner. Overall, our findings suggest that zebrafish RARs may be involved in mediating TPP-induced developmental toxicity, a mechanism of action that may have relevance to humans.

Propagation of Tidal and Subtidal Free Surface Oscillations into River Channels from the South Atlantic Bight

Suneil Iyer, Marine Science - Junior
Mentor: Dr. Alexander Yankovsky, Earth and Ocean Sciences

Tidal sea level oscillations propagate from continental shelves into river channels in the form of long gravity waves well beyond the limits of salt intrusion. These dynamics were a focus of numerous recent studies, which led to the development of the “tidal river” concept. Subtidal oscillations in the “weather” frequency band (periods from a few days to a few weeks) can exhibit similar propagation upstream the river channel, but have so far attracted less attention from researchers. In this work, we analyze data obtained from USGS stream gauge stations at several rivers flowing into the South Atlantic Bight along with NOAA tide gauge stations located on the adjacent coastline. Subtidal free surface oscillations in river channels decay at a slower rate than tidal oscillations (referenced to their amplitude on the coast), while their propagation speed is lower than at tidal frequencies. Potential to kinetic energy ratio sufficiently far upstream in the river channel becomes comparable for tidal and subtidal oscillations, as effects of earth’s rotation become negligible. The results suggest that a coastal storm surge can cause more severe flooding inland along the river channel than tides with comparable coastal amplitude.

Heat and Permeability Influence on Deep-Seaﬂoor Hydrothermal Chimney Distribution

Avery Lee, Geological Sciences - Senior
Mentor: Dr. Scott White, Earth and Ocean Sciences

Globally along mid-ocean ridges hydrothermal chimneys alter the earth’s lithosphere and ocean geochemistry. This alteration takes place as a result of seawater percolating down into the crust near magma where it is heated to temperatures that exceed 400°C. The heated water rapidly rises, while reacting with and removing minerals from the host rock, and erupts to the surface where chimneys form as hot, mineral rich water encounters 20°C surrounding water and precipitate. Our understanding of circulation pathways is incomplete. The two criteria governing hydrothermal chimney distribution are permeability, how easily water can seep down into the crust, and heat, from magma generated by the spreading seaﬂoor. These criteria for chimneys were investigated at a segment of the Galapagos spreading center (92W ~20km) with data from the 2010 GRUVEE expedition. Unlike typical bathymetric data this expedition provided rare accurate bathymetry in which chimneys can be observed as spikes. DSV Alvin
video recorded 23 chimneys which were used as reference to develop criteria to identify many other chimneys using bathymetry alone. Heat-features, such as lava flows and mounds, and permeability-related features, faults and fissures, can be observed in the data as well. We analyzed locations of these features found in the bathymetry in order to study why chimneys are distributed the way they are. The strongest spatial correlations suggest that pillow lava flows are very conducive to hosting chimneys although fault-related permeability is the dominant control in the distribution of chimneys.

**Biological Control of Net Blotch Disease through secretion of an allelopathic agent by Laetisaria arvalis**

**Christine Nance**, Chemistry - Junior; USC Sumter

Mentor: Dr. Kajal Ghoshroy, Biology; USC Sumter

The interaction of Laetisaria arvalis, a soil-dwelling basidiomycete fungus, and Pyrenophora teres, a plant pathogen known to cause Net Blotch disease of barley, was examined for hyphal interaction. P. teres had previously shown hyphal damages and inclusions of vesicles when grown in presence of L. arvalis. Samples of mycelial plugs were collected from each fungi, placed together on potato dextrose agar plates (PDA), and incubated at 22°C until fungi grew and made contact. Samples were then viewed using light microscopy and SEM. Due to possible damage during SEM prepping, results from images were conflicting, indicating damages to both L. arvalis and P. teres. Further SEM images will be taken. Additionally, pH was measured in fungal plugs collected by sampling across the plate. As the distance of the clearing zone increased from P. teres, the pH dropped sharply. The pH levels near the pathogen were at 6.2 and those closest to L. arvalis were at 2.3, leading to the conclusion that Larvalis was releasing an acidic antifungal compound. Extraction of L. arvalis was carried out with acetone, chloroform, ethanol, and water, followed by bioassays on hyphal lawn of P. teres. Clearing zones were found on the fungal lawn, around acetone, chloroform and ethanol extracts. Those found around aqueous extracts were much smaller in diameter. Findings support our hypothesis that L. arvalis secretes an allelopathic agent that induces rapid hyphal lysis in P. teres. The active compound isolated from chloroform: methanol extracts of L. arvalis mycelia is currently being characterized and is likely to be a lipophilic organic acid.

**Establishing marsh stratigraphic boundaries in Basra Governorate, southern Iraq using stable isotope analyses of δ18O and δ13C in macrofossils**

**Kaitlyn Bretz**, Environmental Science - Sophomore

Mentor: Dr. Jennifer Pournelle, Environment and Sustainability

Geological sections sampled by the Sealands Archaeology and Environment Program in southern Iraq, radiocarbon-dated as spanning 11ka BP-present, reveal largely homogenous, unlaminated fresh-brackish marsh sediments with few visual stratigraphic indicators. However, previous work in the region suggests centennial-millennial scale climatic variation that may be detectable in the fossil record. Due to their involvement in the hydrological cycle, ratios of oxygen and carbon stable isotopes (18O/16O and 13C/12C) preserved in malacofauna (gastropod and bivalve) shells can be used as proxy indicators of precipitation and temperature changes in regional and global climate. Because 18O and 13C isotopes are denser than 16O and 12C isotopes, they remain in water bodies when evaporation rates increase, and become less concentrated when melt water and precipitation rates increase. Thus, in arid regions, they are good indicators of variation in precipitation and temperature changes.
of increasing temperature and/or decreasing rainfall. Using accelerator mass spectrometry, ratios of stable isotopes of carbon and oxygen will be measured in selected macrofossil specimens (gastropods and bivalves) extracted from sediment samples collected at two locations in former deltaic marsh zones in Southern Iraq that were annually recharged by the snowmelt- and rain-fed Tigris and Euphrates Rivers. If changes in stable isotope ratios are detectable in either sediment sequence, these will be used to refine the stratigraphic sequence, select boundary samples for additional studies and radiometric carbon dating, and reconstruct the history of local climate variation.

**Trace element geochemistry from Lanzarote, Canary Islands: Evidence for metasomatism beneath eastern Canaries**

*Leslie Bruce*, Geological Sciences - Senior

Mentor: Dr. Michael Bizimis, Earth and Ocean Sciences

I present trace element concentrations and Hf, Nd isotopic data from clinopyroxene and orthopyroxene minerals separates from a set of lherzolite and harzburgite xenoliths from various site locations on Lanzarote, Canary Islands. The overall goal of this study was to determine whether the lithosphere beneath the Canaries formed during the opening of the Atlantic (180-200Ma), or whether it contains fragments from the much older African lithosphere. The xenoliths analyzed in this study define two dominant patterns based on their chemical composition. The first pattern shows extreme depletions of Zr, Hf and Ti in both clinopyroxene and orthopyroxene, relative to rare earth elements (REE) with similar compatibility in the mantle. Calculated melts in equilibrium with these clinopyroxenes have characteristic Zr, Hf and Ti depletions and extreme enrichments in light REE, similar to oceanic and cratonic carbonatites. I conclude that xenoliths with this REE pattern have been overprinted by carbonatitic type melts, most likely during the recent Canary-related volcanism. The second pattern shows smaller depletions in Hf, Zr and Ti in clinopyroxene, but with corresponding enrichments in these elements in orthopyroxene. Xenoliths with this REE pattern are characteristic of melt-rock reaction in the lithosphere, where a silicate melt (probably related to the host Canary lavas) infiltrates and reacts with the lithospheric peridotites. The xenoliths analyzed in this study fall in the same narrow Nd range as the Canary lavas (143Nd/144Nd = 0.512886–0.512996), but have relatively more radiogenic Hf isotopes (176Hf/177Hf = 0.282948–0.283442) than the lavas. This decoupling of Hf from Nd isotopes has been previously observed in Hawaiian xenoliths as well. This suggests that Nd has likely been overprinted by metasomatism by the Canary melts, but Hf retains some information about the original depletion of the rock. The preservation of the Hf signature is due to this isotope system’s resistance to metasomatism. Future Nd model ages are also consistent with recent metasomatism. Lu-Hf systematics from clinopyroxene suggest recent metasomatism of the 180-200 Ma Atlantic lithosphere. However, one orthopyroxene cannot be explained by this recent metasomatism due to unradiogenic Nd compared to the Canaries lavas. This sample may be an inherited older metasomatic event, which suggests the possibility of older lithosphere (i.e., African) fragments present beneath the Canaries. In order to further constrain this assumption, further analyzes needs to be conducted on xenoliths from the Canary Islands.

**Identifying Sedimentological Response to Fluid Forcing in Aeolian Environments**

*Morgan Cunningham*, Marine Science - Senior

Mentor: Dr. Jean Ellis, Geography

When wind velocity exceeds a critical threshold, beach and dune sand initiates motion and transports. Aeolian driven transport increases or decreases the elevation of the sand bed, inducing morphological change in beach dunes. The magnitude of the relationship between wind and bed elevation has not previously been quantified, nor has the lag time between velocity changes in the wind field and the bed elevation. The process-form relationship between wind velocity and bed elevation was studied using data collected from Jericoacoara, Brazil. To characterize this relationship, wind velocity and bed elevation data was condensed and processed using MATLAB. The magnitude of elevation change over time and temporal relationships between wind velocity and bed elevation changes were analyzed. Normalized auto covariance analysis identified second-scale lag times between wind velocity variations and that the bed elevation changes lag the fluctuating winds. Explanations of the fundamental relationships between wind and sand motion are critical to advancing research in the field of aeolian geomorphology. Findings from this project will provide a better understanding of sand accretion and erosion, which will benefit coastal managers and residents involved in community planning and beach nourishment efforts.
Characterization and Quantification of Dissolved Organic Phosphorus in Aquatic Systems

Kelly McCabe, Marine Science - Junior
Mentor: Dr. Claudia Benitez-Nelson, Earth and Ocean Sciences

The dissolved organic phosphorus (DOP) fraction of the marine phosphorus pool has been recognized as a significant, biologically available source of P for phytoplankton. Yet our lack of understanding regarding DOP composition and cycling has hindered efforts to understand nutrient limitation and its subsequent impacts on the marine food web. In order to constrain the composition of marine DOP, a bench-top electrodialysis (ED) reverse osmosis (RO) instrument was constructed to isolate material for chemical characterization. Recent work suggests an ED/RO instrument is highly effective for characterizing dissolved organic matter (DOM), but has not been specifically tested for DOP composition. To determine the instrument’s ability to isolate various DOP compounds, artificial seawater was spiked with eight known DOP compounds (triplicate measurements of two phosphodiester, short and long chain polyphosphate, phosphonate, and complex phospholipids) and processed using ED/RO. High-resolution time-series measurements of total dissolved and soluble reactive phosphorus (TDP, SRP, respectively) were taken to determine DOP recovery over the course of desalting, concentrating, extracting, and cleaning stages. Nuclear magnetic resonance spectroscopy (31P NMR) was used to determine compound integrity following isolation. Preliminary data shows variable, but consistently high specific-compound DOP recovery (66-81%) with little to no alteration of sample integrity.

The Effect of Vegetation on Sulfide Production in a Model Constructed Wetland

Lance Swiger, Biology - Senior; USC Aiken
Mentor: Dr. Michele Harmon, Biology/Geology; USC Aiken

Constructed wetlands take a natural approach to the remediation of water polluted with heavy metals. One of the ways that constructed wetlands remediate polluted water is through the production of sulfide by sulfate-reducing bacteria in the sediment. Sulfides produced by sulfate-reducing bacteria complex with divalent metals that are then sequestered in sediments, making them unavailable for uptake by aquatic organisms. Our goal was to determine if certain vegetation will enhance sulfide production in a wetland environment. To answer this question, we used a model constructed wetland system planted with three types of common wetland vegetation: Canna generalis, Carex stricta, and Pontederia cordata. Surface and interstitial water was collected periodically and analyzed for sulfate, sulfide, and pH. Treatment tanks planted with C. generalis and C. stricta produced the highest sulfide concentrations, followed by the non-vegetated controls, and then the P. cordata. None of these differences were statistically significant when compared to the non-vegetated control treatments; therefore, the data do not support the hypothesis that vegetation would enhance sulfide production in a wetland environment. However, increasing trends in pH indicate that the experimental system is maturing, and conditions may be becoming more favorable for supporting sulfate-reducing bacteria as this experiment progresses.

Researching and Implementing a Functional Aquaponics System in the USC Greenhouse

Abigail McConahay, Biological Sciences - Senior
Mentor: Dr. Jerry Hilbish, Biological Sciences

A species of cold-water barnacle, Semibalanus balanoides, is found along the coast of southwest England. Each spring, this species reproduces by dispersing larvae into the ocean, where it then is transported along the southwest English coast and eventually settles on the rocky shore. Depending on the location of settlement, waves of larvae may come from the same or different adult populations, and at the same or varying times. The goal of this project is to investigate the patterns of larval propagation and the factors that effect regulation of settlement at different sites along the English coastline. In this project, I evaluated recruitment of larvae at four different sites in southwest England, which vary in distance with relation to each other. I have examined the juvenile counts at each site and determined the peak days of settlement. I compared all of the data from the sites and will look at factors that could effect recruitment, such as temperature. I have found that the two most eastern sites show similar larval settlement patterns, suggesting that the young have originated from the same adult population in the same wave. However, the two western sites display independent settlement patterns from each other and from the eastern sites. This suggests that the larvae at these sites are from distinct adult populations, which displace their larvae at unique times.
Debunking fad diets: A review of popular weight loss programs

Anna Catherine Caldwell, Exercise Science - Senior
Mentor: Dr. Teresa Moore, Exercise Science

Are fad diets as good as causing successful weight loss as a lifestyle change to healthy eating and regular exercise? Short-term, quick weight loss diets, or fad diets, have become a hot topic in this world that seems more and more to revolve around appearances. Some of these diets can be truly helpful for successful weight loss; however, most are designed to help you lose weight quickly, but won't help in maintaining the weight loss. This review of weight loss programs is aimed at “debunking” these diets and discovering what diets are truly best for successful weight loss. The purpose of this study is to determine what the best ways of successful, healthy weight loss are for the obese population in the United States and why. This review was compiled from the research of several other authors who specialize in weight loss. It compares the results of various fad diets against a solid lifestyle of good nutrition and regular exercise. This study produced a side-by-side review of various fad diets and supplements, and offers those who are looking to lose weight an opportunity to compare diets side-by-side and see a clear one that will meet their needs and see which ones simply do not work.

The Effect of Cadence on Metabolic and Respiratory Measures During Incremental Cycle Ergometry to Max

Ron Doiron, Exercise Science - Senior
Mentor: Dr. Ray Thompson, Exercise Science

Several studies report that VO₂ and VE are greater at faster pedal rates even when work rate is controlled. However, it is not known whether pedal rates influence respiratory rate (RR) and tidal volume (Tv) during cycle ergometry, both components of VE. PURPOSE: Determine whether RR and Tv are affected by pedal rates during cycle ergometry. METHODS: Eight subjects completed 2 identical incremental tests to volitional on separate days pedaling at 60 or 90 rpm. All gas analysis data and work rates were controlled and collected. Data were analyzed using repeated measures ANOVA. RESULTS: Peak values for VO₂, VCO₂, RER, RR and Tv were not different between pedal rates. Peak VE (160±14 vs 151±13 L/min-1) was significantly greater at 60 than 90 rpm (p<0.05). At submaximal work rates from 100 to 200 watts (in 25 watt increments) VO₂ (avg difference 0.22, 0.29, 0.25, 0.32 and 0.31 L/min-1), VCO₂ (avg difference 0.25, 0.25, 0.22, 0.29 and 0.29), VE (avg difference 7.1, 6.7, 8.3, 11.9 and 10.3 L/min-1) and RR (avg difference 4.5, 2.3, 3.5, 5.2 and 3.1 br•min-1) were significantly greater at 90 than 60 rpm (p<0.05). Tv was not different between 60 and 90 rpm (avg difference -.04, 0.09, 0.07, 0.15 and 0.18 L•br-1). CONCLUSION: Faster pedal rates augmented metabolic and respiratory responses at submaximal intensities. The greater VE at 90 rpm was due to increases in respiratory rate. The greater RR at faster pedal rates may contribute to overall greater energy expenditure without further aiding gas exchange.

Diminished Visuomotor Learning is Associated with Impairments of Visual Search In Patients With Stroke

Kristen Fuss, Exercise Science - Senior
Mentor: Dr. Troy Herter, Exercise Science

Many stroke survivors struggle to perform daily tasks even though they exhibit minimal or no impairments on standard clinical assessments. This suggests that there may be fundamental flaws in current clinical assessments. One critical flaw is that they do not normally examine visual search (active scanning of the visual environment with eye movements) although it is commonly impaired following stroke. We know that visual search underlies expertise in many activities, but we do not know the extent to which impairments of visual search may contribute to activity limitations following stroke. Specifically, deficits in visual search caused by stroke may be associated with abnormal sensorimotor learning, thereby contributing to chronic activity limitations. We examined eight stroke survivors between the ages of 40-85 during six weekly sessions. During this time, the participants practiced a novel visuomotor task, the Object Hit and Avoid task, within a virtual environment. For this task, subjects use virtual paddles to hit away two objects (Targets, e.g. circle and rectangle, n=200) and avoid hitting six other objects (Distractors, e.g. square, triangle, oval, etc., n=100). The task was performed using an upper-limb robotic apparatus (KINARM End-Point Lab), which permitted accurate monitoring of hand and eye movements. The results reveal that there is a strong correlation between visual search and motor task performance such that individuals demonstrating improvements in visual search showed improvements in motor performance. The results of this study provide evidence suggesting that clinical assessments should consider the role of visual search in motor learning during rehabilitation. This may be used to improve outcomes of patients through more appropriate post-stroke rehabilitation.

Computer Simulated Joint Action Tasks vs. Live Simulations

Lily Gullion, Exercise Science - Junior
Mentor: Dr. Roger Newman-Norlund, Exercise Science

In this study, I aimed to validate the computer games which Dr. Newman-Norlund has created as means to quantify social skills. Teamwork based skills are traditionally difficult to measure, but these video games are intended to assign numerical values to everyday motor skills between pairs. To do this, I built a tangible version of one of the computer games, which is a board and ball lifting game. I measured and graphed the ball as children worked together to lift the apparatus, and compared those graphs to the results from the similar computer game. This project has major implications in data collecting for other research projects involving social skills, and the video games have the potential to be used as novel therapeutic tools for those with impaired social skill disorders.
Cooperation Station: The Correlation Between Performance on Real-Life and Virtual Teamwork Tasks

**Brady Newell**, Exercise Science - Junior
Mentor: Dr. Roger Newman-Norlund, Exercise Science

Autism Spectrum Disorder is a complex neurodevelopmental disability, affecting an estimated 1 in 68 children in 2014, approximately 120% higher than in 2002 according to the Centers for Disease Control and Prevention. One of the primary characteristics of Autism is an impairment in social functioning that negatively impacts relationships with same-age peers as well as adults. Researchers have begun addressing the social symptoms of Autism and exploring the nature of human-human cooperation through the use of computer-based games that mimic real-life cooperative tasks. Such games allow players of similar ability levels to work together across great distances, and could provide an affordable alternative to traditional, clinic-based interventions. The purpose of this project is to examine the correlation between performance on real-life and virtual cooperation tasks in order to determine the validity of this approach. Children at the Northwest YMCA of Columbia are currently participating in this study. Pairs of children play a real-life game of tag in a controlled space, and then use joysticks to play a virtual game of tag on a computer. We expect that performance (time to tag your partner) on real-life and virtual teamwork tasks will be significantly correlated. Additionally, we expect a correlation between age and tag performance. Positive findings may be used to further justify the use of cooperative video games as a tool to treat clinical populations with social impairments.

Can RPE Distinguish Between Different Work Efficiencies at the Same Work Rate?

**Christopher Schattinger**, Exercise Science - Senior
Mentor: Dr. Ray Thompson, Exercise Science

Rating of perceived exertion (RPE) is a subjective gauge to measure exercise intensity and is correlated with exercise metabolism and heart rate (HR). PURPOSE: To determine whether RPE can detect differences in work efficiency during incremental cycle ergometry to max at 60 and 90 RPM. METHODS: Eight subjects completed 2 identical incremental tests to volition on separate days pedaling at 60 or 90 rpm. RPE was not different between 60 and 90 rpm. CONCLUSION: As a general measure, self reported RPE can be used to report changes in work intensity. However, RPE is not able to sensitive to changes in metabolic rate related to changes in work efficiency at the same work rate.
Effect of Systemic Inflammation Inhibition on Muscle Oxidative Capacity in a Mouse Model of Colorectal Cancer

Alexander Teshon, Biochemistry and Molecular Biology - Junior
Mentor: Dr. James Carson, Exercise Science

Cancer cachexia is a debilitating wasting condition that is associated with chronic inflammation and muscle mass loss. Decreased skeletal muscle mass parallels reductions in muscle oxidative capacity during the progression of cachexia. The small thiol compound, pyrrolidine dithiocarbamate (PDTC) has both anti-inflammatory and antioxidant properties, and has been shown to attenuate skeletal muscle mass loss in C26 tumor-bearing mice. The effects of PDTC treatment on muscle oxidative capacity during the progression of cachexia has yet to be examined. Therefore, the purpose of this study was to determine if two weeks PDTC treatment could increase mitochondrial oxidative capacity in ApcMin/+ mice that had initiated cachexia. It was hypothesized that systemic inflammation inhibition would increase skeletal muscle oxidative capacity in ApcMin/+ mice. ApcMin/+ mice that had initiated cachexia (7% BW loss) received PBS or PDTC treatment (10mg/kg BW) for 2 weeks. Succinate dehydrogenase staining of tibialis anterior (TA) muscle cross sections was performed to determine muscle oxidative capacity. C57BL/6 mice served as controls. Cachexia decreased TA muscle mass, but PDTC treatment increased muscle mass regardless of genotype. Data analysis is currently being performed to determine the effects of PDTC treatment on muscle oxidative capacity. The current study will help to better define the role of systemic inflammation on muscle oxidative capacity during the progression of cancer cachexia.

Accuracy of medication orders in fictional medical-themed television shows

Sarah DeMott, Pharmacy - Senior
Alexas Polk, Pharmacy - Senior
Mentors: Dr. Phillip Mohorn, Clinical Pharmacy and Outcomes Sciences
Dr. Brandon Bookstaver, Clinical Pharmacy and Outcomes Sciences

Patients have reported using medical-themed television shows as an outlet for medical information. Accuracy of this information is unknown. The purpose of this study is to analyze medication orders in fictional medical-themed television shows and to determine the degree of accuracy. This retrospective study analyzes medication orders in fictional medical-themed television shows airing from September 1989 to May 2014. A search of Internet Movie Database for shows categorized as “medical series” was conducted. Shows airing in other countries were not readily retrievable in the United States and were excluded. Medication orders were documented in a standardized, living spreadsheet, with patient demographics, prescriber information, medication indication, medication information including dose, route and frequency being the primary data points. Data collectors evaluated the order using appropriate medical and pharmacy references from the year of the show’s filming. A panel of investigators conducted a follow-up analysis to validate these findings. A preliminary analysis was conducted on 901 medication orders from 356 episodes of 20 different medical-themed television shows. There were approximately 2.5 medication orders per episode. Initial analysis revealed that approximately 87% of medication orders were accurate. The most common categories of drugs prescribed were antidysrhythmics/vasopressors/ACLS drugs, anti-infectives, and analgesics/antipyretics. The medications accurately coincide with the most common medication indication categories seen, cardiovascular, trauma and infectious diseases. This research will bring awareness of erroneous medication information to the public and become a platform to reiterate the importance of seeking medical advice and information from licensed professionals.

Everything Counts

Meaghan Freiter, Pharmacy - Sophomore
Mentor: Dr. Jun Zhu, Pharmacy

For two semesters I worked in a Pharmaceutical lab under Professor Jun Zhu and his post doc students Adrian Gomez and Wei-Lun. During this time I primarily learned the Western Blot technique. In this lab we used Western Blot analysis to test the phosphorylation of proteins found in rat brains that have been introduced to various levels of nicotine. Before the Western Blot testing began I was able to participate in some of the behavioral observation of the rats induced with nicotine. Additionally, I learned lab and biohazard safety techniques, how to make various buffers, and how to mix the buffers according to the instructions from my mentor. My decision to take on this research opportunity stemmed from my interests in pharmacy. I was aware that research is an important component of the pharmaceutical industry, and in exploring it I learned valuable skills and lessons.
that I believe will make me a better pharmacist some day. While the tasks I was given often felt simple and minor, upon reflection I found that the precision, focus, communication, and teamwork involved in completing them were exactly the skills I need to develop to be a successful and effective pharmacist. Even though I have found that research is not something I would like to do full time someday, I was able to gain a better appreciation for this field and skills that I can carry with me as I begin my first semester of pharmacy school in the fall.

Clinical characteristics and risk factors associated with mortality in patients hospitalized with spontaneous bacterial peritonitis

James Fulton, Pharmacy - Senior
Mentors: Dr. Bryan Love, Clinical Pharmacy and Outcomes Sciences
Dr. Scott Sutton, Clinical Pharmacy and Outcomes Sciences

Spontaneous bacterial peritonitis (SBP) is a complication of ascites that is associated with increased morbidity and mortality. The objective of this study was to determine the clinical characteristics and risk factors associated with mortality in hospitalized SBP patients in the United States using the 2011 Nationwide Inpatient Sample (NIS) of the Healthcare Cost and Utilization Project (HCUP). Patients hospitalized with the primary or secondary diagnosis of SBP in the United States in 2011 were identified by the ICD-9 code 567.23. Patients were further categorized based on associated signs and symptoms (hepatic encephalopathy, coagulopathy), and infectious complications during hospitalization (sepsis, pneumonia, urinary tract infection). Hospital demographics including geographic location, teaching status and staffing rates were collected. Pearson's chi-squared test and student’s t-test were used to compare categorical and continuous variables, respectively. Logistic regression models were used to estimate the odds of mortality according to patient and hospital factors. A p-value 0.05 was used to determine statistical significance. In total, there were 8,023,590 inpatient admissions during 2011. Of these, 20,035 (0.25%) were hospitalized with SBP. In the adjusted logistic regression analyses, older age, female gender, presence of acute liver failure, hepatic encephalopathy, hepatorenal syndrome, pulmonary hypertension, sepsis, severe sepsis, coagulopathy, and hepatitis C virus were independently associated with inpatient mortality. In-hospital mortality for SBP was high especially in those with sepsis, hepatocellular neoplasms, hepatorenal syndrome, hepatic encephalopathy, acute liver failure, and patients requiring transjugular intrahepatic portosystemic shunts. Our study documented significant healthcare cost and utilization with hospitalized SBP patients.

Prescribing patterns of probiotics in adult hospitalized patients

April Liimatta, Pharmacy - Senior
Ying Lin, Pharmacy - Senior
Mentor: Dr. Brandon Bookstaver, Clinical Pharmacy and Outcomes Sciences

With the incidence of diarrheal illness in hospital settings increasing, clinicians often use probiotics concomitantly with antibiotics. Data has demonstrated decreases in antibiotic associated diarrhea (AAD) and suggested an impact on Clostridium difficile associated diarrhea (CDAD). The optimal dosing and impact in hospitalized patients is currently unknown. The primary endpoint of this study is the difference in duration of antibiotic associated diarrhea between predefined study groups (once daily dosing vs. multiple daily dosing). Secondary endpoints include the rate of CDAD between administration with antibiotics. Methods: This study has been submitted to the Institutional Review Board for approval. The electronic medical record system will identify adult (≥ 18 years old) hospitalized patients who received a minimum of two days of probiotic. The following patient demographic data will be collected: age, gender, height (cm), race/ethnicity, and weight (kg). Relevant laboratory data including other potential causes of GI side effects, such as medications, will be obtained. The exclusion criteria for this study includes patients who were on probiotics prior to hospital admission, 18 years old, or on probiotic therapy for 2 days. Patients were not excluded based on any comorbid conditions or prior episodes of CDAD. Patients will be grouped for comparison based on dosing frequency of probiotics (once daily vs. multiple daily dosing). All patient information will be de-identified by the investigators and maintained confidential.

Survey of Geriatric Curricula in US Pharmacy Schools

Hillary McGee, Pharmacy - Senior
Mentor: Dr. Karen McGee, Pharmacy

The population in the United States is aging rapidly and increasing the number of geriatric patients who need specialized pharmaceutical care. Based on a study published in 2005, pharmacy schools at the time were not increasing the focus of geriatric education among their courses even though the aged population continues to grow. A single survey was created to assess seven major learning areas important for geriatric pharmacy care: (1) Communication Issues (2) Long Term Care Options (3) Socioeconomic Issues (4) Geriatric Syndromes (5) Medication Regimen Reviews (6) Appropriate Medication Prescribing (7) Professional Organizations Methods: The Geriatric Curricula Survey was emailed to 191 geriatric faculty at 91 pharmacy schools. A repeat email was sent after two weeks. The survey was a single response survey created using Redcap®. Results: 46 surveys were completed, representing 44 pharmacy schools. Geriatric topics that were sufficiently taught in the pharmacy curricula included: communication issues with aging, prescribing issues/medication regimen review, and long term care options. Geriatric topics that were not sufficiently taught included: practical labs experiences, socioeconomic issues, and geriatric wellness programs. Conclusions: The authors recommend an increased emphasis on the following education topics to improve geriatric curricula: socioeconomic issues such as living wills, Practical labs with empathy or sensitivity training, geriatric wellness programs, and the role of the consultant pharmacist. References: 1. US Department of Health and Human Services. Aging Statistics (http://www.aoa.acl.gov/Aging_Statistics/index.aspx) 2. Dutta A, Daftary M, Oke F, et al. Geriatric education in US schools of pharmacy: a snapshot. Consult Pharm. 2005;20(1):45-52.
Effects of Renal Disease on Medication Errors in an HIV-infected Population in the Southeastern United States

Hana Rac, Pharmacy - Senior
Mentors: Dr. Brandon Bookstaver, Clinical Pharmacy and Outcomes Sciences
Dr. Celeste Caulder, Clinical Pharmacy and Outcomes Sciences

Purpose: The purpose of this study is to determine how the severity of chronic renal disease (CRD) affects the prevalence of HIV-related medication errors in HIV-infected patients and to assess the characteristics of the errors.

Methods: This study evaluated adult HIV-infected patients who had a glomerular filtration rate (GFR) 60ml/min that were treated with at least one nucleoside reverse transcriptase inhibitor. Both outpatient and inpatient data was examined in the 2 year follow-up period. The stratifications of renal failure were a GFR 60ml/min and not on hemodialysis and any GFR while on hemodialysis. The primary outcome investigated was how the severity of CRD affected the prevalence of medication errors. Medication errors were described by type of error, location of error, and whether or not the error was reconciled. Clinical outcomes and whether transitions of care affected errors were evaluated. Prescribing habits of physicians for patients on hemodialysis were also examined.

Results: The prevalence of medication errors in patients with hemodialysis was 72.7% and 84.1% in those with CRD and not on hemodialysis ($p=0.112$). The errors in non-hemodialysis patients were more likely to be dosing errors ($p=0.001$) likely due to the hemodialysis patients having significantly more hospitalizations which led to more opportunities for errors of omission. Age and hospitalizations were associated with a higher rate of medication errors in this HIV-infected population.

Conclusion: There is no statistical difference between the prevalence of HIV-related medication errors in patients on hemodialysis and those with CRD and not on hemodialysis.

Semantic alignment and attentional interference in conversations between friends and strangers

Amanda Bennett, Psychology - Senior
Mentor: Dr. Amit Almor, Psychology

Research has shown language interferes with performance on a concurrent visuomotor task1, 2. Here we examined how alignment between interlocutors affects performance on a concurrent visuomotor task. Latent Semantic Analysis was used to calculate alignment. We hypothesized that conversations between familiar partners would show greater semantic alignment indicated by higher latent semantic similarity scores compared to with a stranger. Also, the less familiar partners are with one another, the greater the attentional demands of the conversation would be and the worse the participant would be at performing the concurrent visuomotor task. Twenty participant triads were recruited, each consisting of two friends and a stranger. The participant performed a ball-tracking task during three control blocks, a conversation block with a friend, and one with a stranger. The tracking task difficulty varied among slow, medium, and fast. An analysis of LSA scores revealed a significant interaction such that LSA scores were higher in the 1st half of Friend conversations than in the 1st half of Stranger conversations, but this difference disappeared in the 2nd half of the conversation. A repeated measures ANOVA of tracking performance found an interaction between Partner and Conversation, characterized by a significant difference between Talk and Listen segments in Stranger conversations such that talking interfered with tracking more than listening. This indicates semantic alignment is sensitive to attentional resources. Also, at least at some levels of processing, alignment is not an automatic process but may rather reflect high level processes that can be controlled by interlocutors depending on various parameters of the conversation.


Modulating Vocal Pitch Motor Control through Neurostimulation

Keiko Bridwell, Baccalaureus Artium et Scientiae - Sophomore
Caroline Hayden, Exercise Science - Freshman

Mentors: Dr. Dirk den Ouden, Communication Sciences and Disorders
Dr. Roozbeh Behroozmand, Communication Sciences and Disorders

Brain damage, such as that due to neurological diseases or stroke, often impairs the functioning of speech-related areas of the brain. In some cases, notably that of Parkinson's disease, it causes difficulties in controlling voice pitch during speech production and manifests as voice tremors. The control of voice pitch in healthy speakers has been proven in past studies to be partly dependent on the auditory feedback received from one's voice. This study is investigating the effects of High-Definition transcranial Direct-Current Stimulation (HD-tDCS) on pitch control using both a behavioral pitch-shift task and monitoring brain activity with electroencephalography (EEG). HD-tDCS is a form brain stimulation that uses low-level current to increase or decrease the excitability of neurons. It is
predicted that HD-tDCS to the ventral motor cortex, which is strongly activated during vocal pitch control, will cause a faster and stronger response to an alteration in auditory feedback. Preliminary data and analyses for this study will be presented at Discovery Day on April 24, 2015, and the results of the full experiment will be presented at Discovery Day in 2016.

**Examining Improvement in Narrative Skills Following Literacy Instruction for At-Risk Students**

*Addison Neighbors*, Biological Sciences - Senior  
Mentor: Dr. Jennifer Vendemia, Psychology

The human experience is nearly always accompanied by an emotional component. It is necessary to explore the dynamics of emotional processing, and to establish a framework for parsing different emotions. The current study sought to validate a set of dynamic stimuli (8-second video clips) used to induce emotions. Subjects (n=1000) were recruited through the Mechanical Turk interface on Amazon.com. The set of emotionally-laden videos was rated according to the dimensions of valence (positive to negative) and arousal (high to low), in alignment with Russell’s (1980) circumplex model of affect. Categorical separation was an identifiable result of the ratings, lending support for the current bank of videos as being effective in the manipulation of affective space. This work has contributed toward the creation of a standardized set of dynamic stimuli used to elicit emotion.

**Screening for Dyslexia and Language Impairment in Second Grade Classrooms**

*Alexis Cattano*, Psychology - Senior  
*Lucas Padgett*, Biochemistry and Molecular Biology - Freshman  
Mentor: Dr. Suzanne Adlof, Communication Sciences and Disorders

We are limited in our ability to quickly and accurately apprehend the number of objects in our visual scene. This limit is about 3-4 items, and it is known as subitizing (Kaufman et al, 1949). The objective of this experiment was to determine the robustness and flexibility of the subitizing range within the context of visual noise. Participants were asked to identify the number of Gabor patches presented for 200 ms. Each Gabor patch was randomly oriented and had a spatial frequency of 2.05 c/deg. The contrast of the Gabors ranged from 0.2 to 0.75. Visual noise was derived from a Gaussian distribution and had varied in contrast (0.1, 0.2, 0.3, 0.4 and 0.5). Subitizing capacity was defined as a distinct knee in the enumeration graphs. Results demonstrate that subitizing capacity was largely unaffected by visual noise. These results are consistent with the dichotomy between precise and approximate number system.

**Emotion Induction Through Dynamic Stimuli**

*Addison Neighbors*, Biological Sciences - Senior  
Mentor: Dr. Jennifer Vendemia, Psychology

Examination Improvement in Narrative Skills Following Literacy Instruction for At-Risk Students

*Addison Neighbors*, Biological Sciences - Senior  
Mentor: Dr. Jennifer Vendemia, Psychology

The human experience is nearly always accompanied by an emotional component. It is necessary to explore the dynamics of emotional processing, and to establish a framework for parsing different emotions. The current study sought to validate a set of dynamic stimuli (8-second video clips) used to induce emotions. Subjects (n=1000) were recruited through the Mechanical Turk interface on Amazon.com. The set of emotionally-laden videos was rated according to the dimensions of valence (positive to negative) and arousal (high to low), in alignment with Russell’s (1980) circumplex model of affect. Categorical separation was an identifiable result of the ratings, lending support for the current bank of videos as being effective in the manipulation of affective space. This work has contributed toward the creation of a standardized set of dynamic stimuli used to elicit emotion.

**The effect of visual noise on the accuracy of enumeration**

*Lucas Padgett*, Biochemistry and Molecular Biology - Freshman  
Mentor: Dr. Melanie Palomares, Psychology

Brain regions necessary for semantic processing (processing of meanings of words and sentences) is a topic of intense research in cognitive neuroscience. We used lesion-symptom mapping to investigate which areas of the brain are critical for representing meanings of action-related (to throw, the pen) and abstract (to consider, the decision) nouns and verbs. We collected structural neuroimaging (MRI) and behavioral data from approximately 50 stroke patients. These patients were tested on behavioral tasks, which included both lexical decision (LD) and semantic similarity judgment (SSJ). Response times and accuracy ratings were collected for both tasks. Lesions were traced on the MRI images by a neurologist and were correlated with the behavioral data using in-house lesion-symptom mapping software. Preliminary results show a relationship between verb SSJ accuracy ratings for action words and damage to Brodmann areas 21, 22, 37,
and 42 in the left lateral temporal lobe. These areas are implicated in language comprehension but are also associated with visual motion processing, suggesting a relationship between motion processing and action word comprehension.

**Action-Relatedness as a Principle of Neural Organization**  
*Victoria Sharpe*, Baccalaureus Artium et Scientiae - Senior  
Mentor: Dr. Dirk den Ouden, Communication Sciences and Disorders  
Dr. Grigori Yourganov, Psychology  
A double-dissociation between noun- and verb-processing was first theorized in response to the apparent contrast between agrammatic Broca’s aphasia patients and anomic aphasia patients, who displayed quite distinct linguistic deficits. The former were more likely to have selective deficits for verb processing, with noun processing unimpaired. The latter showed the opposite pattern, with impairments for nouns but not for verbs. This has often been perceived as evidence for grammatical category as a principle of neural organization. However, recent studies regarding grammatical class in the brain, particularly those conducted with healthy speakers, have provided inconsistent and inconclusive results. In particular, many of these studies confound grammatical class with semantic distinctions. That is, most, but not all, verbs are action-related and most, but not all, nouns are not action-related. This study aims to eliminate this confound by using fMRI techniques to investigate the activation patterns of both action and non-action nouns and verbs. If neural activation appears to pattern according to action-relatedness, rather than grammatical category, this will suggest that the same regions of the brain can subserve both nouns and verbs, and that action-relatedness, rather than a strictly grammatical notion of word class, serves as a principle of neural organization.

**Just My Speed: The Psychology Behind Songs That Rock**  
*Carly Strohbach*, Psychology - Senior  
Mentors: Dr. Doug Wedell, Psychology  
Dr. Jay Ginsberg, Dorn VA Medical Center  
Dr. Matthew Rashotte, Psychology  
Affect is a window into subjective experience. It is a building block of emotion and has been hypothesized to result from autonomic responses in one’s body (Barrett & Bliss-Moreau, 2009). Music is an auditory stimulus that can produce exceptionally strong affective responses and reliably affect the mood of individuals (Koelsch, 2010). Tempo, a fundamental property of music, has been linked to these affective changes (Hevner, 1937; Van der Zwaag, Westerink, & Van den Broek, 2011). Behavioral results have shown a strong nonlinear relationship between tempo and affect as captured in pleasantness ratings. However, this relationship has not been studied as a function of physiological state, a complex and informative component of affect. This study examined variations of the musical tempos of four familiar pop songs as they relate to behavioral and physiological measures of pleasantness. Characteristic strength and weakness of emotional response was measured with the Affective Intensity Measure (AIM) assessment. The five physiological measures recorded during the experiment were Galvanic Skin Response (GSR), Electrocardiography (ECG) including heart rate variability (HRV), electromyography of the zygomaticus major (EMGZ), and electromyography of the corrugator supercilii (EMGC). The results of this study can shed light on the subjective experiences often sought from listening to music. Key hypotheses to be tested are that pleasantness ratings correlate positively with EMGz and negatively correlate with EMGc, and that tempo-induced arousal correlates positively with GSR.
Psychology and Neuroscience A

Cranial Electrotherapy Stimulation & EEG: Investigating the Effects of the Alpha-Stim AID
Victoria Anderson, Biological Sciences - Junior
Mentors: Dr. Scott Decker, Psychology
Ms. Emma Kate Wright, Psychology
This experiment examined the effects of Cranial Electrotherapy Stimulation (CES) on brain activity, cognition, and mood. The CES device used in this study was the Alpha-Stim, a U.S. FDA approved treatment for anxiety, insomnia, and depression. CES is a non-invasive therapy that supplies micro-currents to the brain via electrodes placed on the earlobes. This electrophysical device is a type of alternative therapy used to treat a wide array of disorders including severe and chronic pain, insomnia, and PTSD. It has also been used to treat symptomology in recovering alcoholics, individuals with migraines, and drug withdrawal patients. Although several theories have been proposed, the exact mechanism by which CES functions is still unclear. However, several studies have shown that treatment with CES increases the levels of β-endorphins, serotonin, and norepinephrine in blood plasma. These effects, in addition to increases in alpha brainwave activity, induce a more relaxed and focused mental state in the individual receiving treatment. Within the current study, participants were administered preliminary behavioral assessments and electroencephalograms (EEG’s), followed by a 20-minute Alpha-Stim treatment. Post-treatment assessments and EEG’s were conducted, along with follow-up questionnaires completed twenty-four hours after the treatment to evaluate potential long-term effects of CES.

Misuse of Stimulant Medication Among College Students: Symptoms of Depression and Eating Disorders
Kari Benson, Psychology - Senior
Mentor: Dr. Kate Flory, Psychology
The misuse of stimulant medication, typically used for the treatment of Attention-Deficit Hyperactivity Disorder (ADHD), is a prevalent and growing problem on college campuses. Misuse refers to using a prescription medication in a way that is not prescribed, which includes using too much, using with other substances, snorting, or using without a prescription. According to a recent review of the literature, the misuse of stimulant medication is significantly correlated with substance use, lower GPA, and various psychological disorders. However, the findings related to depression and eating disorders have been mixed. I conducted an online survey of over 1,000 undergraduates at USC in order to explore these topics. Depression, measured by the CESD-R, was significantly related to misuse among those with a prescription; however, it was not significantly related to misuse among those without a prescription. Specific symptoms of depression were highly related to both forms of misuse, including feeling depressed, an inability to focus, and an inability to get oneself going. A clinically significant rating on the EAT-20 (a measure for eating disorders) was not significantly related to misuse. This may be due to the fact that very few students indicated that they were misused for weight loss purposes, perhaps a positive characteristic unique of USC. The results of our study have implications for the prevention of stimulant medication misuse. My mentor, Dr. Flory, has used these findings to support a multi-million dollar grant proposal submitted to the NIH for a prevention program for stimulant misuse on USC’s campus.

Psychological Predictors of Dietary Intake in African American Adolescents
Chelsey Couch, Psychology - Junior
Mentors: Dr. Dawn Wilson, Psychology
Ms. Lauren Huffman, Psychology
African American youth are at risk for developing chronic diseases, such as type II diabetes, hypertension, and heart disease. Dietary behaviors, such as fruit and vegetable intake (FVI) and energy intake (kcal) have been associated with chronic disease risk. This study’s purpose was to examine associations between cognitive factors (self-efficacy, motivation) with FVI and overall kcals in adolescents participating in Project FIT (Families Improving Together), a randomized controlled trial testing the efficacy of a family-based weight-loss program in African American families. To date, 129 adolescents have participated in Project FIT (67% female, 33% male, Mage = 13.52, SD = 1.73, Mbmi = 96.47%, SD = .429). Dietary data were assessed by registered dieticians, with three random 24-hour recalls based on national standards. We hypothesized that increased self-efficacy and motivation for healthy diet would be associated with higher FVI and less total kcals. Separate regression indicated that self-efficacy and motivation did not significantly predict FVI. The model predicting kcals was significant (R2 =.14, F(5,121) = 3.96, p < .01). Older participants (B = 76.47, p < .05) and males (B = 223.01, p < .05) consumed significantly more kcals than younger adolescents and females. A marginally significant trend showed that higher levels of motivation were associated with both forms of misuse, including feeling depressed, an inability to focus, and an inability to get oneself going. A clinically significant rating on the EAT-20 (a measure for eating disorders) was not significantly related to controls using free operant methods. Both groups were trained respond for...
Learning the Research Process
Rebecca McCord, Psychology - Junior
Mentor: Dr. Kate Flory, Psychology
I had the privilege of working on Dr. Kate Flory’s research team starting the summer of 2014 thanks to the Exploration Scholars Award granted to me by the Honors College. I helped with the USC Social Behavior Study led by Dr. Flory which examines why children with ADHD have social and academic impairments. When I started, I had no research experience or clear idea of what working in a psychological research lab would be like, but Dr. Flory and her research team eased me into the world of research and taught me invaluable research skills. I was able to witness and participate in every stage of the research process. I saw the extensive planning that goes into making a research study possible and learned that there are far more details involved than I would ever have imagined. The duties that I had the privilege of performing included contacting participants via phone and email for reminders, scheduling, phone screening, and data collection, preparing and setting up for conducting the actual research, entering the data collected into our computer system, scoring certain psychological tests, and conducting a portion of the research itself by working with participants and performing psychological measures with them. One of the main things I learned from this experience was the reality of human error in this type of research; if I made a mistake, it affected the results of the study, and many parts of the study involved subjective decisions made by the individual researcher. I also learned that there is an immense amount of work that happens before and after the actual data collection with the participants. The part of research that I originally thought was the most important and that I found the most enjoyable, working with participants, turned out to actually be a small portion of the total work involved in the research study. A final piece that I learned about research studies is the difficulty and sometimes frustration involved in working with human participants. Recruiting participants and getting them to show up when they are scheduled to participate can be quite the challenge, but I learned techniques that can improve the likelihood for participation. I thoroughly enjoyed the opportunity that Dr. Flory gave me to learn about and actively engage in the research process. My experiences working for Dr. Flory’s research study have provided me with the knowledge and skills to go forth and conduct my own small-scale research study.

Virtual Child Rearing in a Developmental Context
Lauryn Johnson, Psychology - Senior; USC Aiken
Mentor: Dr. Meredith Elzy, Psychology; USC Aiken
A child’s emotional and psychological well-being is largely dependent on the parenting style a parent or guardian chooses. Recent research suggests that one mechanism for eliciting behavioral changes involves the utilization of virtually based simulations. Building on this literature, the current study seeks to investigate the potential impact of the My Virtual Child program, created by Manis (2008) for instructional use in undergraduate developmental psychology courses, on parenting behaviors. This program allows a participant the opportunity to raise a virtual child with developmental outcomes based on statistical probability involving parenting practices, biological influences, and chance events. This study will examine if virtual child rearing may have the ability to change individuals’ perspectives on their parenting choices. A sample of 40 participants will be randomly assigned to an experimental group or a control group. The experimental group will complete the virtual child program. Upon completion of the program, their parental attitudes and behaviors will be compared to the parental attitudes and behaviors of the control group. The hypothesis of the proposed study is that parents who have either an authoritarian or permissive parenting style will decrease the frequency in choosing behaviors associated with these parenting styles after completing the My Virtual Child (Manis, 2008) program. If a relationship can be found between completing the virtual child program and parenting style improvements, it may be possible to develop a virtual child program for parental use in community settings that will help parents gain insight into how their actions affect their developing child.

The Housing and Homelessness Action Research Network (HHARN)
Allie Morrison, Psychology - Junior
Mentors: Dr. Bret Kloos, Psychology
Ms. Anita Floyd, United Way of the Midlands
Ms. Nyssa Snow-Hill, Psychology
Entering my second year working with Dr. Bret Kloos’ Housing and Adaptive Functioning Lab (HAF), I have spent the past two semesters assisting with the development of the Housing and Homelessness Action Research Network (HHARN). The HHARN is a link between the resources at the University of South Carolina (USC) and the needs of homeless-related service agencies in Columbia. The goal of the HHARN is to facilitate community-university communication and partnerships. I have had the opportunity to be part of a team researching available USC resources. Through a systematic research of academic courses, university
departments, professors’ research interests, and student organizations, we were able to compile a database of potential contacts for service providers in need of student volunteers, fundraising opportunities, consultation from professors with specific expertise, and other opportunities. We are currently in the process of interviewing management from a large sample of local service providers who interact with the homeless population. These interviews allow us to understand how local agencies can benefit from identified university resources. A long-term HHARN goal is to create a website of contact information to help both parties form connections. The HHARN will serve as an important mechanism to allow USC to be even more engaged in giving back to the Columbia community. HHARN work will benefit students, faculty, and local non-profits. Through working with Dr. Bret Kloos and the HAF lab, I have grown in my ability to think critically and examine how the university can impact people on a larger scale.

**Investigating Autism Symptom Severity Between Preschool Aged Children with Fragile X Syndrome and Idiopathic Autism**

**Lauren Satterfield, Psychology - Senior**

**Mentors:** Dr. Jane Roberts, Psychology  
Ms. Kelly Caravella, Psychology

Fragile X syndrome (FXS) is the most common form of inherited intellectual disability and is caused by a loss of function of the fragile x mental retardation (FMR1) gene. Previous studies indicate that FXS is strongly associated with social deficits seen in the autism spectrum disorder (ASD). The Social Responsiveness Scale is a normed parent rated scale designed to measure symptom severity in individuals ASD. This 65-item rating scale measures five domains: social awareness, social cognition, social communication, social motivation, and restricted and repetitive behaviors. Higher total scores on the SRS indicate greater severity of social impairment. In the current study, the SRS was used to investigate autism symptomology in children with FXS. Pilot data was collected on 6 preschool age children (3-5 years old) who compiled two diagnostic groups, children with FXS (n=4) and children with idiopathic autism (n=2) (IA, autism without a known genetic cause). The data suggest that children with IA have a mean score approximately 10 points higher than children with FXS in the social awareness, social cognition, social communication and social motivation domains. However, mean scores across the two groups were identical on the restricted and repetitive behavior domain. These finding suggests that while both groups show elevated scores indicating social impairment, children with IA are more significantly impaired than individuals with FXS on all domains other than restricted and repetitive behaviors. These findings elucidate differences in profiles of social impairment across these two groups, which is essential for targeted intervention efforts.

**Sleep Extension and Cognitive Function in Older Adults**

**Megan Wall, Psychology - Senior**

**Mentor:** Mrs. Alexandria Reynolds, Psychology

Epidemiologic studies have consistently demonstrated that long sleep (≥8 hours per night) is associated with decreased cognitive performance. The aim of this study was to examine the effect of sleep extension on cognitive function in older adults. It was hypothesized that sleep extension would elicit a decline in cognitive functioning compared with habitual sleep. Eight older (50-79 y), healthy adults who reported sleeping 6-7.5 h per night completed a baseline week and a three-week treatment (habitual sleep or sleep extension of two hours per night). After a recovery week, participants completed another baseline and crossed-over to the next three-week treatment. Cognition was measured via the Stroop Color-Word Test (SCWT) and Trail-Making Task (TMT) after the first baseline and each treatment week. A paired samples t-test on preliminary data showed that participants performed the black font color word reading (part I) of the SCWT faster after sleep extension (M=50.20s), compared to habitual sleep (M=58.23s). The interference task (part III) and scores were not significantly different. The preliminary data show no significant difference between sleep extension and habitual sleep on the TMT tasks (parts A and B). Unexpectedly, participants performed better after sleep extension, which suggests that additional sleep for older adults does not negatively impact cognitive performance.

**Parent-Adolescent Relationships, Self Esteem, and Aggression among High School Aged Youth with Emotional and Behavioral Disorders**

**Katherine Wallace, Psychology - Senior**

**Mentor:** Dr. Mark Weist, Psychology

Parent-child relationships play an important role having both positive and negative impacts on development. An extensive literature suggests that positive parent-child relationships characterized by warmth, involvement, and autonomy-granting, foster a healthy self-esteem and positive developmental outcomes. Conversely parent-child relationships characterized by conflict, neglect or harshness are often linked with inhibiting self-esteem and contributing to difficulties such as aggressive behavior. Yet, little is known about the role self-esteem as an explanatory variable for the influence of parent-child relationships on aggression among adolescents with Emotional/Behavioral Disorders (EBD). The proposed study is to examine (1) the extent to which adolescent-parent relationships impact adolescents’ aggression among youth with EBD; and (2) the role of self-esteem in this relationship. Data collected through the Center for Adolescent Research in Schools (CARS) project will be used to examine this question. CARS participants included high school students identified as by schools as having EBD (n= 647). Data analyses will include adolescent report on the Behavior Assessment System for Children comprised of scales that assess Relations with parents (M = 43.90, SD = 10.83), Self-Esteem (M = 49.15, SD = 11.87), and Aggression (M = 61.81, SD = 13.29). Preliminary analyses indicate...
associations among the study variables as expected with correlation values ranging from $r = .08-.37$; $p \leq .05$. Regression analyses will be conducted in IBM SPSS examining relations with parents as a predictor of aggression, and self-esteem as a mediator. We will present these findings and discuss the implications for supporting adolescents with Emotional/Behavioral Disorders.

**An Analysis of the Connection Between ADHD, Sluggish Cognitive Tempo, and Social Impairment in Children Ages 8-10**

*Alexa Black*, Psychology - Junior

Mentor: Dr. Kate Flory, Psychology

Last year I learned about the research process through working in Dr. Kate Flory’s lab. Dr. Flory’s study aims to understand more about the social impairments that children with ADHD face and how this contributes to their academic achievement. I gained a wealth of knowledge about all that goes into a large-scale research project as well as discovering my own strengths and interests. Working in a research lab has helped me to apply my knowledge from my classes in a more active way. This year, I continued to help on Dr. Flory’s study, but also wanted to look at my own related research question as well. For children with ADHD, especially the inattentive subtype, there is a high comorbidity with Sluggish Cognitive Tempo (SCT). SCT is fairly new and researchers are still debating whether it is actually a subtype of ADHD, or its own distinct disorder. SCT is commonly characterized by decreased information processing speed and clouded thinking. For my research question, I examined results from various measures collected in Dr. Flory’s study that relate to SCT in order to investigate whether children with ADHD who present SCT symptoms have greater social impairment than children with ADHD who do not present these symptoms.

**Prevalence of K-12 Students At-Risk for Behavioral, Emotional, and/or Tic Disorders with a Focus on Sociodemographic Differences**

*William Bradley*, Psychology - Junior  
*Jessica Terpening*, Psychology - Junior

Mentor: Dr. Kate Flory, Psychology

The prevalence of mental disorders among children and adolescents has garnered increased scholarly attention in recent years. Because mental disorders affect 13%-20% of children and adolescents each year, it is necessary to understand the prevalence of mental health concerns, monitor changes in prevalence over time, and examine sociodemographic correlates that describe disparities in prevalence in at-risk populations (CDC, 2013). There is evidence that some mental disorders are becoming increasing prevalent among children and adolescents. In 2011, attention-deficit/hyperactivity disorder (ADHD) was diagnosed in 2 million more children a year than in 2003 (Visser et al., 2014). Data for this presentation was obtained from Stage 1 of the USC Project to Learn About Youth, which collected teacher-completed surveys for 7,168 students in a South Carolina school district that serves students in rural and suburban areas. Surveys inquired about behavioral and emotional concerns in the classroom and included the BASC-2 Behavioral and Emotional Screening System (BESS), Strengths and Difficulties Questionnaire (SDQ), and a brief tic questionnaire. Surveys identified students at high (18%) and low (82%) risk for behavioral and emotional concerns and/or tic disorder. Examination of sociodemographic correlates indicate significant differences for gender, with males being more likely to be at-risk than females,
and significant differences in SES, with students eligible for free or reduced lunch being more likely to be at-risk than their counterparts. Implications include informing mental health policies and interventions targeted at reducing prevalence of mental disorders in at-risk populations. Future directions for research in mental health epidemiology are discussed.

Effect of Prenatal Alcohol Exposure on Norepinephrine Production Enzyme Dopamine β-Hydroxylase

Tessa Crawford, Psychology - Senior
Mentors: Dr. Sandra Kelly, Psychology
Ms. Victoria Macht, Psychology

Prenatal exposure to alcohol can lead to an array of problems that can include cognitive and socioemotional deficits. The umbrella term Fetal Alcohol Spectrum Disorders (FASD) has been adopted to cover the wide range of effects that prenatal exposure to alcohol can produce. Attention deficit disorder (ADHD) is one of the most common disorders co-diagnosed with FASD, which can be caused by the dysregulation of certain neurotransmitters, including norepinephrine (NE). Stimulant medications, such as d-amphetamine (AMPH), are common pharmacotherapies for the symptoms of ADHD. The current study used a rat model of FASD to examine the effects of developmental alcohol exposure and treatment with AMPH on norepinephrine’s synthesizing enzyme dopamine β-hydroxylase (DBH) for potential deficits in production. A 3X2 design had three levels of exposure (ethanol group, intubated control group, non-treated control group) and two levels of treatment (AMPH and water). Ethanol exposure occurred during the early postnatal period which is equivalent to the third trimester in rats and ethanol was give via intragastric intubations on postnatal days (PDs) 2-10. Amphetamine treatment was given via subcutaneous injections during the juvenile period which is from PDs 26-41. Only females were used in this study. Juveniles were sacrificed on PD 42 and tissue was analyzed using immunohistochemistry to stain for DBH. Pictures were taken in Fr1 and Fr3 areas of the Prefrontal Cortex and then analyzed by the ImageJ program. No significant results were found for exposure nor treatment groups. These results may mean that prenatal alcohol exposure has no effect on NE pre-synaptically, and that more focus should be spent on post-synaptic markers.

Religious service attendance and attitudes about homelessness: a correlational study

Paul Hughes, Psychology - Junior
Mentor: Dr. Bret Kloos, Psychology

Attitudes about homelessness can vary based on multiple factors. In this correlational study, reported religious service attendance by Richland County residents was compared to their attitudes about homelessness in the area. We hypothesized that frequent service attendance will correlate with positive attitudes about the nature of homelessness, as shown through the Attitudes Toward Homelessness Inventory. A telephone survey administered through random digit dialing of Richland County residents asked about attitudes regarding the scope of the problem of homelessness and their perceptions of the possibility of ending homelessness in Richland County. The survey also asked participants to report how often they attended religious services in the past 30 days. Findings from this investigation are important for gathering perceptions of public opinions on homelessness, definitions of who is homeless, and who is deserving of help. These perceptions may have an influence on specific decisions about funding and the support for proposed responses to homelessness in Richland County.

Behavioral stress responses of rats in the presence of predator odor: freezing behavior as an indicator of PTSD-like responses

Daniel Lee, Biological Sciences - Freshman
Mentor: Dr. Marlene Wilson, Pharmacology, Physiology and Neuroscience

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. Predator stress is often used as a means to model traumatic stress and PTSD-like responses in rodents. Long Evan rats were exposed either to predator odor (ferret scented towel) or control towel for one hour and assessed for freezing, grooming, rearing, towel interaction, and jumping behaviors. One week following predator odor exposure, the rats were fear conditioned and divided into high or low responders based on cue-conditioned freezing behavior. Significant differences between...
the predator odor exposed and control animals were observed for all behaviors during odor exposure, while no significant differences were found between the low and high responding rats in these responses to predator stress. From the data, there is clear evidence that active or passive, coping mechanisms, increase during predator odor-induced stress with the exception of towel interaction (avoidance) which decreased. Our laboratory has established that Long Evan rats show increased freezing behaviors when in the presence of a predator odor. Thus, further examination into this particular set of behaviors would prove beneficial to identifying possible neurobiological mechanisms that contribute to individual differences in susceptibility to PTSD. Support: USC Magellan award to DCL and VA Merit Award 1I01BX001734 to MAW.

Crossmodal Inhibition of Return  
Evelyn Maclin, Psychology - Senior  
Mentor: Dr. Jessica Green, Psychology  
Attention is a complex system that involves many neural mechanisms. One outstanding question is whether or not the neural systems involved in attention are a single system for all sensory modalities. One well-studied aspect of visual attention is an effect known as inhibition of return (IOR). IOR occurs when an observer conducts a visual search and is then slower to respond to subsequent stimuli that occur at the same location as recently attended targets. In this research study, we are investigating whether attending to an auditory target can produce the same IOR effect on subsequent visual stimuli. To do this, we are recording the electroencephalogram (EEG) from participants while they perform an audio-visual target detection task. This task is designed to elicit an N2pc event-related potential (ERP) component, which is known to reflect attention and to be reduced in amplitude when IOR occurs in completely visual tasks. We hypothesize that the N2pc will be reduced following auditory targets as well, indicating that IOR is linked to the location of attention regardless of the sensory modality of the attended items.

Impact of Implicit Bias on Perception of, and Memory for, Workplace Interactions  
Tammy Warr, Organizational Leadership - Senior; USC Union  
Mentor: Dr. Randy Lowell, Psychology; USC Union  
Everyone we come in contact with experiences implicit bias at some level, which has been shown to impact attitudes and behavior toward others by influencing our perception, behavior, and memory (e.g. Payne & Gawronski, 2010). This can become problematic within the workplace when unconscious attitudes or stereotypes against others guide their actions, understanding, and decision making processes. A person's gender, age, and ethnicity, for example, all have the potential to serve as a foundation for these biases. These unconscious actions are often so subtle as to avoid detection, making the presence of implicit bias impossible to self-report. Implicit Bias in the workplace should not be ignored, but previous research on this topic is minimal, which highlights the significance of the current study. Participants were presented with workplace scenarios involving characters of varying ethnicity and gender. After reading, they answered questions regarding the fairness of task delegation and basic comprehension, in addition to recalling the scenarios from memory. To assess the participants' levels of implicit bias, they also completed the Implicit Association Test (IAT), which was examined in conjunction with the fairness, comprehension, and memory data. Critically, participants' responses regarding the fairness of task delegation were influenced by their own levels of implicit bias and the ethnicity and gender of the character, and the nature of the delegated tasks. In addition, the ethnicity of the participant and story character interacted to influence comprehension accuracy. Effects of bias on participants' representations of the characters in memory will be discussed.
Alcohol Intake and Antibodies Against Periodontal Microorganisms Related to Diabetes

Sarina Dodhia, Biological Sciences - Junior
Mentor: Dr. Anwar Merchant, Epidemiology and Biostatistics
Authors: Sarina Dodhia(1), Yong-Moon Park(2), Deepika Shrestha(3), Anwar T. Merchant(2) (1)Department of Biology, USC, (2)Department of Epidemiology and Biostatistics, USC, (3)Department of Environmental and Occupational Health, George Washington University. The mouth harbors more than 500 species of microorganisms of which about 50 are related with periodontal disease. A subset of these microorganisms has been related with diabetes and pre-diabetes in adults. Diabetes is 5 times more prevalent among adults with highest levels of periodontal damage versus the lowest. Periodontal disease is present in 47% and diabetes in 11.3% US adults. Over 80% US adults consume alcohol, and alcohol intake is associated with risk of periodontal disease and diabetes. We evaluated the relation between and alcohol intake and antibodies against microorganisms associated with periodontal disease and diabetes using the National Health and Nutrition Examination Survey (NHANES) III data and its linked mortality file. Information from non-pregnant participants at least 40 years old, with complete serum IgG antibody data against 19 oral microorganisms at baseline, after excluding edentulous individuals was used. The sample size for this study consisted of 3219 participants whose mean age was 54.08. The percentage of males was 56.34% and the prevalence of moderate to severe periodontal disease was 276.84 people. Of the people who had moderate to severe levels of periodontal disease, 22.6% drank more than 30g of alcohol per day, and 19.87% drank between 15-30g of alcohol per day. It was found that alcohol intake was positively associated with orange-blue clusters of antibodies against periodontal microorganisms among people with diabetes after multivariable adjustment. Alcohol intake was negative associated with red-green clusters of antibodies. From the information gathered, can be determined that there is a relationship between alcohol intake and antibodies against periodontal microorganisms that may differ by diabetes status.

Sarina Dodhia, Biological Sciences - Junior
Mentor: Dr. Anwar Merchant, Epidemiology and Biostatistics
Authors: Sarina Dodhia(1), Yong-Moon Park(2), Deepika Shrestha(3), Anwar T. Merchant(2) (1)Department of Biology, USC, (2)Department of Epidemiology and Biostatistics, USC, (3)Department of Environmental and Occupational Health, George Washington University. The mouth harbors more than 500 species of microorganisms of which about 50 are related with periodontal disease. A subset of these microorganisms has been related with diabetes and pre-diabetes in adults. Diabetes is 5 times more prevalent among adults with highest levels of periodontal damage versus the lowest. Periodontal disease is present in 47% and diabetes in 11.3% US adults. Over 80% US adults consume alcohol, and alcohol intake is associated with risk of periodontal disease and diabetes. We evaluated the relation between and alcohol intake and antibodies against microorganisms associated with periodontal disease and diabetes using the National Health and Nutrition Examination Survey (NHANES) III data and its linked mortality file. Information from non-pregnant participants at least 40 years old, with complete serum IgG antibody data against 19 oral microorganisms at baseline, after excluding edentulous individuals was used. The sample size for this study consisted of 3219 participants whose mean age was 54.08. The percentage of males was 56.34% and the prevalence of moderate to severe periodontal disease was 276.84 people. Of the people who had moderate to severe levels of periodontal disease, 22.6% drank more than 30g of alcohol per day, and 19.87% drank between 15-30g of alcohol per day. It was found that alcohol intake was positively associated with orange-blue clusters of antibodies against periodontal microorganisms among people with diabetes after multivariable adjustment. Alcohol intake was negative associated with red-green clusters of antibodies. From the information gathered, can be determined that there is a relationship between alcohol intake and antibodies against periodontal microorganisms that may differ by diabetes status.

The Attitudes and Beliefs of Undergraduate Nursing Students on Chinese Healthcare Practices

Amy He, Nursing - Senior; USC Aiken
Mentor: Dr. Rebecca Carr, Nursing; USC Aiken
Nursing is a health care profession that seeks to provide holistic care to patients from multiple cultures (Potter & Perry, 2013). In order to do this, nursing education must include information about these cultures and their practices and those of other cultures, including the use of complementary and alternative interventions, such as those found in Chinese health care practices. The accrediting body for USC Aiken School of Nursing, the American Association of Colleges of Nursing (2008), supports cultural competency in all nursing graduates. Throughout their nursing education, nursing students at USC Aiken

Dietary Sodium Intake and Perception of Students at the University of South Carolina

Rozina Merchant, Biological Sciences - Senior
Mentor: Dr. Susan Steck, Epidemiology and Biostatistics
To get a better understanding of the dietary sodium intake and sodium perceptions of students at the University of South Carolina, we evaluated the sodium content in campus dining hall foods, estimated the sodium intake of students in a lunch meal, and assessed students’ perceptions of the sodium content in commonly consumed foods. To evaluate the sodium content of served foods, we examined three weekly dining hall menus. To estimate sodium intake in a typical meal and examine perceptions around sodium content of foods, a survey, administered through SurveyMonkey. Approximately 1,020 undergraduate students received the survey invitation through email and 265 students (average age 21 years, 72% female) completed it. The average combined sodium content of entrée and side items for lunch meals at individual dining facilities were 1107.6 mg, 511.1 mg, 1028.6 mg. The average sodium intake in a lunch meal was 1450 mg, 332 mg, and 723 mg, depending on the dining facility. Approximately 30% of participants reported consuming a meal that was calculated to have more than 2,300 mg sodium daily.
1,500 mg sodium. Participants overestimated the sodium content in Lay’s Potato chips (about 78%) and Poptarts (about 60%), while 77%, 66%, and 78% of participants underestimated the sodium content of muffins, pancakes, and grilled cheese sandwiches respectively. The sodium content of foods varied greatly depending on the dining facility at which they are served. Approximately 30% of participants consumed a full day’s sodium intake in a single meal. Students tended to overestimate prepackaged items and underestimate baked goods.

**Attitudes and Knowledge of Low-Dose CT Lung Cancer Screenings in Medicare Beneficiaries**

**John Odom**, Public Health - Senior  
*Mentors:*  
Dr. Jan Eberth, Epidemiology and Biostatistics  
Dr. Karen McDonnell, Nursing  
Dr. Scott Strayer, University Specialty Clinics

**Background:** Lung cancer is the leading cause of cancer related mortality in the United States. Low-dose CT (LDCT) for lung cancer screening has proven to lower lung cancer mortality rates by effectively detecting cancerous nodules at an earlier stage. Thus, using LDCT for lung cancer screening will play a pivotal role in lowering lung cancer mortality rates and increasing lung cancer survivorship.

**Methods:** An interview survey will be administered by telephone to determine the knowledge and attitudes of patients at high risk for lung cancer of the Family & Preventive Medicine Clinic at Palmetto Health. The survey will be administered to approximately 32 Medicare beneficiaries with a documented current or former smoking history, and will inquire about patients’ knowledge and attitudes of the recent Medicare decision to cover the costs of LDCT screening. Responses will be audio-recorded for research purposes, transcribed, and analyzed for themes.

**Results:** Anticipated results include an enhanced understanding of the patient’s knowledge towards LDCT screening for lung cancer, and their attitudes towards the recent Medicare decision to cover the cost of screening for high-risk patients.

**Conclusions:** Medicare’s coverage decision for LDCT screening was issued in early February 2015. We hypothesize that many Medicare beneficiaries eligible for screening will not be aware of this added coverage benefit. Additionally, their opinions are likely to vary based on factors such as smoking status, and personal or family history of lung cancer. Findings from this study will be utilized in helping to advance lung-cancer screenings in South Carolina.

**A Historical Record of Rail Transportation Spills of Irritant Gas Syndrome Agents in Past 30 Years**

**Todd Peterson**, Nursing - Sophomore  
*Mentors:*  
Dr. Joan Culley, Nursing  
Dr. Salvatore DiNardi, Nursing

**Introduction:** Irritant Gas Syndrome Agent (IGSA) Mass Casualty Incidents (MCIs) (i.e. sulfur dioxide, chlorine, and anhydrous ammonia) pose a significant threat to life and require rapid medical assessment by first responders to reduce death and disability. The early identification of MCIs involving IGsas is essential to an appropriate and rapid response for decontamination, triage, and treatment that can save thousands of lives. Railroads are a major means of transportation for IGsas across the U.S. Purpose: To develop a historical record of mass/frequency/volume of IGsas transported by rail to assist in the formulation of a methodology for a MCI response. Methods: 1) Library databases were searched for information on rail transportation and related infrastructure on IGsas. 2) Google was used to search for rail incidents involving IGsas. 3) Tables were created to organize/analyze the data by incident. Results: An analysis of the data within the last 30 years indicated: 1) More than 5 major IGSA incidents resulted in 10 deaths and more than 900 injuries. 2) IGSA incidents can be deadly e.g. Graniteville chlorine incident (2005) killed 9 and injured over 250 people. 3) Rail incidents are correlated to several factors (length, position, speed, rail infrastructure, etc.). 4) Small communities are not prepared to respond to IGSA MCIs from rail accidents.

**Conclusions/Implications:** This data will be used by Dr. Culley’s research team to improve triage strategies for communities that experience MCIs related to IGsas. Publications and presentations of this data will increase awareness of risks associated with IGSA rail transport.

**How Environmental and Living Conditions Affect the Health of Kenyans Living in the Informal Settlements of Nairobi, Kenya**

**Allie Stugart**, Biological Sciences - Junior  
*Mentor:* Dr. David Simmons, Anthropology

The purpose of this study was to observe the environmental conditions that affect the health of residents of the Kware slum outside of Nairobi, Kenya. The informal settlements that surround the capital of Kenya are facing overcrowding and the health problems that come as a result. The study was carried out using interviews, home visits, and firsthand observation as I traveled throughout the Kware area during a weeklong medical mission trip. Thirty-five interviews were conducted with residents of the slum, who were attending a medical clinic, to gain knowledge of their understanding on the environment they lived in and how it affects their health. Results showed that many residents do not have access to adequate healthcare, clean water, sufficient waste disposal, or education on how to better their circumstances. The area they live in has a very negative impact on their health, which is especially noticeable in their children. Several government healthcare workers were also interviewed in order to gain knowledge of how the Nairobi government is handling the situation. This study was conducted in an effort to bring awareness to the increasing issues found in informal settlements, and also to contribute to future efforts to provide effective resolutions to these health and environmental problems.

**USC Student Perceptions and Behavior on Railroad Crossing Safety**

**Emily Turk**, Public Health - Senior  
*Mentor:* Dr. Sara Corwin, Health Promotion Education and Behavior

Often overlooked but serious public health issues that permeates the city of Columbia are train traffic and railroad crossing safety. With the amount of automobile and pedestrian traffic that the University brings into the capital city, we have reason to be wary of railroad crossings and how they effect the students, as well as how students effect railroad crossings. This project is centered around the perceptions students have on train safety and what behaviors those perceptions elicit. With the information found through anonymous surveying, an intervention will be developed to increase the awareness and knowledge on reckless behavior around train and railroad crossings.
Measuring spatial accessibility to colonoscopy for colorectal cancer screening in SC using novel GIS approaches

Bryttin Boyde, Anthropology - Senior
Mentor: Dr. Jan Eberth, Epidemiology and Biostatistics

Background and Purpose: Utilization of colonoscopy screening has been shown to decrease colorectal cancer incidence and mortality. The relationship between supply and demand of colonoscopy providers to patients is key to analyzing spatial accessibility to colonoscopy among screening-eligible persons in South Carolina. This study aims to analyze spatial accessibility to colonoscopy in SC over time (2004-2010) by mapping the interaction between supply (colonoscopy providers) and potential and realized demand (patients). Methods: The SC Ambulatory Surgery Discharge database (2004-2010), restricted to individuals aged 50-74 who had a colonoscopy, was analyzed to determine the supply and demand of colonoscopy providers to eligible patients in SC. Techniques employed through ArcGIS to aid in the calculation of spatial accessibility included spatial joins and network analysis. In addition, the two-step floating catchment area (2SFCA) method was utilized in calculating the accessibility score of actual use of colonoscopies and potential use. Preliminary Results: From 2004 to 2010, 62.57% of the urban population and 45.2% of the rural population aged 50-74 were screened. Of the 101 facilities providing colonoscopies, 67.3% were located in urban areas, comprising 62.7% of all physicians who performed colonoscopies (n2010=660). Patients living in rural counties utilized a facility in their county 37% of the time, a facility in another rural county 29% of the time or an urban facility 34% of the time. Conclusions: There are currently not enough providers to serve the SC population eligible for colorectal cancer screening, especially those located in rural areas. Further policies and programs are needed to improve access to screening across the state.

Developing a Water Irrigation System for Organic Coffee Crops and Assessing Public Health Needs in La Victoria, Ecuador

Olivia Haley, Biological Sciences - Senior
Zane McGhee, Civil Engineering - Sophomore
Mentor: Dr. Jim Burch, Epidemiology and Biostatistics

EWB-USA is a non-profit, humanitarian organization that partners with developing communities worldwide to design and implement development projects by providing financial support and engineering expertise. Our EWB-USC student chapter is currently in the monitoring phase of a water irrigation project in La Victoria, Ecuador. The primary goal is to work in partnership with the Association of Organic Coffee Producers of Las Lajas (ACOLL) and the local government to design and build a gravity fed water pipeline for irrigation purposes. Our secondary goal is to investigate health concerns within the community to address disparities with health awareness projects. During our January 2015 monitoring trip to La Victoria, the pipeline was assessed; areas where the pipeline was not constructed to specifications were determined. A local monitoring team was assembled in La Victoria to ensure proper maintenance of the pipeline. Concurrently, a public health based survey examined existing preconceptions on the general health of the community. Questions on the survey regarded availability and accessibility of healthcare, common illnesses in the region, and issues with water sanitation. Community interactions provided valuable information about potential future engineering and public health projects. Multiple community members of La Victoria identified Cedros, a town about 30 minutes west of La Victoria in need of municipal water, as a possible site for new projects. To this effect, the EWB-USC chapter will return to La Victoria not only to monitor the irrigation pipeline project, but also to assess the feasibility of starting new projects in Cedros.

Solutions for Patient Safety: Palmetto Health Children's Hospital

Dalenna Kessler, Biological Sciences - Senior
Mentor: Dr. Elizabeth Mack, MUSC Medical Center

I worked with Dr. Elizabeth Mack at Palmetto Health Children's Hospital as part of her collaboration with the Solutions for Patient Safety (SPS) initiative. The SPS is a network of 78 hospitals that had the goal of reducing nine specific hospital acquired diseases (such as adverse drug events, catheter-associated urinary tract infections, and central line-associated blood stream infections) by 40 percent, serious safety events by 25 percent, and readmissions by 20 percent by December 31, 2014. My role in Palmetto Health's portion of this research has been to input data gathered into the SPS database and to help the hospital update this data system to be more efficient. Additionally, I attended webinars during which Dr. Mack and other Palmetto Health healthcare workers collaborated with the doctors at the other hospitals involved in the project. When I first started working with Dr. Mack, I expected to see implementation of new procedures that further protected patients and led to reductions in these safety events, but I was not confident that these specific goals would be met. Throughout my participation in this research, I observed a successful reduction in the average rates of CAUTI, injuries from moderate or greater falls, OBAE, SSI, and CLABSI. SPS and Palmetto Children's Health also saw reductions in ADE and PU. This project is ongoing and by transparently sharing the collected research, the SPS network will be able to continue changing the culture of pediatric care making it safer and more effective nationwide.

Neighborhood Walkability and Perceived Social Support Positively Associated with Neighborhood Satisfaction

Nicole King, Public Health - Senior

Mentors: Dr. Andrew Kaczynski, Health Promotion Education and Behavior
Ms. Stephanie Child, Health Promotion Education and Behavior

Previous research has suggested that neighborhood walkability is associated with neighborhood satisfaction, and that walkable neighborhoods are more social. This social support may be a driving factor of neighborhood satisfaction. The purpose of this study was to examine social support as a mediator of the association between neighborhood walkability and neighborhood satisfaction in eight historically disadvantaged neighborhoods in Greenville, South Carolina. A household survey assessed residents’ perception of their neighborhood.
Questions from the Neighborhood Environment Walkability Scale measured various elements of neighborhood walkability. Social support was measured by the number of neighbors whom a person could call on for help. Neighborhood satisfaction was assessed using a five-point Likert scale, ranging from poor to excellent. A series of regression models were used to test for mediation. All analyses were conducted in SAS, and the PROCESS macro estimating bootstrap intervals was used for testing mediation. A total of 243 respondents were included in the analysis. Walkability was positively associated with both neighborhood satisfaction (b=0.90, p=0.001) and social support (b=0.35, p=0.002). Social support was positively associated with neighborhood satisfaction in the uncontrolled model (b=0.15, p=0.008) however when covariates were added to the model, and specifically income, this relationship became insignificant (b=0.11, p=0.07). The data suggest that social support may mediate the relationship between neighborhood walkability and satisfaction, and that income may play a role in this relationship. Future studies should seek to examine this relationship in neighborhoods with diverse socioeconomic backgrounds.

SABER Epidemiological Study
Kristy Lagarde, Public Health - Senior
Mentor: Dr. Myriam Torres, Epidemiology and Biostatistics
The SABER study is an epidemiological study conducted by the Consortium for Latino Immigration Studies in the Arnold School of Public Health at the University of South Carolina. The purpose of the study was to determine the knowledge of HIV and sexual behaviors among Latino men and women that put them at risk of contracting HIV. In the US, HIV/AIDS disproportionately affects African Americans and Latinos and there is a need to learn about factors that are placing populations at risk. The study included 200 Latinos, 100 men and 100 women from the Pee Dee and Midlands regions of South Carolina. Surveyors were trained to administer the survey face-to-face in either English or Spanish, depending on the preference of the participant. My role with SABER was to create the database, code results and enter data into Epidata, and then export the data to SAS for analysis. I was interested in determining if knowledge of HIV differed between male and female participants. Based on preliminary data analysis, it appears that sex does not have any association to knowledge or understanding of how HIV is spread. However, women were more likely than men to report never using a condom during vaginal sex. These results mean that any intervention planned to improve knowledge of HIV among Latinos may not need to be administered differently based on sex, however the importance of condom use during sex needs to be emphasized for women more than men.

Mobile Technology Tools for Promoting Physical Activity, Healthy Eating, and Parent-Child Communication
Klara Milojkovic, Chemistry - Sophomore
Mentors: Dr. Gabrielle Turner-McGrievy, Health Promotion Education and Behavior
Ms. Danielle Schoffman, Health Promotion Education and Behavior
Pediatric obesity is a serious health issue, and experts agree that actions must be taken to prevent and treat it. One innovative method through which healthy lifestyles can be encouraged is mobile technology, including mobile apps and physical activity (PA) devices. This study examines the relative effectiveness of two methods of family-based health promotion using mobile technology for impacts on healthy eating (HE), PA, and parent-child communication about health behaviors. Parent-child dyads will be recruited from the community using methods such as flyering at community centers, and schools. Children must be between 9-12 years old, and parents are eligible if they do not currently meet the national recommendation for PA. Eligible dyads will be randomized into one of two 3-month mobile interventions, testing the effectiveness of commercially available apps and a PA monitoring device versus utilizing apps, a PA device, and a mobile website that facilitates parent-child communication about healthy lifestyle choices. Changes in dietary quality and average minutes of physical activity per day will be measured at baseline and post-program. To date, 18 dyads have been enrolled (mean parent BMI: 30.8+9.1 kg/m2; mean child age: 10.2+1.0 years). Recruitment will continue on a rolling basis through May, 2015. The data presented will describe the recruitment techniques and yields to date. This study is one of the first to examine the use of mobile apps for enhancing HE and PA among children and parents. Implications of the research will be discussed.

Addressing Childhood Obesity through Community Approaches
Makenzie Perdue, Biological Sciences - Senior
This service-learning interprofessional course challenged students to implement the Junior Doctors of Health curriculum in a local, low-income elementary school. The class was divided into interprofessional teams representing pharmacy, public health, social work, medicine, and political science. The University students were exposed to concepts of obesity prevention from the perspectives of these different disciplines to implement the structured curriculum to groups of fourth grade students. The goal of the four-week program was to promote healthy diet and exercise behaviors for the prevention of childhood obesity. A primary service goal of the program is to train youth advocates (elementary students), called Junior Doctors of Health, who will promote healthy living for obesity prevention in their homes, schools, and communities. At the conclusion of the program, the interprofessional teams created reports that summarized the program for the elementary students to share with their parents, in hopes that they would apply what they learned through Junior Doctors of Health to their lives at home.
Examining the Needs and Dispositions of Sumter School District High School Students with Regards to Studying Physics

Jordan Ard, Biological Sciences - Freshman; USC Sumter
Jessica Kohler, Biochemistry and Molecular Biology - Freshman; USC Sumter

Mentor: Dr. Hui-Ying Chang, Physics; USC Sumter

Out of a total student population of 4740 in the Sumter School District (SSD) in Sumter, South Carolina, only 167 are currently enrolled in a physics course. That is 3.52% of the total student population in the district. As advised by Lori Smith, Coordinator of Science and Fine Arts of the Sumter School District, enrollment in physics courses is insufficient. Since physics is the basis of all sciences and a prerequisite for engineering courses, not having enrolled and succeeded in a physics course during high school could impede a student’s success in such majors. This project aims to examine the needs and dispositions of high school students in SSD with regards to studying physics by exploring the reasons behind their decisions to enroll or not enroll in a physics course during their high school careers. The project also finds out how they believe their physics classes can be improved. This is achieved by conducting an electronic survey among the seniors in all three high schools of SSD, followed by interviews with selected students to understand their answers more in depth. A quantitative and qualitative analysis of the results is presented. These results are intended to help to improve the physics program in SSD as well as shape The University of South Carolina—Sumter’s outreach efforts in the local high schools to encourage students to enroll in college physics courses.

The Freiberg, Germany Relief Society

Amy Bassett, Religious Studies - Senior

Mentors: Dr. Katja Vehlow, Religious Studies
Dr. Yvonne Ivory, Languages, Literatures, and Cultures

“Faith, Family, Relief” is the motto of the Relief Society, the worldwide women’s organization of The Church of Jesus Christ of Latter-day Saints. Established in the 1800s, the Relief Society has been engaged in spiritual ministry and humanitarian aid at the local and international level. In the summer of 2014, student Amy Bassett traveled to Germany for ethnographic research of the Relief Society with a Magellan Scholarship and Ceny Walker Undergraduate Fellowship. The Relief Society chapters in the former East Germany faced particular challenges during the 40 years behind the Iron Curtain through the transformations of the past 25 years since the fall of the Berlin Wall. The Freiberg, Saxony chapter is of unique interest as a Latter-day Saint Temple, the most sacred structure in this religion, was built there in 1985 prior to the reunification of Germany. Through a series of oral history interview with religious leaders and members of the women’s Relief Society Amy Bassett examined the navigation of this religions congregation through these major political transformations and the relationship between the Relief Society and the Temple. This case study provides interesting insights into the role of religious organizations in communities undergoing change, as well as, the significant impact a Temple has on the vitality of local congregations.

What To Do After Graduation: My Journey Through the Fulbright Application Process

Kara Brown, German - Senior

Mentor: Ms. Jennifer Bess, Fellowships & Scholar Programs

German is one of my greatest passions. I’m a German and Anthropology major and I have often contemplated what it would be like to live in Germany for an extended period of time and really absorb the culture and language. One of my other great passions is teaching. I relish in teaching friends new things or relaying something new that I have learned to whoever will listen. While thinking about my post-graduation plans, the thought of doing an English teaching assistantship through Fulbright came to mind, but seemed almost like an unattainable possibility. I had read the statistics and naturally there are many more applicants than positions in Germany. Before I had decided fully to apply, I applied and participated in the Checkpoint Charlie English teaching program. This program was essentially a miniature version of what I would be doing as a Fulbright English teaching assistant. As for the application process… It was definitely a learning experience in many ways. My application process was a bit different from others, but I nevertheless discovered more about myself and my motives, how to use the resources available to me at USC, and what it takes to write a successful application.

Substance Use, Criminal Behavior, and Psychosocial Outcomes among 12th Grade Students in the Southern United States

Amber Lynn Dicker, Psychology - Senior

Mentor: Dr. Nikki Wooten, Social Work

Background: Monitoring the Future is a continuing study that examines the relationship between the attitudes, behaviors, and future plans of United States secondary school students, young students, and college students. This annual survey attempts to study demographic variables, educational variables, and criminal activity variables to determine the relationships and impact between these factors. Methods: In this study the Statistical Software for the Social Sciences (SPSS) was used to analyze publicly available Monitoring the Future data to examine the association between alcohol use, marijuana use, self-esteem outcomes, educational objectives, and criminal behavior among 12th grade students located in the Southern region of the United States (as defined by the 2010 US Census). The publically available data analyzed in this study was collected using a longitudinal, repeated cross-sectional, multi stage area probability design with three stages including primary sampling units, schools within the primary sampling unit, and students within the sampled units. Responses were collected using an on-site survey questionnaire with a response rate range between 66 and 85 percent. Findings: Preliminary results suggest that family history and ethnic background play a role in adolescents’ use of alcohol and marijuana, early and long-term intervention methods are most effective in addressing adolescent substance use, and adolescent substance use has many effects on psychosocial outcome variables such as self-esteem measures, educational objectives, and rates of criminal activity. Implications:
The results of this secondary data analysis offer insights into the effects that alcohol and marijuana use has on 12th graders in the Southern United States. With these potential impacts in mind, the results of this analysis may also provide support for upcoming studies in this area of research.

South Asians and development in Southeast Africa: What can we learn from the middle?

**Alexander Keene**, History - Senior
Mentor: Dr. Josh Grace, History
This project focuses on changing understandings of colonial life and particularly the effect that economic development had on colonial subjects. Development in a historical sense is the economic growth of a region; through this growth it is postulated that social conditions will improve and inhabitants will gain access to luxuries that are common in the West. Ultimately development proves to be a troubling structure within which to understand the convergence of modernization and non-European cultures as it creates a value gradient on which Western lives are the utmost goal. There has been surprisingly little research done on South Asian populations relative to their numbers in Africa. Pursuant to this dearth of material this research focuses on broadening an understanding of the Indian Ocean world as well as the collision between colonial citizens and experiences. A combination of firsthand research from Michigan State University’s Africana library, diverse primary sources and a wide variety of secondary sources enable this work’s scope. The research also includes significant considerations of current development and postcolonial theory as well as the reinterpretation of South Asian narratives in Africa from the 19th and 20th century.

**Camp Read-a-Rama**

**Ashleigh Mann**, Elementary Education - Senior
Mentor: Dr. Michelle Martin, Library and Information Science
During my coursework at USC I found a love for teaching students how to read books. I had the pleasure of being in SLIS 325 a children’s literature class with Doctor Michelle Martin. During our time together she had us attend her Read-a-Rama program where she invited children from around Columbia to get excited about reading. She had mentioned in her class that she hosted a camp during the summer that took this concept and branched it out throughout the community. I was intrigued and decided to become a camp counselor for Camp Read-a-Rama. During my two summers with Camp Read-a-Rama I got the privilege to work with underprivileged children that do not get to see a book everyday. The goal is to try to make reading fun and relevant for these children. During camp I got to plan Splashtastic week. This was a week that incorporated books all about water. I then planned activities to go along with the books we were reading. I learned from this experience how to communicate properly with parents, integrate different curriculum within my activities, and how to manage a large amount of children at once. It is also important to never give up on a child. Getting down on their level and finding what interest them makes a huge difference. Just by asking key questions such as,” What do you like to do on the weekend?” allows for them to feel like they can relate to you. Every child has a place in this world and giving up on children would be like giving up on our future. I plan to take what I have learned through my experiences and become a teacher that can support student's growth within and outside of my classroom.

The Current State of Young Hispanic Children in SC: Projections and Implications for the Future

**Anna Mesa**, Biological Sciences - Senior
Mentor: Dr. Myriam Torres, Epidemiology and Biostatistics
In coming decades the future population of the United States is projected to evolve into a highly diverse young population that will contrast a largely white older generation. By 2060, according to U.S. Census Bureau estimates, Hispanic children will comprise more than one third of the total child population. Additionally, between 2015 and 2060, the total Hispanic population in the United States will experience 125.6% growth; more than doubling in size from 53.3 million to 128.8 million. Considering this demographic shift and in order to ensure the well-being of the nation in the future, the growing Hispanic population must be supported and taken into account. Since it has been found that the growth is due primarily to high birth rates, special attention must be focused on young Hispanic children; especially in the areas in which they currently lag behind other populations. Since the presence of this population in such large numbers is new, policies must be put in place now so they may take effect and evolve as necessary while the population grows. This report is a compilation of the most recent data from the United States and South Carolina regarding all aspects of the young Hispanic child population; from poverty rates to school enrollment. Comparisons with other racial and ethnic groups are also listed to illustrate disparities.

**Romantic-Era Lyrics**

**Victor Reynolds**, Computer Science - Sophomore
Mentor: Dr. Paula Feldman, English Language and Literature
Many great works of English literature were penned during the English Romantic Period – poems such as “Ozymandias” by Percy Bysshe Shelley. However, we do not experience these pieces today as their original audiences did. These works rose to fame as songs, for printed literature was too expensive for the average individual to purchase. As printing became cheaper, we lost the musical aspect of these poems, and thus removed an important element to what made them famous in the first place. The goal of the Romantic-Era Lyrics database is to allow anyone who is interested to experience Romantic-Era literature in a new light. Under Dr. Paula Feldman’s direction, I have built a preliminary version of the Romantic-Era Lyrics website, a searchable database of hundreds of Romantic-Era scores. The website features famous authors such as Lord Alfred Tennyson and Caroline Norton, and it includes interactive visualizations of recordings for four different versions of the work “Auld Robin Gray” by Lady Anne Lindsay. Publishing houses, poets, and composers are also searchable. Building this database required me to design and program several distinct components – a backend database, an API to access the database, programs to import metadata, and a front-end interface. The ability to see and hear this vast archive of literature as music will be useful to students, scholars, and educators of all levels, and we hope that it will invite new audiences to experience Romantic-Era literature the way it was meant to be experienced.
Capstone Abroad Experience in Ghana  
Nathan Smith, Art Education - Sophomore  
Mentor: Dr. Minuette Floyd, Art
In the summer of 2014 I traveled with a group of USC students, largely comprised of Capstone Scholars, to Ghana, West Africa with Dr. Minuette Floyd and Theresa Harrison. We were abroad from the 11th to the 26th of May, learning about Ghanaian history and culture as well as teaching art lessons at local schools and orphanages in Accra and Cape Coast. I was drawn to this experience because as an Art Education major it offered me a unique practical experience in teaching practice. In addition, the Ghana experience interested me because I have traveled to other western nations and across the United States in the past, but I had never had an experience in a third world country or non-western culture. We spent a large amount of our time in Ghana gaining exposure to this unfamiliar West African culture. We toured former slave castles, explored jungles and slave trails, witnessed authentic urban and rural life, experienced traditional art making, and participated in cultural activities like dance and music. However, the teaching experiences were also immensely significant. My peers and I worked in small flexible groups to move between makeshift seminar spaces while teaching on request at two different schools. These experiences helped us all to expand our views of the world and of non-western cultures. In addition, I gained a large amount of practical teaching experience, as well as a set of unique cultural experiences that I will be able to take into my future.

Portable Classroom Use  
David Wheaton, Mathematics - Senior  
Mentor: Dr. Alexander Matros, Economics
Portable classrooms are a major problem in many areas of the United States. They are intended as temporary fixes for overcrowding, but often end up being more permanent fixtures. Portable classrooms are often cost-inefficient in the long-term and harmful to learning outcomes. The purpose of this project is to find factors that are associated with portable classroom use in different school districts. Time series data is taken from the SC annual report cards to perform data analysis. The data is available from 2007 to 2014 on portable classroom use, along with several other theoretically relevant factors. OLS regression is used to perform the relevant data analysis. Both a cost benefit analysis and correlational data on portable classroom use will be presented and discussed.

Feminism, Diversity, & Prioritizing Issues  
Zaria Brown, Political Science - Senior  
Mentor: Mrs. Samantha Lewandowski, Housing
The connections between how minority groups such as women fight for the rights if even those if the majority a well as the importance of diversity within these groups.

Community Service Programs and Crime Rates in South Carolina  
Carman Fowler, Psychology - Junior  
Mentor: Dr. Nikki Wooten, Social Work
Summary: Community service programs build relationships within communities; develop neighborhoods at institutional, structural, and economic levels; engage citizens; and create sustainable change. Strong community relationships and neighborhood orderliness have been shown to create social networks that influence community behavior and reverse the effect of negative social conditions through an inverse of the Broken Window Theory: suggesting that when criminals see that community members are invested in their neighborhood they are deterred from committing crime. Methods. This study was an analysis of secondary data from the 2012 reporting year of the National Incident-Based Reporting System and the agency databases from the South Carolina United Way and the South Carolina Information Highway. The data was analyzed by South Carolina regions (Upstate, Midlands, PeeDee, Lowcountry) and counties.
(n=46) to (1) describe the location and type of community programs by South Carolina counties and regions, (2) determine if there is a difference in the type of community programs located in different regions and counties, (3) determine the property and violent crime rates of different counties and regions, and (4) compare the differences in community service programs in counties and regions with low crime rates versus high crime rates. Findings suggest that there is a negligible correlation between community service programs and crime rates for the state overall, but the correlation differed for the four South Carolina regions. The Midlands regions had a negligible relationship, the PeeDee and Lowcountry regions showed a positive relationship and the Upstate region showed a negative relationship.

**The Role of National Religious Culture and Self-Control on Consumer Buying Decisions: A Cross-Cultural Study**

**Jenn Frazee**, International Business - Senior  
**Mentor:** Dr. Thomas Kramer, Marketing

Consumers take many different factors into consideration when purchasing a product, and our research sought to study the effect of some of these factors. The specific aim of our research project was to measure the effect of national religious culture and its value on decision-making in self-control dilemmas, as it relates to consumer buying decisions in Italy compared to the United States. We hope that at the completion of this project we will have been able to document the degree to which Italian consumers rely on their nation’s spiritual beliefs as guidelines or justifications to resolve self-control dilemmas relating to the purchase of consumer goods, and to compare how these decisions are made in a religion-based society versus a more secular society, like that of the United States.

**Managing Ambush Marketing at Mega Sport Events: A Case Study of the 2014 FIFA World Cup**

**Joe Gelay**, Sport and Entertainment Management - Senior  
**Jack Mitchell**, Sport and Entertainment Management - Senior  
**Mentor:** Dr. John Grady, Sport and Entertainment Management

The researchers found minimal incidents of traditional ambush marketing throughout Rio de Janeiro, which served as the epicenter of the World Cup in Brazil. Notably, the instances of ambushing that the researchers did find in the thematic space of the event often urged consumers to engage with their brands through social media. It is clear that ambushers are now relying on social media more heavily as a means to connect their brands to mega events. For example, high-profile campaigns such as Nike’s #RiskEverything, and Banco do Brasil’s #TorcidaBrasil

**Closing the Research to Practice Gap: Effective Techniques for Dissemination in Social Work Research**

**Sophia Krysa**, Broadcast Journalism - Junior  
**Mentors:** Dr. Robert Hock, Social Work  
Ms. Marissa Yingling, Social Work

While there is ongoing debate about the amount of lag time between when a research innovation is made and when it is implemented, multiple studies indicate that the average time for program implementation is seventeen years (Morris, Wooding & Grant, 2011). To shorten this research-to-practice gap, researchers are encouraged to disseminate their findings to those stakeholders who are best able to make use of them. In recent years, a variety of dissemination models and frameworks have emerged to guide the communication efforts of researchers across multiple disciplines. The purpose of this literature review is to examine dissemination frameworks that are particularly useful for social work researchers and to provide examples of their use in real world settings. Data and frameworks were obtained by performing a literature review using Google Scholar and EBSCO. Keywords included “research dissemination”, “techniques” and “frameworks”. The first innovation, developed by the National Center for Dissemination of Disability Research, provides strategies for strengthening the ways in which research results can be accessed and used by those who need them. Second, Herie and Martin (2002) developed a framework that utilizes the most important aspects of knowledge diffusion and social marketing theory. Finally, Jacobson, Butterill and Goering (2003) developed a framework to increase researcher familiarity with user groups. These frameworks and examples of their practical application will be summarized and displayed on Discovery Day.

**Front Row Sports Blog**

**Jason Mohn**, Public Relations - Senior  
**Mentor:** Dr. Glenda Alvarado, Journalism and Mass Communications

Blogging has prevailed as a public outlet for both aspiring and professional journalists to share thoughts, opinions and news stories. Sports blogs in particular have gained credibility and popularity in recent years. The presented work discusses a public relations student’s efforts to manage his own sports blog over the course of several months, while balancing a full class schedule and a part time job. The student has been exposed to a number of frameworks, the use of analytic resources, audience involvement and theories the student learned from his academic curriculum. Along with the academic resources, the student summarizes his experiences over time spent as a sports blogger, and how his perspectives have changed.

WITHDRAWN
Perceptions of Islam Among Student Political Organizations

Lane Smith, Anthropology - Senior
Mentor: Dr. Sherina Feliciano-Santos, Anthropology

Today's politics are inextricably tied to cultural and religious practice. Political actors misunderstandings, which emerge out of different cultural assumptions and religious practices, may lead to global conflicts. This situation is noticeable in the current political climate, specifically in terms of European and America's relationship to the Middle Eastern, North African, and South Asian Muslim majority countries. Throughout these large regions, Islam plays massive roles in cultural, political and social practice. In today's globalized world, information about varied religions and cultures circulate widely through media and communication technologies, entering into the domain of political discourse. In this context, an examination of the ways in which future political leaders, such as students in political and social organizations at the University of South Carolina, perceive varying religious and cultural practices in important. For this study, I am examining the ways in which student led political and social organizations perceive Islam on the world stage. The groups in this study are the College Democrats, College Republicans, and the Feminist Collective at the University of South Carolina. To conduct this project, I am observing meetings of each group while leading discussions about Islam with respect to world politics. Coinciding with the meetings, I am distributing anonymous surveys with questions pertaining to certain topics within Islam. I am also requesting private open-ended interviews with willing members. The material collected in the anonymous surveys will inform the questions asked and expounded upon in the open-ended interviews.

The Feasibility of Magnetically Levitated Train Systems in the United States

Joshua Snead, International Business - Senior
Mentor: Dr. William Sandberg, Management

I analyzed and researched the capability of the United States economy to build and operate a Magnetically Levitated train system by exploring modern infrastructure dialogue and by reaching out to transportation technology and policy experts. I found that the United States has the technology and the capability of constructing a Magnetically Levitated train system, but considerable political hurdles are preventing forward movement. Magnetically Levitated train systems could revolutionize US transportation and infrastructure.

Hands On Learning Experience to Work with a Community to Improve their Health

Lucy Aranda, Public Health - Senior

When working to improve the health of communities within cultures different from your own, cultural relativism is the key to success. I had learned about this concept in my classes at USC, but it wasn't until my study abroad semester in Thailand that this principle really proved to me that blindness to certain cultural aspects could lead to huge failures. Our semester long project aimed towards gathering data on the health status and health problems of the people living in various impoverished communities in the outskirts of Khon Kaen, Thailand, and using our information to plan and implement a health intervention addressing one of the most prevalent problems we identified in our assigned community. My group of four other students and I were assigned nutrition in the railroad slum community of Lao Na Di, so after weeks of surveys, interviews and collecting of information from community members, health care providers and community leaders, we put together a two hour nutrition information session for members of Lao Na Di to come and learn about the importance of and how to maintain a healthy diet. Keeping a cultural relative mindset helped us to create an intervention that was effective for our target audience. Unfortunately we did run into some unperceived issues that proved to us that despite our greatest efforts to remove ourselves from our own culture while conducting our research and executing our intervention, it’s sometimes very difficult to account for every cultural obstacle that you might face and because of this, you need to be flexible and ready to make adjustments to your plan when faced with these issues.

Corrections in America: A Failed System

Magdelena Bellone, Criminology and Criminal Justice - Senior

Corrections is a national problem and a failed system that needs to be addressed. The United States of America accounts for 5% of the world’s population, yet we account for 25% of the world’s incarcerated population. With over 2.2 million people under incarceration and even more under the supervision of parole and probation, it is no surprise that corrections in America are a big deal. Over my time as a criminal justice major, I have learned how our corrections system works and how the United States has increased severity in punishment. I have also worked with a public defender in the juvenile system that deals directly with delinquents and searches for alternatives to detention. This knowledge of our nation criminal justice system combined with knowledge I have gained from studying abroad gives me a unique perspective when it comes to corrections. What I know is that our current system is not working, about 2/3 of people released from prison or jail recidivate, or commit another crime, within three years. This is creating more work for our system, and as a result, more taxpayers money spent. I myself am motivated to learn about the corrections system so that when I graduate I can help change policy to help offender’s rehabilitate and create
Experience and empowerment: Using peer leadership as a platform for women's advocacy

Hunter Faile, Accounting - Sophomore; USC Lancaster

My graduation with leadership distinction pathway is Professional and Civic Engagement. My purpose is to show examples of how leading others in my role, as a peer advisor and Student Government Association Vice President, have helped to enhance my collegiate experiences. Additionally, I will highlight the marginalization of women in high level leadership positions in major corporations and non-profit organizations, and how I have used my co-curricular experiences as a platform to encourage young women to enter into the professional world.

My message has been influenced by Facebook COO Sheryl Sandberg, and it encompasses three key points: 1) sit at the table, 2) make your partner and real partner, and 3) don't leave before you leave. This is a message I have begun to share with local middle schools, and a message I am beginning to expand to local churches and Girl Scout troops. I am also working with the Office of Student Life to develop a student organization for ambitious and motivated collegiate women who plan to enter the professional workforce.

Cultural Learning in Costa Rica

Brantley Fortenberry, Public Relations - Senior

In the spring of 2014 I made the decision to take my studies abroad and made the life-changing trip to Costa Rica. Having studied Spanish, I wanted to minor in something where I could use the language as part of a professional career. In order to gain a more global insight I decided to embark on a Language and Culture program at Universidad Veritas. During this time I was able to live with a Costa Rican family and take classes that pertained to my major, as well as an advanced Spanish class. Living in a foreign country, with a family that didn't speak English and being able to explore the country was one of the best experiences of my life. I was also able to devote much of my class time to three things I love: craft beer, culture and photography. My time abroad proved to me that I can be very flexible and adapt easily to most situations. I learned new and creative ways of communication and developed a cultural identity that doesn't exactly fit into one category. As a Hotel, Restaurant and Tourism Management minor I have a natural curiosity of different cultures and the world around me. Studying abroad helped not only satisfy these desires but also strengthened my urge to explore even more.

Today's Pre-Med Student, Tomorrow's Doctor

Lilianne Kaminski, Biological Sciences - Senior

As an upcoming graduate with Leadership Distinction in Professional and Civic Engagement, I was challenged with connecting my experiences outside of the classroom to the knowledge I gained from my academic studies over the past five years. During my undergraduate career at the University of South Carolina there were a variety of opportunities such as attending lectures, conferences, internships, and leadership roles that aided in my professional and personal development. Two of the most meaningful experiences I have had include interning at Dr. Jason Rosenberg's S.C. Pain and Spine clinic and aiding in the transition of freshman students as a U101 Peer Leader. Through these opportunities I was able to witness concepts I learned in class, such as the four
models of patient-physician relationships and how a community’s culture affects personal health. While seeing my classroom education in true-life scenarios, I was able to pair this knowledge with my experience to foster my communication skills and gain a deeper understanding as to why compassion, humility, empathy, and patience have now become necessary qualities in practicing physicians. I believe that through these skills and erudition, I will be able to pursue a career in medicine as the ideal physician and continue to give back to my community in the best way possible.

Parallels between Leadership Experiences and the Field of Biology

Reena Patel, Biological Sciences - Senior

During my sophomore year, I applied to become a peer advisor for Cross College Advising, a branch of the Student Success Center. Since I was 18, I knew I wanted to major in biology and eventually pursue a career in dentistry. My experience is unlike most, due to the fact that I have never changed my major or altered my plans on applying to dental school. The average college student changes their major and career choice at least once, which is the reason why I applied to be a peer advisor. I wanted to help students find a career they are passionate about by helping them select the right major. After working as a peer advisor for several semesters, I realized I truly enjoyed offering guidance and support to first year students, which led me to become a U101 peer leader and orientation leader. During these leadership experiences I gained valuable insight and skills, which I applied to my studies in biology. Along with this, I was able to take the theories and concepts I learned in the classroom and relate them to my experiences outside the classroom. The purpose of this presentation is to illustrate the parallels between my classroom and beyond the classroom experiences. After further reflection on these experiences, I feel confident in taking what I learned and applying it to my ambitions after graduation.

A total transformation through research

Priya Purohit, Biomedical Engineering - Senior

The classroom is empirical in regards to exposing students to new subjects and materials, but it takes more than just a few textbooks to develop a strong passion for any subject. Having the opportunity to delve into undergraduate research regarding cochlear implants added a new dimension to my understanding and interest of biomedical engineering, which has in turn shaped my career aspirations. Being a part of the entire research process (writing grant proposals, recruiting participants, analyzing data, and presenting findings) has given me a brand new perspective on what it takes to make a science–oriented design come to life, and I now know that dedicating my career to patenting these ideas is what I want to do to help further advance our world technologically and scientifically.
**Professional and Civic Engagement: Internship and International Experience**

**Alexandria Abikhaled**, Political Science - Senior

During the summer of 2014, I interned for Congressman Joe Wilson in Washington, D.C. through American University’s Summer Intern Program. This program allowed me to see first hand how involved South Carolina Representatives are with their constituents and what they do to support their district. Beyond my responsibilities responding to constituent requests by phone or by mail, I also worked with legislative staff on several issues and was responsible for giving private tours of the White House and Capitol. Throughout this internship I was encouraged to participate in staff meetings and attend congressional committee hearings and briefings. Although my internship was heavily focused on domestic and district issues, I also learned about the Congressman’s stance on multiple important foreign issues. Prior to my internship I also studied abroad in Aix-en-Provence, France for 6 weeks. This study abroad experience also affirmed my love for travel and interest in foreign affairs. Both of these experiences are important to me because it provided me the opportunity to gain valuable knowledge I only would have otherwise gained exposure in through a textbook. Experiencing legislation, another culture, and acquiring new connections led me to search within myself to determine what kind of woman I would like to be and how I would like to devote my time and energy. In the future, I would like to work in international security or help develop anti-terrorism strategies in the Middle East.

**Leadership and Travel: A Lasting Impact**

**Ashley Davis**, International Business - Senior

During my four years at the University of South Carolina, I have had many opportunities to lead, mentor, volunteer, and travel. Individually, these experiences led me to grow as a stronger woman and gain professional skills and insights. Looking at all of my experiences as connected, though, I am more aware of the impact they’ve had on my way of living and how they have reshaped my thinking. One of the most impactful experiences during my years as a collegian was spending five months studying abroad in Copenhagen, Denmark at Copenhagen Business School. From the time I was accepted to USC and began my journey as a freshman in 2011, I knew I wanted to major in International Business and study abroad. What I didn’t know was where I would end up and how much of an impact it would have on my entire life. While in Copenhagen, I took three classes, travelled to six European countries, and met some of the most diverse and amazing friends I could ask for. Sure, there were some challenges while preparing to live in a foreign country, but the lessons I learned, people I met, and memories I made during my time abroad have given me a greater appreciation for other cultures, taught me invaluable lessons of independence and confidence, and has sparked an incredible passion for international business and travel. I would like to present my experiences at both Carolina and in Copenhagen, and share the importance of leadership, travel, and learning in the global world in which we live.

**Bedrock to Blooms**

**Charlotte Doka**, Environmental Studies - Senior

The Carolina Community Farm and Garden, located behind the Green Quad Residence Hall, is a service learning tool used by many students and faculty at the University of South Carolina. Basics of gardening, permaculture, and composting are taught by students, for students, through experiential learning. After working for two years in the Carolina Community Farm and Garden, I realized that there are few things as rewarding as growing and maintaining a garden. Through my internship with Sustainable Carolina, I became aware of organizations in the greater Columbia area that were interested in starting a garden like ours, but needed guidance in getting started. In an effort to meet the needs of these organizations, I wrote, “From Bedrock to Blooms: A Beginner’s Guide to Urban Community Gardening,” a how-to manual for starting a garden like ours. The knowledge for the book came from researching permaculture techniques, as well as going off my own gardening experiences. The handbook educates readers on budgeting, managing, garden designs, composting, and many other topics. Through my experience researching and writing the handbook, I learned that you don’t have to have a green thumb to be a successful gardener; given the right knowledge, everyone can be a successful gardener!

**The road less traveled: Soft skills and hard science**

**Ashley Garris**, Business Administration - Sophomore; USC Lancaster

During my undergraduate career at USC Lancaster, I have embarked on a journey of extensive self discovery. I have taken an unconventional approach to gaining entry to pharmacy school by blending my interests in chemistry and business. While at USC Lancaster, I have been involved in as many co-curricular opportunities as possible in an effort to diversify my experience. I will be showcasing how my blended interests have led me to value discovery, communication, determination, and servanthood as soft skills that will benefit me in a hard science.

**Learning through Leading and Helping Others in Greek Service Organizations**

**Christa Hall**, Management - Senior

The Greek service organization, Tau Beta Sigma (TBS), has helped me with the development of many life skills, and specifically has helped me improve my academic success, cultivate emotional poise in all situations, demonstrate leadership skills, grow personally, and build lasting connections with others. My presentation will discuss the insights that I gained from these experiences, and the positive impact that it has had on shaping my experience at the University of South Carolina. Through being involved with TBS on a District level, and currently as the Southeast District President, I have gained a deeper understanding of the organization and the University community, I have been able to mentor other sisters across the Southeast, and I have planned major events and workshop presentations. The Professional and Civic Engagement pathway of Graduation with Leadership Distinction has helped me learn more about myself and my work with this organization. Through my GLD process, I have come to learn that I find enjoyment in helping others better themselves and get the most out of
their experiences in Tau Beta Sigma because I care deeply about the organization and the core values that it represents. I have learned how to interact with and lead others, how to effectively train people and foster idea sharing, how to be tolerant of people who are different than me and learn differently than I do, and to communicate effectively with others. In the future I will be better prepared to work with others, be more able to train others on topics effectively, be more tolerant and accepting of others, and be able to work with and lead groups more effectively.

**Developing Profound Leadership and Communication Skills through an On-Campus Job**

**Taylor Marchman**, Public Health - Senior  
Mentor: Dr. Sara Corwin, Health Promotion Education and Behavior  
An education in the field of Public Health is significant to everyone around the world. As I transferred to University of South Carolina in August of 2013 I already had the opportunity to gain a wonderful experience working on campus at University of South Carolina Upstate which allowed me to explore leadership and communication skills at a higher level than just the experience from class. As we all know as a public health major you must be willing to work with others in multiple ways such as; workplace, social and community outreach, and much more. In the middle of August, once I got settled into Columbia from transferring I was given the opportunity to extend my experience working on campus at the university’s registrar office. With this job I am able to interact with co-workers, higher educated management staff, students, and parents to prove my leadership and communication skills through training, customer service, entering data, and so much more. This on-campus job that lasted my entire four years of college has made it much easier for me to get connected with everything on campus, but also given me confidence for my future in the public health field.

**How USC Changed my Life**

**Ashlyn Hill**, Biological Sciences - Senior  
**Mentor:** Ms. Lisa Camp, USC Connect  
Before coming to college, I knew that my life would change drastically beyond arrive, but I was unaware of exactly how much. Throughout my time at the University, I have been offered opportunity after opportunity to better myself and to expose myself to different career pathways. Each opportunity has helped me to develop valuable skills that I know will work to make me the best that I can be in my field. I was allowed to be a Resident Mentor and MAPP (Minority Assistance Peer Program) Coach where, during my time, I learned to be objective when handling situations. I was also allowed the opportunity to join Los Amigos del Buen Samaritano, an organization on campus that volunteers at La Clinica del Buen Samaritano, a free medical clinic for lower income Spanish-Speaking patients where I learned diplomacy, all the while practicing the Spanish language, which helped with my Spanish minor and connects with my Spanish classroom experiences. Because of my time here at USC and the activities I have been involved in, I feel better prepared to enter the professional world and I feel confident that I will succeed.

**Learning on a Global Level**

**Liz Hurley**, Psychology - Senior  
**Studying abroad is something I had always envisioned myself doing during my college experience.** However, declaring a psychology major and figuring out how my interests and requirements were going to coincide with an abroad program proved to be challenging. It was not until I was introduced to the exchange program at Universitat Wien in Vienna, Austria that I found something that fit my needs. Being a psychology major, I am intrigued by the immense diversity in our world. I have been afforded the opportunity to learn about brain functionality and psychological development in a classroom setting, but being able to see these things from an international perspective was truly eye-opening. Living in a foreign city for five months changed my perspective and allowed me to look at things in a different light. It is an experience that has greatly enhanced my time at USC and has served as a catalyst for my desire to graduate with leadership distinction in global learning. I have learned a great deal about myself, gained key insights, and discovered a pathway I am passionate about. My time in Vienna has transformed me from an insecure college student to a confident member of, not only of USC, but the global community.

**Professional and Civic Engagement: Finding My Future**

**Anthony Miles Scott**, Biological Sciences - Senior  
While attending the University of South Carolina, I have had the opportunity to grow and evolve through many experiences. Each opportunity that I have had while being a student at USC has been meaningful and has allowed me to thoroughly develop my leadership and interpersonal skills. As a candidate for Graduation with Leadership Distinction in the Professional and Civic Engagement pathway, I would like to share some “beyond the classroom” experiences that have contributed to my leadership development. I volunteer weekly at Palmetto Health Baptist Hospital; I served on a Medical Mission trip to Belize and participated in the Finding Your Future summer internship. I was provided these three opportunities through the Office of Pre-Professional Advising at USC. Through these opportunities, I learned to communicate effectively with others and to appreciate the differences among people. While fulfilling requirements for Graduation with Leadership Distinction and reflecting on my time at USC, it has become evident that each of these experiences contributed to my success as a student and will continue to serve me well in my future endeavors.
The Art of Leadership

**William Fowler**, Exercise Science - Senior

My time as an undergraduate at the University of South Carolina has largely been defined by one thing: leadership, and the relentless pursuit to become a better leader. While pursuing a degree in Exercise Science, I have been able to apply my academic studies to the various leadership evolutions I have had throughout my career, allowing me to hone my leadership skills, and develop my perspective on what it means to lead. As an Army ROTC cadet and officer candidate, I learned the importance of leading by example, and always striving for the highest level of mental and physical readiness. Courses in anatomy, physiology, nutrition, and many others have allowed me to apply knowledge from the classroom to my physical activity and dietary habits, helping me to achieve this physical and mental readiness, and increasing my overall fitness as a leader. My training in the Army developed critical thinking skills that allowed me to become a leader of integrity, empathy, and compassion while obstacles such as rebuilding a fraternity that challenged the Greek stereotype taught me how to lead despite going against the grain of modern Greek culture. In this presentation, I will detail and illustrate how my area of study, Army training, and experiences as a leader in student organizations collectively molded my leadership style, emphasizing physical and mental readiness through developing a sound mind within a sound body.

How Marketing Research Relates to Biology and the Medical Field

**Courtney Murray**, Biological Sciences - Senior

This May, I will be graduating from the University of South Carolina with leadership distinction in Professional and Civic Engagement. Over the past few years, I have had the opportunity to intern with a marketing research company, through which I have learned many valuable lessons. However, marketing research is not the career path I plan to follow; I will be pursuing a post-graduate career in the medical field, which is why I am graduating with a Bachelors of Science in Biology. Although these two areas of study seem like polar opposites, I found that they do in fact relate to one another. One of the main ideas behind marketing research is to test if your marketing efforts are successfully reaching your target audience, resulting in a positive reaction. My role in the company I work for involves compiling data into presentations for clients regarding the success of their brands, products, or advertisements. This involves identifying the target audience that the client is aiming to reach and testing their reactions. Throughout my time at USC, I have taken many biology and psychology courses that stress the importance of individualizing medicine and treatment to each particular patient – what works with one person, may not work with another. Although marketing research and medical treatment seem very different, I have found that they share certain basic principles and I believe my experience in marketing research will be helpful in a future career in the medical field.

How Community Service Helped Me Decide My Career Path

**Frannie Rogers**, Public Health - Senior

Throughout my time here at the University of South Carolina I have had the opportunity to gain educational experiences both inside and outside of the classroom. During my community service experiences at Girls on the Run and Eastminster Presbyterian Church nursery, I was not only able to help others, but I was also able to learn a great deal about myself and my leadership abilities. My community service experiences also helped me to decide on the career path that I want to pursue. From each service site, I was able to gain the experience that now has me wanting to pursue a career in Health Education. I know that I will be able to use what I learned from my volunteer service in this profession. During this presentation I will explain what I did at each service site and how it relates to a career as a Health Educator. I will also include key insights that I feel are important that are related to what I’ve learned inside the classroom.

My Beyond the Classroom Experience as a Changing Carolina Peer Leader

**Kimberlyn Roosa**, Mathematics - Senior

Changing Carolina is a group of students who represent Student Health Services and Campus Wellness and work to improve the health and wellness of the Carolina community. We host peer-led events and campaigns ranging over numerous aspects of overall health and wellness and facilitate interactive health presentations for new students. Changing Carolina initially interested me because I was looking for a way to get involved on campus while also being in a leadership position. Being a Changing Carolina Peer Leader has taught me about the different aspects that play a role in our holistic health and in what areas college students need help and resources. I also learned new ways of intervention and prevention that are successful on college campuses to help improve the students' overall health.
health and well-being. Working with Changing Carolina introduced me to the field of public health and inspired me to be a leader in my professional career. Before my experience, I was unsure of my future plans for employment or further education, but Changing Carolina helped me realize that I was interested in furthering my education and obtaining a career in the public health field. As well as impacting myself, I believe that my time as a peer leader has also impacted others. Through presentations and events, I hope that I have influenced my peers to make healthier decisions and to take care of themselves in all of the areas of their wellness as well as given them the knowledge and resources to do so.

Self Image: What my personal brand says about me
Ragen Steele, Marketing - Sophomore; USC Lancaster
In this project, I will share my growth as a student at USC Lancaster. From my first moments as a college student, I began developing a personal brand that I will share with future colleagues across my profession. Throughout my journey, I have learned how important vision, magnetism, motivation, and situation are developing my brand and improving my self-image as a professional in the field of marketing. I believe media pushes us to think about self image in terms of beauty and size. While I do believe self image is important, I have learned that developing my self image, as a professional, is rooted more in experience than outward appearance. I will share how concrete leadership and work experiences, coupled with academic courses, spurred me to reinvent what I believe a positive self image to be.

Leading Through Activism
Jonathan Valdez, International Studies - Senior
I am planning to graduate in May of 2015 with Leadership Distinction in Professional and Civic Engagement. During my four years at the University of South Carolina, I have been afforded the opportunity to experience a multitude of internships that have aided me immeasurably in my professional and personal development both inside and outside the classroom. Some of my most rewarding experiences have been interning with the immigration policy team of The Center for American Progress as a South Carolina Washington Semester Fellow and working at the South Carolina House Democratic Caucus as both an intern and later a campaign field director. These experiences helped me gain a deeper understanding of efficiency, cooperation, advocacy, and adaptability that further harnessed my abilities to work with others, communicate effectively, and advocate through activism. Throughout my four years at the University of South Carolina, I have been able to acquire the necessary language skills through my minor in Spanish and a gain an understanding of national and international politics through the various International Relations courses I have taken and the public policy conferences I have attended. I plan to use these skills as I continue my educational path towards receiving a law degree in order to practice immigration law, an issue I have always been passionate about.

An Ongoing Process
Katrine Victoria, Management Science - Senior
Mentor: Dr. Dottie Weigel, University 101
Trained to think about problems in action likened to a process, I've grown accustomed to seeing variables both in and out of scope that are affects. This inward and outward insight has expanded my perspective and has challenged my critical thinking skills. In pursuit of leadership excellence, I plan on utilizing my thought processes in order to make an impact and create a presence in the supply chain industry. I hope to one day be part of a global community, which, like myself, strives for change and improvement in all things that impact our society.

A Semester Abroad in the “Garden City” of Central Chile, South America
Gabrielle Wubbenhorst, Tourism Management - Senior
As a Tourism Management major, I have always had a passion and desire to travel. I knew back in high school that I wanted to take the opportunity in college to expand my knowledge in a global setting. I spent my spring semester enrolled as an international student through API at the Universidad Viña del Mar in Chile, South America. While in Chile, I spent four months immersed in the culture, living with a host family, which offered me the opportunity to experience life as a Chilean. I travelled domestically and internationally, and attended a variety of cultural events and excursions while enrolled in classes with other students from around the world. I learned the history of Chile and its people, and gained a better appreciation of how culture and traditions have developed. I came away from my experience with new knowledge and appreciation for differences in culture and tradition from what I had seen. I learned to be more flexible, independent, and spontaneous in my travel plans. I was also excited for the opportunity to practice and show off the Spanish I had studied since seventh grade in an immersive setting. I improved my confidence in speaking Spanish and learned vocabulary specific to the Chilean dialect, called chilenismos. Throughout my time in Chile, I gained language skills and a more global insight that I will forever carry with me in my future travels.
**Service Trips and Their Impact on the Community and Individual**  
*Bea Pullekines*, Public Health - Senior  
Service trips have been a major portion of my community service experience. Week long trips provide the most in-depth understanding of how service impacts the community as well as the volunteer. This poster presentation will look at in detail how community members and volunteers learned from each other. It will also address how participating in service influences the individual after he or she returns home. There will be an emphasis on Alternative Breaks trips sponsored by the University of South Carolina. These trips provided the most opportunities to learn everything previously mentioned as well as gain leadership and planning skills. The three trips also contributed to my overall college experience in the sense that it provided a “real life” experience to several concepts that I learned about in various classes.

**Our Time with the Tigers: Our Alternative Break at the Carolina Tiger Rescue**  
*Sofia Butt*, Pharmacy - Sophomore  
*Jaime Tyo*, Business Administration - Sophomore  
The Carolina Tiger Rescue is a non-profit facility in Pittsboro, NC where wildcats found in un-natural environments are brought to and cared for. In the winter of 2013, we signed up to volunteer at the rescue for a week. We decided to sign up because we enjoy participating in community service and wanted to give back to biology, but I feel that I learned more that semester than I have in most of my years of living. My time in London solidified my belief that I should be working with people and also opened my eyes to the fact that I want travel to be an integral part of my life. Studying abroad has lead me to pursue a career in sales and also better prepared me to interact with the diverse people I may encounter in this profession and life.

**FOCUS: Helping Wounded Warriors Rediscover Their Meaning and Purpose**  
*Ashly Bradley*, Social Work - Senior  
During my undergraduate career in social work, I spent a week interning for the FOCUS Marines Foundation. With the help of many leaders and volunteers from the community, the Foundation developed a 5-day workshop called FOCUS, which is held on a private farm in St. Louis, Missouri. The course provides essential resources and tools for easing the transition of wounded, ill and injured Marines and Corpsmen returning from the wars of Iraq and Afghanistan. Upon leaving the service, wounded veterans are faced with the realization that they are no longer able to pursue their dreams of becoming an honorable, courageous, and committed Marine or Corpsman they were trained to be. In addition, the scars of war that include TBI, PTSD and physical disabilities make their transition even more challenging, resulting to depression, lack of direction and hopelessness. However, FOCUS helps these veterans become active members of society and realize his or her dreams and goals. This experience was personally significant because as a daughter of a retired Marine and a future social worker, I am very passionate about working with this population. Throughout my week at FOCUS, I was able to gain invaluable knowledge and exposure to the barriers veterans face, hear testimonials of their personal struggles and learn about additional tools and resources to help them become more successful in their transition and recovery. The program was not only valuable for the participants, but it provided me an opportunity to apply what presented for my own personal self-growth.

**Graduating with a Distinction in Leadership in Professional and Civic Engagement pertaining to the Sexual Health of Students at the University of South Carolina**  
*Amanda Cowan*, Biological Sciences - Senior  
For Discovery Day, I will present on my interactions inside and outside of the classroom regarding sexual health on the campus of the University of South Carolina. I will demonstrate how the techniques and knowledge I learned within the classroom allowed me to reach out to my fellow peers and promote sexual health. I will also demonstrate the purposeful engagement beyond the classroom and how it has prepared me for my future endeavors. This project has made me reflect on the leadership roles I have held on campus, allowing myself to examine my effect on the students at the university. Being able to raise awareness of sexual...
health and promote different services held on campus, I have made my time here at USC worthwhile and have impacted students’ lives. Discovery Day has allowed me to summarize the impact I have made and how sexual health is an important topic to be talked about on college campuses. My presentation will take a look into what sexual health means and how this pertains to students at the University of South Carolina.

Learning about myself through the environment: From science to policy

James Crowder, Environmental Science - Senior
For the past 12 months, I have worked with a nonprofit, Conservation Voters of South Carolina (CVSC). Their main goal is to “protect the South Carolina you love,” through education, various programs, policy research and formulation, and government relations. Those last two parts are where I focus my energy: building the legislative relationships to present new environmental policy for South Carolina. As an environmental science student at the University of South Carolina, I have learned the importance of environmental protection and preservation. Through several different work experiences, I learned that I wanted to have a direct effect on policy to promote our natural resources. I had the opportunity to completely overhaul the scoring mechanism in the biennial Scorecard, where we give legislators a grade on their voting record on environmental legislation, as well as its online structure for a new website. I was also able to draft a “dream bill” to reform South Carolina’s surface water withdrawal laws, pieces of which were introduced in February 2015 to the South Carolina House of Representatives. Through this experience, I have learned that affecting policy is the best way to continue my intentions of conservation, and I hope to continue this far into the future.

A Time For Service

Jasmine Dunlap, Public Health - Senior
Throughout my years of being a student at the University of South Carolina, I learned what it truly means to be an Active Citizen.

And I Thought I Was Supposed to Teach Them: A lesson in learning from first-year students

Erin Ghant, Psychology - Senior
The University of South Carolina’s University 101 is one of the leading first-year programs in the country. First-year students learn about our university, resources that will enhance their college experience, and how to successfully navigate the transition from high school to college. It is with this program that I have contributed to both my university and myself. I became a peer leader to give back to a university that has given so much to me and to help other students flourish in the university setting. Becoming a University 101 Peer Leader and helping 19 first-year freshmen only enhanced my college experience. Through my peer leader experience I grew in my leadership abilities and fostered a passion for helping others. While working with first-year students in a service learning based course I learned how to think critically about problems and communicate solutions effectively. I also learned the importance of self-reflection, empathy, and active listening. With this presentation I will discuss the insights that I gained through this experience and how I can relate it to my future career in social work.

How my study abroad experience in Mulhouse, France affected my student and professional life

Olivia Haley, Biological Sciences - Senior
Mulhouse is a small tri-national city nestled in the rustic region of Alsace, France. For the academic year of 2012-2013, I studied as one of the only four American exchange students at the only university in town: L’Universite de Haute-Alsace. My goal was to study the French language and culture, but I found myself exploring the rich multi-cultural aspect of the town. An idea originally conceived from convenience as most stores were closed on Sundays, five international students and I were at the core of a group that went on regular excursions within the region. As our cohort grew, these trips to different museums, towns, festivals, and attractions strengthened our ties and gave us insight into the importance of engaging with different perspectives, values, and cultures. Like Aesop’s fables, each excursion provided me with a new lesson which I incorporated into my student and professional life; each lesson was like a piece of a mosaic that collectively represents the citizen that I am today. Therefore, I have created a physical mosaic with tiles detailing what I learned from each experience and how I applied each lesson to my life as a student and as a young professional.

Volunteer Ambassadorship at the Harriet Hancock LGBT Center

Kelley Kennedy, Business Economics - Sophomore
Through the University of South Carolina’s Community Service Ambassador program, I volunteered for over 100 hours at the Harriet Hancock LGBT Center during the past academic year. The Harriet Hancock Center is a nonprofit that hosts support groups and conducts political activism for the LGBT community. I assumed responsibility for maintaining the nonprofit’s website. I updated the content, correcting information about the Center’s leadership, programs, and events, and manipulated the website’s style. The project was intended to help the Center in its outreach efforts, because a strong online presence is vital to expanding the influence of a nonprofit. The revision of the website helped support the LGBT community in South Carolina, which is incredibly underserved by existing South Carolina institutions, by connecting people with resources. I improved the website by revising outdated content and manipulating WordPress templates and web design elements to improve the appearance and functionality of the website. I learned many technical skills related to Web Design, including new HTML and CSS skills. I also gained a great deal of insight into the nonprofit model and achieved a deeper understanding of how private organizations conduct social and political activism. Moreover, I learned about the issues that affect the LGBT community in South Carolina, including a lack of legal protections against housing discrimination and the open prejudice of state policymakers. Ultimately, the experience increased my commitment to being ally for LGBT rights and inclusion and equipped me to be more effective in that pursuit.
Fostering Independent Learning Through Peer Tutoring
Ashley Martin, Exercise Science - Senior
Mentor: Mrs. Elizabeth Belle, Thomas Cooper Library
The ability of numerous University of South Carolina students to learn independently has been cultivated and promoted through peer tutoring. During my junior and senior year, I have had the opportunity to work with my fellow students and further their understanding in challenging subjects such as Physics and Organic Chemistry. After completing physics and organic chemistry classes at USC, I had gained first-hand experience of how demanding these courses can be. I frequented peer tutoring to help me grasp a better understanding of perplexing physics and organic chemistry concepts. I was able to use my experience and growth in my classes and as a previous tutee to go on to help my peers conquer difficult material and acquire a better understanding through peer tutoring. I gained a great deal of awareness, empathy, and knowledge of the learning process by assisting my peers overcome hardships in the classroom.

Communication and Effective Collaborative Learning
Diva Moncada, Exercise Science - Senior
The Supplemental Instruction program was created to help students do well in historically difficult courses through peer led study sessions. As an SI Leader I helped to enhance students' understanding of chemistry by creating lesson plans, conducting sessions, and by serving as a resource for them to turn to outside of lecture. I became an SI Leader because I have excelled at chemistry and I wanted to share my study skills and knowledge with other students so they could succeed as well. I also wanted to improve my leadership skills and become a better public speaker. Being in this position has taught me a lot about communication and effective collaborative learning which will be the focus of my presentation as I pursue GLD in Professional and Civic Engagement. The largest impact on me has been the change I have seen from my first session to my last sessions in my ability to get students to interact with each other and the material. Through this experience I have learned that preparation, positive communication, and implementing collaborative learning techniques by understanding the different learning styles are the keys to getting through to all the students in a session. The skills I have learned, including the execution of a group learning session and the ability to get others involved, are invaluable in the workplace and will help me pursue a career in the health care field.

Learning Abroad
Emily Nelson, Finance - Senior
Mentor: Dr. Dottie Weigel, University 101
¡Vale! My love for the Spanish language started when I was in a language exploratory class in middle school. I continued taking it through high school and college and knew I wanted to study in Spain in order to reach my fluency and career goals. During the spring semester of my sophomore year, I studied abroad at the University of Granada at the Center for Modern Languages in Granada, Spain. As a Spanish minor, I took Spanish grammar and pronunciation classes in Granada as well as a variety of classes on Spanish history and culture. One of my career goals is to work internationally, specifically in a Spanish speaking country, and I knew by traveling and studying in Spain, I would have an advantage in the workforce. Living abroad and gaining the cultural insight and first-hand experiences has given me an even stronger desire to work internationally. The experience of living and learning abroad was one that will stay with me forever. I grew personally and professionally in my time abroad more than I ever would have expected. My Spanish has vastly improved and I can confidently say I am an advanced speaker. I am confident I will succeed in my career due to my time abroad. I learned where my weaknesses are, but I have also excelled in the areas I am strongest. My abroad experience drastically shaped the person I am today. This poster presentation will provide an opportunity to learn about my classroom and beyond-the-classroom experiences.

Community Service Within the Carolina Community & Abroad
Caroline Perdue, Exercise Science - Senior
This presentation will discuss how my college experiences, both within and beyond the classroom, have had a profound impact on one another to create my unique collegiate experience at Carolina. Many of these experiences have individually shaped me into who I am today, but together, have confirmed what I’ve always aspired to do with my future. Working with a local hospice organization, volunteering abroad, interning locally at a hospital, and so many other opportunities, have all contributed to this understanding. The presentation will showcase many different connections between these experiences; for example, how skills learned in my EMT course enabled me to better treat patients while interning in cardiac rehabilitation. Furthermore, my presentation will illustrate how my experience abroad has helped me gain a cultural understanding, which parallels to working in the free Spanish clinic. Finally, the independence I gained after completing an EMT course helped me gain a cultural understanding, which will be the focus of my presentation.

Understanding Diversity
Emily Rutledge, Psychology - Senior
Mentor: Ms. Kayla Lisenby, Student Life
The University of South Carolina has provided endless opportunities for students to thrive in their studies. Studying psychology I was able to get involved in multiple diverse leadership roles, which have helped me gain the skills necessary for advocating differences. I got involved with the LGBTQ Peer Advocate Program as an Ally through the Office of Multicultural Student Affairs. I was intrigued and driven by the passion and dedication of my surrounding peers. Given the opportunity to educate others about supporting an inclusive community, I was also providing outreach through our Safe Zone Ally training. Upon presenting to University 101 classes, I realized how beneficial it would be to a University 101 Peer Leader. Through co-instructing, I was able to use the knowledge ascertained through my psychology studies to relate with the first-year students. Using empathy and understanding, I was building deeper connections bound to last longer than a semester. I was able to effectively accomplish transferring these
skills of empathy, communication, organization and problem-solving to working with a middle school health psychology program, Project PLAY, in an independent study with, USC faculty, Dr. Zarrett. Working directly with those in the field helped solidify my passion for my studies and experiences at the University of South Carolina. Working with a range of diverse individuals, I’ve been able to amplify my respect and perspective of others. The skills and traits that my education and involvement have helped me develop will continue to flourish in my present and in the future.

**Professional and Civic Engagement: A Future Physician Explores the Medical World**

*Allison Smith*, Exercise Science - Senior  
*Mentors:* Dr. James Mullin, Lankenau Institute for Medical Research  
Dr. Reid Tribble, Carolina Cardiac Surgery Associates  
*During my four years here at Carolina, besides attaining my degree in Exercise Science, I have had the opportunity to expand my learning beyond the classroom and into the field of medicine. Through experiences such as shadowing a cardiothoracic surgeon and participating in medical based research I have gained invaluable information that will help me in my ultimate goal of becoming a caring, dedicated, and successful physician. As a shadowing student I have observed and participated in effective communication with patients, patient’s families, and other health care professionals. I was also able to observe the ethical practices of both physicians and researchers throughout both of my experiences. I was able to use information I had gathered throughout my four years of science courses by applying them on a day-to-day basis. I know the connections I have started to make during these four years will continue to grow as I move forward with my education in the field of medicine.*

**Healing a Better Future**  
*Jake Smith*, Exercise Science - Senior  
*From the rural hospitals in the jungles of Belize to the high-tech hospitals found throughout the United States, one thing that they all have in common are the people that fill the halls and rooms. The doctors, nurses, and healthcare physicians work tirelessly to provide the best possible medical care to their patients. No matter what setting a doctor may be practicing in, their job title requires them to be leaders and healers for whatever patient that walks through the door. In today’s healthcare system every doctor must be able to present themselves with poise, confidence, and purpose. This is because in any hospital the one person in the room that can be put on a pedestal and confided in for guidance is the doctor. Through my studies at the University of South Carolina I have had access to endless healthcare and leadership opportunities in which I have learned about the qualities that make a successful doctor. These experiences have shaped me into the future doctor of tomorrow that I aspire to become. The journey began with a hospital internship in Belize and from there grew into a vice presidential position with my honor society on campus. Through these experiences as well as many others I have seen a small glimpse into what my future looks like and discovered what it takes to be a doctor in today’s healthcare society.*

**Impression in Graduation with Leadership Distinction**  
*Margaret Smith*, Exercise Science - Senior  
*My future career goal is to become a physical therapist, and to make sure that was the field I truly wanted to end up in I job shadowed. Job shadowing in physical therapy is not so much hands on, but purely observation. I shadowed in all four of the physical therapy disciplines: Acute care, skilled nursing, outpatient, and pediatrics. I knew that I was interested in becoming a physical therapist, but I put in the hours of job shadowing to make sure that going through with physical therapy school was something I could see my putting my entire effort towards. I learned through my time shadowing that physical therapy is exactly what I want to have my life’s work be. It solidified my passion for helping people recover and it was worth every hour of observing to have the confirmation that I was going into the right field for me.*

**Megan Twomey & Continuous Growth**  
*Megan Twomey*, Management Science - Senior  
*My presentation will guide you through the experiences that led me to become the professional and leader I am today. I will highlight some key insights I uncovered while looking back at my education and what it really taught me. I also went through an in-depth analysis on what experiences have really worked together to steer my life choices and development over the past few years in college.*

**Professional and Civic Engagement**  
*Brandon Waltenbaugh*, Marketing - Senior  
**Internship:** This past summer, I worked with Endwell Greens Golf Course & Banquet Center as a marketing & promotions intern. This is a local golf course and banquet center that offers catering to a wide variety of events to the community including weddings, graduation, vacations, etc. As a marketing and management at the University of South Carolina, this internship provided me with hands-on experience in company promotions and advertising. I used social media and other means of advertising to promote the company. I had the opportunity to work with a designer in helping to do website design using WordPress. Working with the right people in this environment really helped me learn a lot about more about how marketing and advertising works in a company setting. I learned that building the right team, with various backgrounds and experiences is essential to ensure a company’s success. *Resident Mentor:* For the past two years, I have served as a Resident Mentor at USC. I’ve gained a great amount of leadership experience through this experience. I’ve learned many qualities including teamwork, time-management, perseverance and the ability to surround myself with the right people. I learned to be ready to deal with a variety of situations, involving many different types of people in many types of environments. I hope to be able to take this information into the workplace someday, knowing that I need to be able to work with many different types of people, in various environments to achieve certain tasks in an effective manner.*
Graduation with Leadership Distinction

Alexandria Abikhaled
Ahmed Abu-Selmia
Oyeyemi Adeniran
Lucy Aranda
Kelly Ballance
Taylor Barbalace
Lindsey Barbare
Marie Basil
Thomas Beatty
Vincent Belken
Magdelena Bellone
Daniel Binette
Heather Boatwright
Kristen Boissonneault
James Bonds
Rachel Booth
Sarah Borum
Ashlyn Bradley
Casey Brooks
Norvel Brown
Jamelle Brownlee
Connor Brunson
Deirdre Buchta
Janelle Buniel
Shannon Burke
Ashley Cady
Anna Catherine Caldwell
Chrysta Carricato
Chieh-Yu (Jessica) Chang
Jacqueline Chiarì
Alexis Coleman
Courtney Cooper-Lewter
Alec Courtright
Amanda Cowan
Elizabeth Crips
James Crowder
Matthew Csonka
Kaitlin Daley
Ashley Davis
Melissa Davis
Emma De Neef
Amber Lynn Dicker
Thu Dinh
Charlotte Doka
Alexander Drake
Mary Ellen Dudash
Morgan Edwards
Rachel Eklund
Kayla Engel
Morgan Esarey
Hunter Faile
Ryan Fleming
Brantly Fortenberry
Shandrea Foster
William Fowler
Jenn Frazee
Jalissa Fulton
Ashley Garris
Erin Ghant
Nicole Gilland
Jorge Guerrero
Olivia Haley
Alexandria Hall
Christa Hall
Michael Harman
Stephen Hartzog
Tiffany Haselden
Caroline Hayden
Kristin Hendricks
Marissa Hickman
Ashlyn Hill
Liz Hurley
Jessica Illenberger
Katie Jerald
Paige Jones
Ericka Jordan
Kirstin Jurgensen
Lilianne Kaminiski
Kimberly Kimbrell
Nicole King
Lauren Knapp
Leslie Knight
Haley Landreth
Lawrence Lucas
Colleen Maguffin
Kimberly Mancini
Ashleigh Mann
Taylor Marchman
Alex McGill
Alexi McHugh
Natalie Medler
Diva Moncada
Courtney Murray
Drew Myers
Niraali Naik
Emily Nelson
Claire Niehaus
Jacqueline Nolan
Erin Norell
Chelli Nottoli
Katherine Oldham
Emily Olyarchuk
Dylan Opalich
McKenzie Osborne
Anne Parham
Reena Patel
Benjamin Peachey
Sarah Pellegrini
Caroline Perdue
Makenzie Perdue
Patricia Perez
Ashlynn Polanco
Bea Pullekinis
Ashley Pullen
Priya Purohit
Kayleigh Quinn
Lindsay Richardson
Daniel Riggio
Krista Robbins
Grace Ann Roberts
Alma (Frannie) Rogers
Elizabeth Rogers
Shannon Rogers
Kimberlyn Roosa
Lindsey Rumfelt
Emily Rutledge
Christopher Sanders
Katherine Saunders
Stephanie Saunders
Kathleen Schaefer
Anthony Miles Scott
Jahmaun Sessions
Katie Sheligren
Alyssa Shillingford
Jordaan Simpson
Stephen Singleton
Shelby Sipperly
Nick Smillie
Allison Smith
Jake Smith
Margaret Smith
Rachel Smith
Whitney Smith
Olivia Spead
Troy Spires
Kevin Stam
Ragen Steele
Katherine Stewart
Jessie Suttle
Alison Swan
Audrey Talley
Paradise Taylor
Julie Thiesfeldt
Taylor Tuozzolo
Megan Twomey
Jonathan Valdez
Samantha Versace
Katrine Victoria
Brandon Waltenbaugh
Kaneisha Wheelock
Courtney Whitaker
Aaron Wright
Gabrielle Wubbenhorst
Victoria Young
Emily Zhao
Discovery Day 2015
Graduation with Leadership Distinction
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Graduation with Leadership Distinction
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