Undergraduate Research and Arts Colloquium

Wednesday, April 17, 2013
12:00 p.m. - 6:00 p.m.
Marshall Student Center
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Welcome

Welcome to the 2013 USF Undergraduate Research and Arts Colloquium. Today’s event is the largest undergraduate research event ever held at USF and provides a venue for over 290 undergraduate students to present their current research and receive feedback from research mentors, colloquium facilitators, faculty, peers, and the USF community. As one of the nation’s top public research universities, USF is the ideal environment to conduct research and the scope and rigor of the research activities continues to grow.

Today’s event highlights the breadth of transformational research being conducted at USF across all disciplines by extremely committed undergraduate students. Each project you see represents at least one full semester of effort and is the product of the undergraduate student and his or her highly supportive research mentor. As you move through the poster and arts displays, listen to the oral presentations and see the performances, please be sure to engage with the students to learn about the process they used to develop their projects and their projects’ impact not just to the discipline, but also to them. They are eager to share their results and receive feedback about their work.

This year you will note that 88 students are presenting CREATTE projects. CREATTE stands for Creating Research Experiences and Activities Through Teaching Enhancement. The CREATTE initiative was sponsored by the OUR to provide faculty with resources to offer undergraduates an authentic research opportunity as a component of an undergraduate course. This allowed many students to engage in research who otherwise would not have had the opportunity. You may also view posters on the design and implementation of the CREATTE courses that have been prepared by the CREATTE Faculty Scholars and their graduate student assistants.

The OUR would like to acknowledge the Office for Research and Innovation for sponsorship of this ResearchOne event. We also wish to express sincere gratitude to all of today’s facilitators who so enthusiastically volunteered to make this event a success. We thank the many staff members who worked tirelessly to make this event possible. Most importantly, thank you for joining us on this day of inquiry and discovery and for your continued support of undergraduate research at USF. Finally, congratulations to all the exceptional students and research mentors who are participating in the 2013 Undergraduate Research and Arts Colloquium!

Please take a few minutes to complete the event survey form so we can improve this event in the future.

Sincerely,
Office for Undergraduate Research Staff
April 17, 2013

Dear Participants:

Welcome to the University of South Florida’s annual Undergraduate Research and Arts Colloquium.

At USF, we take it as a point of pride that the research efforts and creative expressions of our undergraduates are encouraged and supported as high priorities — as evidenced by the prominence of today’s activities. Although you may not realize it, most universities fail to recognize significant research accomplishments by undergraduate students.

Fewer still understand and promote the important interdisciplinary relationship between the natural sciences and the arts that often adds to our appreciation of each. “Study the science of art and the art of science,” urged Leonardo da Vinci. They “are branches of the same tree,” said Albert Einstein.

As one of the nation’s best and fastest-growing research universities, USF values scientific and scholarly inquiry for their power to develop a fuller understanding of ideas, issues, trends, and technologies that transform processes and/or products that change the way we live, create substantial economic or social benefit, or provide organizations and individuals with a distinct competitive advantage.

At the same time, we remain conscious of studies showing that involvement in the arts is associated with gains in math, reading, cognitive ability, critical thinking, and verbal skill. Arts learning and practice also improve motivation, concentration, confidence, and teamwork. The intrinsic pleasures and stimulation of the art experience do more than sweeten an individual’s life; they can connect people more deeply to the world and open them to new ways of seeing, creating the foundation to forge social bonds and community cohesion.

It is the purpose of higher education not only to disseminate knowledge, but also to instill the creative problem solving, communication, collaboration, and global literacy skills so essential to our students, their future employers, and society in the 21st century. And because we can never be sure in advance which research, scholarly or artistic activity will contribute most to, or indeed be essential for, any one individual’s attainment of these skills, USF will continue make available an array of opportunities — such as the Undergraduate Research and Arts Colloquium — for students to find inspiration in many different fields.

I offer my thanks to the faculty mentors on campus who regularly spark our students’ passion for research and inquiry-based learning as well as stimulate them to imaginative works that dazzle our eyes and ears.

In addition, I extend my sincere appreciation to Dr. Robert Sullins, dean of undergraduate studies, and Dr. Richard Pollenz, associate dean for undergraduate studies and director of undergraduate research, for their continuing leadership and commitment to shaping this impressive celebration of undergraduate scholarship at USF.
Though it is, of course, our student researchers and artists who merit our greatest thanks and admiration. Your learning is measured by far more than the hours spent preparing your work for this colloquium. Committing to a path of scholarly inquiry demands both personal risk and sacrifice. By accepting these challenges, and with a new spirit of collaboration and innovation, you help to ensure the nation’s future success in the global marketplace of ideas.

May your endeavors enrich the world just as you have enriched the broader USF community today.

Sincerely,

Ralph C. Wilcox, Ph.D.
Provost and Executive Vice President
March 15, 2013

Dear Students:

I am delighted to offer my enthusiastic support for the Undergraduate Research Symposium. Every year more and more students are involved in presenting their projects. It is always a pleasure to see the quality and sophistication of the work, presentations and discussions led by the students. I like to say that there is no such thing as "undergraduate research"...there is research accomplished by undergraduate students. Research is research no matter who does it!

But let me offer some remarks in another direction based on my commitment to USF World and the globalization of USF. Research experiences often take students (and faculty) outside of the university and the urban environment into diverse communities where there is an opportunity to experience the culture, where students and community members alike become teachers and learners, enhancing the life changing potential of the international experience. In a recent article about study abroad, Williamson said: "We need to organize more encounters than activities" (emphasis added). These encounters are often through research.

It is also through our strengths and unique capabilities in research that we "sell" our university to partners abroad. We forge our strongest relationships with international colleagues through our faculty connections, and through our students we expand our breadth in the research enterprise and many of the long lasting linkages abroad.

Research credibility and output attract international graduate students. Research is key to successful relationships among universities and advancement of their international recognition and status. Research activities not only focus on the topic under investigation but also deepen learning, reinforce values and create an awareness of intercultural differences.

Congratulations to all of the students who participate in this extraordinary event. I am certain you will find the value of this experience as you go forward in your education and careers.

Sincerely yours,

Karen A. Holbrook, Ph.D.
USF System Senior Vice President for Global Affairs & International Research
Professor of Molecular Medicine

1 Williamson W: In study abroad, simple is sophisticated. CHE, Dec. 9, 2010.
April 17, 2013

Dear Participants:

Congratulations on being a part of this year’s Undergraduate Research and Arts Colloquium. USF Research & Innovation and ResearchOne are proud to sponsor this event, and we thank Dr. Robert Sullins, Dr. Richard Pollenz, and the many faculty mentors who have guided you on your journey.

The University of South Florida has grown into a research powerhouse throughout the nation and internationally. The success of our researchers and artists testifies to the value and power of multidisciplinary research and collaboration. Creativity from USF laboratories, studios, and stages continues to generate new knowledge, art, and solutions to the challenges and opportunities in our world. Our strong focus on innovation and the translation of research from the lab to the market is evident in the record breaking 98 patents granted to USF last year, 52 license/commercialization agreements and 10 new startup companies. USF is ranked 10th in the world among all universities for U.S. patents (IPO).

Our students are a critical part of our success in the patenting and commercialization of USF research. USF graduate Kerriann Greenhalgh transformed a drug delivery technology into a unique product for the skin while at USF and launched her company KeriCure with the help of the USF Technology Transfer Office (TTO). USF students Sean Verdecia and Jason Ross designed the AbleNook, a unique prefab living structure for use in disaster zones, while at USF and launched their company in 2011. USF students Marlyn Colon and Matthias Elliot created Mud Power, Inc., which is developing Microbial fuel cells, and won $100,000 in the first annual Mega-Watt Ventures Clean Energy Business Plan Competition for their strong business plan and clean energy technology.

Alexei Novitzky created the SkateCase, a skateboard that acts like a briefcase, while he was a USF student. With the help of the TTO, he has been issued a patent, launched his own company, Looshes Labs, and was recently selected for the national 2013 Innovation Expo, sponsored by the U.S. Patent and Trademark Office and the Smithsonian Institution. Also selected was the Rolling Dance Chair, conceived by USF dance instructor Merry Lynn Morris and developed and patented as the result of collaboration between USF’s College of Engineering and College of The Arts with a team that included USF students. It was recently licensed to Vertec, Inc.

We continually seek opportunities for our students to gain valuable job experience. For example, one program with the Florida High Tech Corridor Council has led to agreements with 43 companies participating in 74 projects resulting in 170 internships over the last three years. Another program with Modelithics, Inc., one of our Accelerated Businesses in Residence at the USF Research Park, has had a positive impact on over 60 USF business and engineering students, providing grants and internships.

Our university’s success is the direct result of the commitment of our faculty, students, colleges, departments, institutes, centers, and community and business partners. Together, we are finding real world solutions to real world problems. Your dedication to research, scholarship and creative endeavors makes you a critical part of this success. Thank you, and again, congratulations.

Sincerely,

[Signature]

Paul R. Sanberg, Ph.D., D.Sc.
Senior Vice President for Research & Innovation

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About the Office for Undergraduate Research

The Office for Undergraduate Research (OUR) partners with the USF community to provide every undergraduate student the opportunity to engage in a meaningful research experience. One of the primary aims of the OUR is to provide support to undergraduate researchers, mentors, and staff through a variety of services and instruction.

**Student Services:**
Professional Development Workshops, Interdisciplinary Research Scholarships, Research Travel Funding, OUR Sponsored Research Projects, UR Consultation Services and Faculty Networking, UR Course Credit Consulting

**Program and Mentor Services:**
UR Position Announcements and Applicant Screening, Mentor Training Workshops, Customized OUR Class Presentations, Mentor Guidebook, UR Student Data and Course Consulting, OUR Recruitment Support

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What Students are Saying About the OUR

“USF’s OUR is a great way for students to learn about how to get started with research and the many research opportunities USF has to offer.” Psychology major

“After attending the Getting Started in Undergraduate Research Workshop I felt encouraged enough to apply for research positions. Knowing that the OUR is available to help me through the process gives me the confidence I need to begin networking.” Microbiology Major

“The OUR provided excellent advice about the undergraduate research process. I recently obtained a research position and I am excited to get started. Thanks OUR!” Biology Major

“Before speaking with OUR staff, I did not even know that undergraduate research was expected of me, or how beneficial it would be for my career.” Humanities major
Abstracts

Behavioral Sciences

*Patterns of Abuse in Nursing Home Residents with Dementia: An Examination of the Literature*
Danielle Barcy  
Mentor(s): Amanda Holup  
Program: Gerontology

Considering the increasing need for long-term care services and support among individuals who have dementia, understanding abuse in nursing homes is an important issue for researchers. The purpose of this study was to examine the patterns and characteristics of abuse in nursing home residents with dementia. In this study, we examined existing literature from 1998 to present day focusing on abuse and neglect in nursing home residents with dementia. Results indicated that nursing home residents were aware of abusive situations but were unfamiliar with protective services and strategies for handling abusive situations. Results also indicated that abusers were most likely stressed formal (e.g., nurse staff) and informal (e.g., family) caregivers. These findings suggest that abuse could be avoided through adequate staff training and by creating an enjoyable, less-stressed environment for the staff. Training should focus on providing staff and residents with information about services and supports to prevent abuse such as the ombudsman program. Future research should develop interventions to help prevent abuse in this vulnerable nursing home population.

*Paralleling Effects of Aging in Individuals with Downs Syndrome and their Caregivers: An Examination of the Literature*
Stephanie Bedoya  
Mentor(s): Amanda Holup  
Program: Gerontology

Few researchers have examined the quality of care and quality of life of aging individuals with Down syndrome and their caregivers. Since both the care recipient and the caregiver are aging, there is an increasing demand for assistance which may affect their quality of life. In this study, we examined existing literature from 1991 to 2007, focusing on the quality of care and quality of life for aging individuals with Down syndrome. Study characteristics including the age of the caregivers and care recipients, gender of the caregivers and care recipients, caregiver stress, and the use of formal assistance were examined. Results indicated that caregivers were often females and approximately 63 years of age. On average, care recipients were approximately 30 years of age. Results also indicated that mothers who had prearranged replacement caregiver were less stressed and had a greater outlook on life. On the contrary, mothers who did not have a concrete plan or had to put their adult child on a waiting list for formal assistance, showed more signs of distress and less satisfaction with life. These findings suggest that families often provide informal support for aging individuals with Down syndrome but formal assistance is the preferred option when caregiving becomes burdensome. Additionally since most of the research examined individuals...
who live in institutionalized settings, future research should examine how aging in a home-like environment affects the quality of care and quality of individuals with Down syndrome.

All Older Adults are Not Alike: Understanding Factors Influencing Intra-age Group Differences in Pain Severity and Experience with Pain in Black and White Cancer Patients

Kiaraliz Castro
Mentor(s): Tamara Baker
Program: Gerontology

Pain in the elderly is often undertreated and not considered a significant health issue. Factors influencing pain severity among this cohort often result from concurrent problems and comorbidities to higher rates of medication side effects and treatment complications. This study aimed to determine intra-age group differences in the experience of cancer-related pain and pain severity in young-old (55 to 64 years) and old-old (65+ years) patients receiving outpatient treatment at a comprehensive cancer center. The sample included White and Black cancer patients (N=151) 55+ years of age (65.4±7.75). Participants completed a series of questions assessing demographic, health (comorbidities), and behavioral characteristics (distress, self-efficacy, experience with pain), and pain severity. Preliminary analyses showed no significant differences in total pain severity between the groups. However, a significant effect was found for distress from pain, t(141) = 2.61, p<.05, with the old-old reporting less distress. Separate models were calculated for the young-old and old-old, with results showing a significant model for the young-old, with pain severity (β=.37, p<.05) and chronic pain self-efficacy (β=.38, p<.05) as significant indicators of experience with pain. Similar model results were found for the old-old group. Our results indicate significant differences with distress from pain by age, suggesting that older adults may have developed more effective coping mechanisms to deal with their pain, compared to the young-old adults. Moreover, the younger cohort may still have familial and occupational obligations, which may add to their levels of distress and reported physical symptomatic experiences.

Speech Production Skills in Conversational Speech: Errors Related to Overlapping Speech Sounds

Morgan Donovan
Mentor(s): Ruth Bahr
Program: Communication Sciences and Disorders

Klein and Liu Shea (2009) have demonstrated that children with speech sound disorders (SSD) can often produce a sound correctly in single words, but misarticulate that same sound/word in running speech. They related this phenomenon to the overlapping of sounds (or coarticulation) that occurs during speech production. These researchers have provided data on how often this happens in children with SSD; however, little is known about the frequency of this phenomenon in typically developing (TD) children. This project was designed to analyze how often between-word simplification patterns occur in the conversational speech of TD children. We hypothesize that TD children will use fewer between-word simplification patterns when compared to similar data obtained on children with speech sound disorders. Method: Ten children (two with SSD) with normal language skills, ages 3-6 years, participated in this project. They completed a language screening test, an articulation test, produced a conversational speech sample, and repeated 20 phrases targeting between word simplification patterns. Percentage of consonants correct (PCC;
Shriberg & Kwiatkowski, 1982) was determined for the articulation test and conversational samples, as an intelligibility measure. Four between-word error types were identified in the conversational samples and phrases. These data were compared to Klein and Liu Shea (2009) and the two participants with SSD. Results and Discussion: TD children made fewer between word simplifications than noted in the SSD group in both conversation and test phrases. These findings suggest that the test phrases may be a useful diagnostic tool for identifying the root of unintelligibility in conversation.

**Survival Language: An Analysis of the Semantic Network Characteristics of Words Associated with Survival**

David Dzien, Jr.

Mentor(s): Douglas Nelson

Program: Psychology/Criminology

This research discusses the subjects of word association and semantic network connectivity. In particular, it focuses on whether words pertaining to survival themes in the English language have greater associate connectivity within their semantic networks, and would therefore be more easily-recalled, than words unrelated to these concepts. This idea stems from the findings of an earlier piece of research which indicated that the semantic networks of target words with smaller sets of associates were more likely to be recalled than those with larger sets of associates. Perhaps for the function of easier comprehension or communication, words related to concepts such as survival possess a more densely-packed associate set and thus, form semantic networks with more resonant connections than words related to more mundane concepts or themes. An archival data analysis of the USF Word Association Norms, shows that data across word groups appear to be consistent with this hypothesis, perhaps indicating that our minds tend to prefer the quality of associate interconnectivity over the quantity of associates within the semantic network when dealing with more critical or significant themes, in particular those closely related to life, danger, or survival. If additional research on this subject, ideally using a larger set of word association norms, is able find the same trends in the data, it could have a profound impact on argument for the evolutionary theory of language.

**CREATTE Project**

**Exploring Explicit and Implicit Self-Esteem as a Predictor of Adult Aggression in Victims of Childhood Physical Abuse**

Maria Estevez

Mentor(s): James Epps, Tiina Ojanen

Program: Psychology

Approximately 30% of all abused children will go on to abuse their own children continuing a vicious cycle (U.S. Department of Health and Human Services, 2006). Abused children differ from non-abused children in their self-esteem, and later in life in the severity of adult aggression. The long-term consequences of maltreatment in children on adult aggression have been widely documented, suggesting that aggression-related cognitive distortion in aggressive children is also maintained into adulthood (Epps et al., 99). Thus, it is important to take a closer look and identify whether Implicit self-esteem (I/SE), and Explicit self-esteem (E/SE) will predict the association between childhood physical abuse (CPA), and adult aggression (A/A). Investigators hypothesize
that Explicit and Implicit SE serve as a predictor (and possible mediator) between CPA and A/A. Specifically, we expect that adults with a history of CPA, and a combination of High E/SE, and Low I/SE will show higher levels of aggression than adults with this same combination and no prior history of CPA. Participants will be asked to complete a series of five questionnaires that will measure the following: Explicit SE, Implicit SE, Anger & Aggression, Childhood Physical Abuse history, and Narcissism. Multivariate Analysis of Covariance will be used to analyze the effects of abused vs. non-abused, and High vs. Low Implicit and Explicit SE on adult anger measures. Findings from this research should add to the body of knowledge which could assist psychologists in the treatment of aggressive adults with a history of CPA.

**Music Listening Enhances Spatial Task Performance in Preschool Children**

Laura Faluade  
**Mentor(s):** Jennifer Bugos  
**Program:** Biomedical Sciences  
Research suggests that musical training may transfer to high-level cognitive skills in early childhood. (Moreno et al., 2011) Musical training is known to benefit executive, spatial, temporal, and verbal functions in various populations suggesting transfer capabilities (Chan, Ho, & Cheung, 1998; Ho, Cheung, & Chan, 2003). The purpose of this research is to examine the effects of a novel six-week preschool music program on processing speed and temporal spatial task performance. It was hypothesized that children enrolled in music instruction would demonstrate knowledge and application of musical skills as well as enhanced cognitive performance on measures of processing speed and temporal spatial tasks. This weekly intergenerational summer music program spanned for six weeks and consisted of a preschool repertoire, standard classical repertoire, structured musical activities, and homework requirements for parents and young children. Pilot data were collected in eight students and parents enrolled in the program. Results of paired samples t-test showed significantly enhanced performance on a spatial temporal task, \( t(7) = -3.0, p = .02 \). Results of a paired samples t-test on processing speed scores showed no significant differences post-training, \( t(7) = -1.6, p = .16 \). Data from this pilot study suggest that music listening may increase performance on spatial temporal tasks in young children. Future research is necessary to demonstrate more generalizable results.

**Are You ‘Fan’ Enough? The Role of Identity in Media Fandoms**

Samantha Groene  
**Mentor(s):** Vanessa Hettinger  
**Program:** Psychology  
The purpose of the present study was to determine whether participating in a media fandom is part of an individual’s identity conceptualization and if self-relevant constructs (i.e., affect, belongingness, self-esteem, and anxiety) mediate this phenomenon. In addition, the project sought to determine whether media fandoms (despite not typically incorporating the face-to-face contact of sports fandoms and other classes of group identity) operate according to the basic principles of social identity theory, which states that individuals derive their self-concept from their group memberships. Prior to the main study, a new unifying measure of media fan identification was created and its internal reliability was established. Further establishment of reliability, as well as criterion validity for this measure, were established in the main laboratory study. In the main
study, self-proclaimed Harry Potter fans and self-proclaimed Twilight fans were assigned to an affirming or threatening false feedback condition on a test of Harry Potter and Twilight fandom knowledge and personality. Results indicate that both Harry Potter and Twilight fans were sensitive to the false feedback manipulation, such that participants in the affirming condition exerted significantly more effort on a subsequent domain-related essay task and felt significantly more positive than participants in the threatening feedback condition. These results demonstrate that media fandoms operate similar to other social groups (despite a lack of emphasis on face-to-face contact), with fans being sensitive to group categorization and the benefits and costs of participation in a media fandom.

**The Effects of Mindfulness on Rumination**
Megan Howard
**Mentor(s):** Jonathan Rottenberg
**Program:** Psychology
Rumination is a type of maladaptive emotion regulation strategy that is a risk factor for psychological problems. Mindfulness practices may be effective in altering ruminative tendencies because they teach a nonjudgmental, accepting, and present-centered awareness. Although rumination has typically been found to be harmful, recent studies have shown evidence for two components: brooding and pondering. The latter component of rumination may actually contain the qualities of mindfulness that serve to modify the cognitive deficits related to problems in emotion. This longitudinal study examined the effects of mindfulness meditation (MM) techniques on females who reported currently engaging in rumination and whether these techniques will lead to increased reports of adaptive emotion regulation and well-being. The recorded MM practices were designed to teach mindfulness-based strategies for emotion regulation that eliminate the need for rumination and self-blame and improve acceptance and resilience when negative feelings arise. High ruminators (n = 30) and low ruminators (n = 30) were randomly assigned to learn the MM or finance-related techniques and then instructed to practice the techniques daily for two weeks. Simultaneous multiple regression analyses will be conducted to determine whether females who practiced the MM techniques spent less time negatively ruminating (brooding), more time positively ruminating (pondering), and an increase in affect of well-being compared to those who practiced the finance-related techniques. Individuals who learn to modify the way in which they ruminate through mindfulness may be able to alleviate many of the negative thoughts and feelings associated with mood disorders like depression.

**Strategies for Encouraging Successful Adoptions**
Alyssa Hughley
**Mentor(s):** Christine Rinck
**Program:** Women’s Studies
The dissolution of an adoption is traumatic for all parties involved, the child, the new parents, and the agencies assisting in the adoption. Because of this trauma, few adoptive parents are willing or even available to discuss the reasons associated with the dissolution. This means that agencies, such as the Sylvia Thomas Center for Adoptive and Foster Families, are left with no feedback to possibly implement strategies to limit future dissolutions. A survey instrument will be designed and administered to individuals who dissolved an adoption and to adoption agency professional
inquiring as to reasons why the adoption dissolved. This survey will be administered electronically with invitations being sent via email. Sylvia Thomas Center will send the survey will be sent out to the appropriate audience. Once the survey results have been collected, they will be assessed to determine if specific workshops or other strategies could be created that would help to decrease the likelihood of a dissolution. A second survey with a list and description of these workshops will then be sent to the same population as the first survey for feedback as to whether these workshops would have hypothetically affected the outcome. The results of the second survey will then be used to design workshops that will be used with adults who are considering adoption. If the survey fails to generate any usable information, the project will then shift to creating an evaluation document to be used with the current workshops and class for adults who are considering adoption.

Usability of Electronic Reading Devices
Mary Jamieson
Mentor(s): Lisa Elliott
Program: Psychology

The shift from printed, written works to electronic reading devices is quickly gathering speed. Such a shift raises questions regarding the effects from and practicality of electronic reading devices: when reading, what factors contribute to being able to read on different devices? Do items like screen size, keyboard controls, features of the reading program, or color of the text affect a person’s ability to understand a written passage quickly and accurately? This study has been developed to compare reading devices (i.e. Kindle, iPad). By comparing the devices for reading performance, comprehension and satisfaction, we will be able to suggest attributes that contribute both positively and negatively to usability and to reading comprehension. We know from previous studies that some of these devices will enhance the perception of letterforms and reading by supporting various design factors (Sanocki and Dyson, 2012) but we suspect that attributes of the devices will not help because of their design. The goal of the study is to create guidelines which will enhance usability and discover properties of the devices that effect perception of letter forms/reading and understand how the type of reading material may interact with different devices. This study is being conducted from a sample size of 100 undergraduate students. The study is a single factor within design with participants reading a portion of a popular non-fiction book about travel or science on four different devices (i.e. laptop, kindle, smartphone, and book). Efficiency, effectiveness, satisfaction, and reading comprehension will be measured.

**CREATTE Project**
“Wha Gwan?” A Cross-Cultural Perspective from Jamaica in America
Alison Koskos
Mentor(s): Karla Davis-Salazar
Program: Biomedical Sciences

A cross-cultural study is an aspect of anthropology that uses field data from numerous and diverse societies to examine and test hypotheses about human behavior in relation to the culture within a specific region. This study investigates and analyzes the differences between dating, wedding and Christmas customs, rituals and traditions between Jamaican and American cultures in order to explore underlying beliefs and values about gender roles and relations in kinship. The study was
conducted through a series of interviews directed toward an international student currently attending the University of South Florida. The information was then analyzed in a cross cultural context and directly related to the differences between Jamaican and American traditions. Dating, weddings and the celebration of Christmas all involve social and intimate activities involving either two people or a family unit that include a wide variety of behavioral patterns, expectations, and evaluations that vary considerably between Jamaica and America. The comparisons between the two cultures ultimately lead to what expectations were behind gender roles and what influences defined kinship within each of the cultures. By understanding the differences of traditions and values in a cross cultural perspective, individuals may be able to further explore the ingredients of what defines culture.

**Student Perspectives on Choosing and Changing Majors at USF**

Humberto Linero  
**Mentor(s):** Karla Davis-Salazar  
**Program:** Anthropology

Based on a report by Complete College America, USF’s six-year graduation rate for first-time, full-time students was 48% in 2010. One of the factors impacting USF’s graduation rate is students changing majors. In many cases, a change in major represents a delay in graduation, which means spending more time and money. The purpose of this research is to determine the reasons why USF students change major, factors that students take into consideration when choosing a major, students’ opinions about USF’s advising methodology, and more. Using qualitative and quantitative data gathered through interviews conducted with USF students and advisors during spring 2013, this study suggests that students change major at least one or two times between their sophomore and junior years. Seventy-five percent of students interviewed indicated that their advisors did not help them choose their major. Importantly, students who had some experience in their majors, before entering university or during their freshman year, were more likely not to change major. The results of this research will contribute to the development of a method to help students choose their major more effectively.

**The Parietal Old/New Effect Shows Indication of a P300 Process**

Jomar Lopez, Wendy Olsen  
**Mentor(s):** Siri-Maria Kamp  
**Program:** Psychology/Biochemistry; Psychology/Communication Sciences and Disorders

In this study, we compared two brain processes that display similar properties, such as amplitude, timing, and their origin within the parietal lobe: the P300 and the parietal old/new effect. Both of these processes are found within the human event-related potential (ERP), which represents the averaged electrophysiological activity that occurs in response to a stimulus presented, for example, visually or auditorily. The P300 is typically elicited by unexpected stimuli that are presented among a sequence of expected stimuli. The parietal old/new effect displays similar physical properties to the P300, however, it is elicited when during a recognition test, the participant judges a stimulus as “remembered” (or “old”), compared to “new”. We hypothesized that the parietal old/new effect is driven by a P300 process elicited during recognition memory. Participants studied categorized word lists in which one category occurred infrequently (and was therefore unexpected). Subsequently, they were presented with another sequence of words, which they had to judge as
previously studied (“old”) or new. The properties of the P300 elicited in the study phase were compared to the parietal old/new effect in the recognition phase. We found some evidence that the parietal old/new effect is a P300 process. Therefore, the two literatures could be combined and research on the P300 can provide information on the parietal old/new effect, and vice versa.

The Florida Mental Health Institute’s Role in Statewide Children’s Mental Health Advocacy
Olivia Means
Mentor(s): Tomaro Taylor
Program: Biology
There are many challenges associated with caring for children with mental health needs, including implementation of state policy changes and continuation of appropriate funding. Through archival research, legislative review and information gathered from past and present Florida Mental Health Institute (FMHI) faculty, this research investigates how FMHI has contributed to advocacy for children with mental health issues and guided such dealings in a positive direction within the state of Florida. In 1967 Florida legislature provided funding to create a mental health facility to serve as a statewide resource. Initially, FMHI provided inpatient and outpatient services, but a series of reorganizations redefined FMHI’s purpose to providing training programs, conducting applied research in mental health prevention and intervention, and evaluating existing mental health services. FMHI’s successes within children’s mental health include: workshops incorporating family involvement in the treatment of these children; evidence-based research showing that extensive residential treatment may not provide the best environment for building positive behavior skills and coping mechanisms; and conducting a preliminary study uncovering the need to address mental health issues in programs serving children (e.g., Florida Departments of Juvenile Justice and Education). Understanding the trajectory of children’s mental health services demonstrates the impact large institutions like FMHI have on ensuring that progress meets the changing needs of these children. This presentation highlights FMHI’s history and role in the evolution of services in Florida for children with mental health issues, while encouraging a discussion about where more development is needed for better detection, prevention, and intervention practices.

The Relationship of Self-Efficacy in Symptom Reporting in a Mild Traumatic Brain Injury Population
Melanie Midkiff
Mentor(s): Tracy Kretzmer
Program: Psychology
INTRODUCTION: Self-efficacy is the belief that one is capable of carrying out a behavior necessary to reach a specific goal. Research has consistently demonstrated that an individual’s perceived self-efficacy can impact a person’s motivation, quality of life, and overall health. Those with poor self-efficacy tend to experience poorer outcomes and are often at increased risk for developing depression and anxiety. For individuals with chronic medical conditions, self-efficacy can be central to symptom management. As a result, self-efficacy has become a targeted area of intervention for many medical populations. However, research on self-efficacy within a mild traumatic brain injury (mTBI) population has not been well explored. OBJECTIVE: This study examines the possible relationships between perceived self-efficacy and post-concussive and
psychological symptom severity in a mTBI population. METHODS: Retrospective chart review of consecutive patients admitted to a VA rehabilitation unit. Inclusion criteria included a history of concussion and continued post-concussive symptom complaints. Those not meeting DoD/DVA consensus criteria for mTBI/concussion or those with a history of severe psychiatric illness were excluded. 159 participants completed multiple self-report measures of self-efficacy, depression (BDI-II), PTSD (PCL-C) and post-concussive symptomology (NSI). RESULTS: Self-efficacy was found to be significantly correlated with each of the measures administered. Lower self-efficacy was related to higher ratings of symptoms (i.e. more severe symptom reporting) across all measures: BDI-II ($r = -0.63$, $p < .01$), PCL-C ($r = -0.56$, $p < .01$) and NSI ($r = -0.53$, $p < .01$). CONCLUSIONS: Although this preliminary examination is limited, results provide additional insights into factors that may be contributing to persistent post-concussive symptom complaints and offers a potential area of intervention. Given that self-efficacy is potentially a modifiable factor, future studies examining the additional impact of self-efficacy in post-concussive symptom management are warranted.

**Slow Brain Waves in Working Memory Processes**
Sara Milligan, Nicole Eckert
Mentor(s): Siri-Maria Kamp
Program: Psychology
In this study we are analyzing the relationship between slow brain waves and recall performance by examining the scalp-recorded electrical activity (EEG) of a subject’s brain during memory encoding. Specifically, we are investigating how the magnitude of slow brain waves recorded at the time of study relates to the number of words the participant is able to recall from the study list. The participants’ EEG was recorded while they were being presented with a series of words on a screen, which they were expected to recall (that is, write down on a piece of paper) immediately after the end of the series. Each participant studied 20 word lists containing 15 words, and we divided these lists into categories of high and low recall performance, according to whether the number of words recalled was above or below the median for that participant. Our results suggest that the lists that are associated with a larger number of recalled words also tend to show slow wave activity of higher amplitude during stimulus presentation. While there have been some prior studies associating slow waves with episodic memory, our study is the first to record the slow waves over the course of the entire lists. Previous research has also indicated that slow brain waves are associated with working memory processes. Taking our results together with prior research, we conclude that higher slow wave activity in the brain is related to working memory processes that enhance subsequent recall performance.

**Reducing Runaway Behavior through an Interview and Intervention Process: Comparison of Interview Results from Behavior Analysts and Child Welfare Personnel**
Jessica Moore
Mentor(s): Kimberly Crosland
Program: Psychology
In the United States, children in the foster care system are more than twice as likely to run from their homes than children in the general population. Children who do run away become susceptible to a wide range of problems – from substance abuse to poor school performance. The purpose of this study is to compare interview results based on the Functional Assessment Interview
for Runaways (FAIR) tool. This tool is an interview-based assessment that helps determine the reasons why youth run away so that intervention strategies specific to function can be developed to decrease the future likelihood of runaway behaviors. Six behavior analysts and six child welfare personnel will view three videos each in which a youth and an interviewer role-play using a scripted scenario that includes details as to why the youth ran away. The interviewer asks the youth questions from the FAIR tool. The participants will fill out the entire interview tool, although only the functions and interventions they write down will be analyzed to determine the effectiveness of the tool in developing function-based interventions. The participants will also complete a social validity questionnaire including three Likert-scale items and two open-ended questions regarding the ease of use of the tool. It is of upmost importance to develop a feasible tool that reduces youth runaway behaviors in the foster care system. If this tool helps to determine interventions that stabilize youth in the foster care system, it could result in increases in safety, well being, school attendance and performance.

**CREATTE Project**

*Social Exclusion and Adolescent Self-esteem: Does Perceived Popularity Matter?*

Sergio Perez  
**Mentor(s):** Tiina Ojanen  
**Program:** Psychology

The project described in this presentation was researched and developed during the Child and Adolescent Social Development CREATTE course and takes the form of a rigorous research proposal. This presentation will highlight the research that was required to develop the proposal and the components of the planned research project and its impact. Connection to others and popularity among peers critically impact adjustment during adolescence (Cillessen, 2012). Social rejection has been extensively studied and is found to be related to peer victimization, aggression, inattention, immature behavior, anxiousness, and social avoidance (Bierman, 2004). However, does rejection/exclusion hurt even more when it is done by a popular (influential, powerful) peer? While youth may regard popular peers differentially, popularity has not been examined in the context of social exclusion. In this study, I propose to examine the effect of exclusion on adolescent self-esteem by manipulating the perceived popularity of the excluder. A controlled experimental study will be conducted where the participant will be excluded by a perceived popular peer (experimental group), or a neutral peer (control group). Exclusion will be assessed using a computer game Cyberball (Williams, et al., 2000) and will constitute the independent variable; self-esteem will be the dependent variable. Participants will be recruited from local middle schools (target N = 200). Based on existing literature on popularity during adolescence, I expect that the experimental group will report lower self-esteem following exclusion than the control group. Through developing this proposal I have gained a greater understanding of designing research in psychology. Since completion of this class, I have been able to initiate this project as a real-life study, under a mentor in the Department of Psychology, and currently developing skills to pursue a research career in Psychology.
**CREATTE Project**
*The Changing of Chinese Weddings*
Simone Pettit
**Mentor(s):** Karla Davis-Salazar
**Program:** Business
This study is a cross-cultural comparison of Chinese and Western or “White” weddings. After researching Chinese weddings, first present then diving further into the past, I found it redundant to exclusively compare the two cultures’ most commonly practiced wedding rituals, as the western wedding has become remarkably popular in modern China, I felt there would be little to compare; instead this will be a comparison of the diverging traditions surrounding weddings in China and the likely influences, i.e. the U.S.A, and the UK. Along with the changes in Chinese weddings I found a change in gender roles, or at least a disturbance, its seems that coupled with the idea of a modern white wedding, Chinese women also desire to have a western marriage, which consists of different gender roles, some of which there grooms, research shows, often do not expect or desire. This has inspired some interesting, though limited, research by anthropologists, which I was able to find using the University of South Florida’s extensive library and resources. With all of my compiled research I have created an introductory analysis of the impact, and timescale of the Western wedding on China, urban and rural. This change in Chinese culture is important for our understanding of China and the way its society works and why it functions as it does. This understanding would help the west to better communicate and understand the modern Chinese culture of which we are on good terms, yet have much to learn, better communication would increase our ability to make strong connections between our two cultures with minimal culture shock and misunderstanding.

**CREATTE Project**
*Human Capital of Older Adults from Racial and Ethnically Diverse Backgrounds*
Kelsey Pfaller
**Mentor(s):** Brianne Stanback
**Program:** Gerontology
The concept of human capital is the skills an individual acquires through training and experience to increase their value and it is important because it gives them access to opportunities, health, and wealth. Among the most complex questions is of how do we increase the human capital of older adults from racial and ethnically diverse backgrounds? That very question is the focus on this project as the legacy of disadvantages that arise from diminished human capital such as lack of access, insufficient education, an absence of resources, and general difficulties and struggles may cause difficulty across the entire life course. This project compares the experiences of three women interviewed as participating in the Otis R. Anthony Oral History project with research literature on ethnicity and aging in order to identify complications and strategies that have worked in the past to increase human capital across the life course for women. The comparison showed destitute situations improved by opportunities to increase both skills and knowledge. Among the most important implications is the need for education strategies to negate adverse misconstructions and programs to increase job skill levels, increase the accessibility to such programs, integrating human and social capital, and increasing cultural sensitivity in a health care setting. Both kinds of programs are critical if the gap between advantaged and disadvantaged cohorts is going to be
narrowed in the future. Further research should focus on applying the strategies identified in this research so that human capital will be increased.

**A Mind of Her Own: Personal Narratives of Atypical Brain Function**  
Dana Putney  
**Mentor(s):** Navita James, Lori Roscoe  
**Program:** Communication  
Narrative is a form of meaning-making and the foundation of communicating self to other. Pathographies, or narratives written about illness, are an art form growing in popularity in the context of a Western medical discourse which has long largely ignored the essential voice of the patient. This paper is a narrative study of autobiographical pathographies by women with atypical brain function whose diagnoses range from autism spectrum disorder to bipolar disorder and hemorrhagic stroke. It examines how authors construct interpretation and meaning of particularly singular internal experience, as well as approaches to making these narratives relatable to diverse audiences. Excerpts ranging in size from 170-325 words were selected from three published pathographical memoirs and analyzed. This analysis was based on an outline of techniques and relationships it was theorized may contribute to construction of interpretation and meaning as well as relatability of the narrative. It was found that, in relation to each other, the women’s construction techniques were, in many ways, as singular as the experiences described. When analyzing major elements such as narrative voicing, descriptive and affective language, and relations of identity and disorder, each author’s experience of atypical brain function appeared to influence their methods in unique ways. While disparate in means, all authors provided narratives that are theoretically relatable to many different audiences despite the extreme singularity of experience described. Their techniques could contribute to popular understanding of bridging gaps in experience and provide examples for anyone seeking to understand or be understood on an interpersonal level.

**Juvenile Homicide**  
**Jordyn Rad**  
**Mentor(s):** Kathleen Heide  
**Program:** Criminology  
My mentor Dr. Heide and I are researching juvenile homicide and recidivism. Juvenile homicide remains a serious issue in the United States. Although juvenile violence has been declining in recent years, youths under 18 still comprise about 10% of homicide arrestees. Despite the interest in kids who kill, our review of the literature shows that little is known about the likelihood of juvenile homicide offenders (JHOs) recidivating. Our project goal aim is to follow up on 59 young males evaluated by Dr. Heide in the 1980s. Sample subjects were under age 18 when they were charged with murder or attempted murder in the first or second degrees. This 30 year follow up will build on an earlier study in which Dr. Heide tracked these individuals 15 to 17 years after they had been committed to the adult Department of Corrections in Florida. The present study will examine when these JHOs were released, length of time spent incarcerated, percentage of those who recidivated, time to failure, types of crimes committed post release, and number of original sample subjects deceased. To the extent possible, this study will attempt to determine the correlates of those who succeed and those who failed. Our results are still in progress and to be
Effects of Intensive Piano Training on Auditory and Cognitive Processing in Older Adults

Celia Riffe

Mentor(s): Jennifer Lister, Nathan Maxfield

Program: Communication Sciences and Disorders

Computerized, adaptive, process-based auditory training programs have been shown to improve working memory, speed of processing, and everyday function among older adults but compliance with the programs is often a problem. It is thought that a more engaging and social program of auditory training may encourage better compliance and, thereby, provide even more benefit. Learning to play a musical instrument is a form of auditory training that is adaptive and engaging, and adult musicians are known to have superior auditory processing as compared to adult non-musicians. The purpose of this study was to investigate the effects of an intensive, two-week piano training program on working memory, speed of processing, and executive function for a group of seven older adults (mean age = 70). Participants had fewer than three years of formal music training, minimal hearing loss, and no neurological or cognitive disorders. We hypothesized that the participants would demonstrate training-related improvement on all outcome measures. Paired-sample t-tests indicated no significant difference between pre- and post-training scores on any of the outcome measures. These results suggest that an intensive piano training program is not a viable alternative for a computerized, adaptive, process-based auditory training program. Results will be compared to those of recent studies in our lab in which other types of auditory training have been employed.

**CREATTE Project**

Callous Unemotional Traits, Social Goals, and Reactive and Proactive Aggression: Concurrent Associations during Adolescence

Devon Robbins

Mentor(s): Tiina Ojanen

Program: Psychology

The project described in this presentation was researched and developed during the Child and Adolescent Social Development CREATTE course and takes the form of a rigorous research proposal. This presentation will highlight the research that was required to develop the proposal and the components of the planned research project and its impact. Callous unemotional (CU) traits are manifested in aggressive, severe patterns of antisocial behavior in youth and related to severe conduct problems, violence and aggression, bullying, and delinquency (Frick & Dickens, 2006; Barry et al., 2007). However, little research has examined social goal strivings in relation to CU traits and aggression. Given the aversive adjustment implications of CU traits in youth, research on the motivational processes by which CU traits are related to aggressive behaviors is warranted. The current study proposes to examine the association between CU traits, goals for peer interaction, and reactive and proactive aggression during adolescence. I expect to observe a positive association among CU traits, goals status and dominance among peers, and proactive (instrumental) aggression, such that dominance goals will mediate the association between CU
traits and proactive aggression. However, as emotionally heated (non-instrumental) aggression, reactive aggression is expected to be related to CU traits alone. Additional data patterns will also be examined. Participants will be recruited from local middle schools (target N = 300). Survey data will be collected using established measures. The findings are expected to have theoretical and practical implications for the study of CU traits and aggression, including interventions programs. The development of this proposal enabled me to pursue this research with a faculty mentor in the Department of Psychology and has motivated me to apply for graduate programs in Forensic Psychology to improve mental health care in the criminal justice system. The process of developing this proposal will be described.

**Subsequent Memory Effects in Frontal Slow Waves Elicited by Emotional Words**

Nasreen Sadeq, Chelsea Goodwin  
*Mentor(s):* Siri-Maria Kamp  
**Program:** Psychology; Psychology/Biomedical Science  
The P300 is a brainwave occurring in response to unexpected stimuli. In memory studies, words that are unique from the list ("isolates") elicit a larger P300 when they are later successfully recalled. Words that are encoded using elaboration (for example, connecting them into sentences) as well as non-isolate words elicit Frontal Slow Wave "subsequent memory effects" (Karis et al. 1984). Another line of research suggests that the valence of emotional words (positive or negative) influences the Frontal Slow Waves' lateralization - their location in the brain's hemispheres (Cunningham et al. 2005). Our experiment investigated whether the Frontal Slow Waves elicited by emotional stimuli are also correlated with subsequent recall. 17 participants studied and immediately recalled neutral word lists containing an emotional isolate (positive or negative word), or lists containing only one type of emotional word (either positive or negative). Positive word lists showed higher recall levels than negative or neutral lists. Analyses of the brainwaves (EEG) revealed two Frontal Slow Wave components: One was left-lateralized and largest for positive words; the other was right-lateralized and largest for negative words. The left Frontal Slow Wave showed a subsequent memory effect that was in the opposite direction as previously reported for Slow Waves: Its amplitude was largest for words that were later not recalled. In addition, a P300 subsequent memory effect was present for negative words only. Our data indicate that Frontal Slow Waves that vary with emotional valence are not the same as those previously reported to correlate with later recall.

**Disadvantage as Moral Self-licensing**

Thomas Saltsman  
*Mentor(s):* Joseph Vandello  
**Program:** Psychology  
The current study aims to not only empirically bridge together research on moral licensing and the underdog phenomenon, but to more closely examine these processes in terms of the self. Moral licensing occurs when past behavior makes one more likely to commit morally questionable acts or express morally questionable thoughts without the fear of feeling or appearing immoral. Further, according to research on the underdog phenomenon, individuals are more likely to relate to and identify with those at a competitive disadvantage, often imbuing the competitively disadvantaged with more positive moral and sociable characteristics. In this study, we administered a priming
essay task, followed by a 38-item reaction time task and a moral attitudes questionnaire. Though not supportive of our hypotheses, in-lab participants at a large, southeastern university who were primed with thoughts of personal advantage were less likely than were participants in the study’s other affective priming conditions (personal disadvantage and neutral) to identify with morally positive characteristics and to experience more comfort and confidence when making ambiguous moral decisions. This research provides insight into the potentially interrelated natures of one’s perceptions of personal advantage, power, and morality.

**Going Beyond Spelling Accuracy: Linguistic Feature Patterns of Superior, Average, and Poor Spellers**

Ellen St. John  
**Mentor(s):** Ruth Bahr, Elaine Silliman  
**Program:** Communication Sciences & Disorders  
Despite recent cross-linguistic research on spelling in students with language impairment (e.g., Connelly, Dockrell, Walter, & Critten, 2012; Silliman, Bahr, & Peters, 2006), how spelling patterns can serve as clinical/educational markers of an oral-written language learning disability (OWL LD; Silliman & Berninger, 2011) remains unresolved. This study extends the work of Garcia et al. (2010) on superior, average and poor spellers by including a linguistic analysis of misspellings. The primary question is whether a linguistic feature analysis of dictated word spellings produced by superior, average, and poor spellers will identify patterns that have diagnostic/instructional utility. Sixty typically developing students entering grade 1 or grade 3 were followed longitudinally. They were divided into spelling level groups based on WIAT-II spelling subtest scores. These data were gathered each year until grades 5 or 6, respectively. Students’ accurate and inaccurate spellings over the four-five years of collection were analyzed with the Phonological, Orthographic, and Morphological Analysis of Spelling (POMAS) (Bahr et al., 2012). Different performance patterns in terms of number of words attempted and percent accuracy were noted for each spelling level category. Linguistic feature errors were noted to change over time; however, unlike average or superior spellers, as the morphological complexity of dictated words increased, older poor spellers either did not attempt the word or relied on strategies typical of younger children, such as phonologically-based spellings. This study suggests that percent accuracy as the sole measure of assessment provides an imperfect window into students’ instructional needs. Educational implications will be described.

**CREATTE Project**

**Prospective Associations of Child Emotional Abuse and Adolescent Externalizing Symptomatology**

Victoria Swaidan  
**Mentor(s):** Tiina Ojanen  
**Program:** Psychology  
The project described in this presentation was researched and developed during the Child and Adolescent Social Development CREATTE course and takes the form of a rigorous research proposal. This presentation will highlight the research that was required to develop the proposal, the components of the planned research project and its impact. Extant research has established that child emotional abuse (CEA) is positively associated with substance use severity, aggressive
behaviors, and violent behaviors (i.e., externalizing symptomatology) during adulthood (e.g., Crawford & Wright, 2007; Berzenski & Yates, 2010). However, few studies have examined this association during adolescence and none of them has examined gender differences or change/stability in these associations over time. Given the importance of this period for the development of externalizing symptomatology (e.g., Susman et al., 2010), this project examines associations of CEA with these symptoms during adolescence. In a short-term longitudinal design, this study will examine concurrent and longitudinal associations among the key constructs, while also assessing gender differences in their prevalence rates and mutual associations. Participants will be recruited from local high schools (target N = 400; three repeated assessments over nine months regarding emotional abuse before age 13, current substance use, aggression, and violence). Using established measures, self-, parent-, and teacher-reported data will be collected. Associations among the constructs will be examined by computing zero-order correlations and longitudinal regression models. One-way ANOVAs will be used to examine mean-level differences by gender, and latent growth modeling construct stability/change over time. Findings from this study are expected to increase conceptual understanding of externalizing difficulties, with implications for related interventions.

**CREATTE Project**

Physical and Relational and Peer Victimization, Disordered Eating, and Body Dissatisfaction: A Short-term Longitudinal Study

Lia Thibodaux

Mentor(s): Tiina Ojanen

Program: Psychology

The project described in this presentation is currently being researched and developed during the Spring 2013 Child and Adolescent Social Development CREATTE course and takes the form of a rigorous research proposal. This presentation will highlight the research that was required to develop the proposal and the components of the planned research project and its impact. Currently, the relationship among peer victimization and disordered eating patterns or body dissatisfaction is currently unclear in adolescent research. Two existing, relevant studies have found that boys are especially influenced by victimization by peers in terms of disordered eating (Aime, Craig, Jiang, & Connolly 2008), and there is little peer influence on body dissatisfaction (Linville, Stice, Gau, & O’Neil 2011). Further, the specific form of peer victimization in this context remains little understood: victimization may include direct physical attacks, or indirect manipulation of peer relationships (relational victimization). To examine prospective associations among physical and relational victimization, disordered eating, and body dissatisfaction, I propose to conduct a short-term longitudinal study. Participants will be recruited from the six through eighth grades in public middle schools (target N = 800). Survey data will be collected using established measures and will be administered in two assessment occasions, six months apart. Regression will be used to assess the longitudinal associations among the variables, and gender differences in the variable’s mean-levels and associations will be assessed. Physical victimization is expected to have a greater impact on boys, while relational victimization is expected to impact girls more. Findings from this study are expected to aid the development of prevention strategies for eating disorders stemming from disordered eating and body dissatisfaction. The development of this proposal has inspired me to continue this research because eating disorders have a relatively
high mortality rate, and I believe prevention programs are necessary. The process of developing this proposal will be described.

**CREATTE Project**

*Parental Attachment Survey*
Olivia Valdes
Mentor(s): Winny Shen

**Program:** Psychology/Biomedical Science

Previous studies have identified that parental attachment is related to critical life outcomes, such as social competence, general life satisfaction, and emotional adjustment, in children, both during their childhood and into adulthood. However, current measures of parental attachment are mostly geared toward young children or contain scales with much variation within responses. The present study seeks to remedy some of these shortcomings by developing a new measure entitled the Parental Attachment Survey (PAS). This 10-item self-report measure, which uses a true/false scale, is intended to assess young adults’ attachment toward their parents. The present study will examine the reliability and validity of the PAS using a sample of college students. To examine convergent validity, we will examine the correlation between the PAS and a subset of items from the Parental Attachment Questionnaire (PAQ). To examine divergent validity, we will examine the relationship between the PAS and the General Health Questionnaire (GHQ), as we do not expect that parental attachment is related to current levels of health. To examine criterion validity, we will examine the relationship between the PAS and aggression, as measured by the Direct and Indirect Aggression Scale (DIAS), as we expect that parental attachment will predict aggression because previous research has found that maternal depression symptoms as well as maternal hostile controlling behavior predict behavioral problem in 4-year old children. We predict that this finding will be translatable to parental attachment and that low attachment levels will too predict aggressiveness.

*Prescription Drug Abuse at USF*
Maxwell Wesemann, Kristian Zambrana, Sarah Parsi
Mentor(s): Catherine Batsche

**Program:** Social and Behavioral Sciences/International Studies; Social and Behavioral Sciences

Prescription drug (Rx) abuse at the University of South Florida (USF) is understudied. In the United States, Rx abuse is the second most abused category of drugs. In a time when students are in a major transition period in their lives, the threat of falling victim to drug abuse is significant. Based on our own undergraduate experiences we hypothesized that there would be a significant amount of Rx abusers at USF. From our pilot study of 83 responses, 16% of USF students were found to abuse Rx drugs in their academic career (stimulants and painkillers). There is a disconnect from our pilot study and the Alcohol 101 study carried out by USF Wellness, which found that less than 2% of students abuse Rx drugs. From our results, it is necessary to conduct a study to determine when the majority of prescription drug abuse begins. We propose to expand the study to expose prescription drug abuse rates of various high schools that make up a large concentration of USF incoming students (such as high schools in Tampa and its surrounding region). After gaining a better understanding of the issue that USF faces through research, a plan
can be created to reduce prescription drug abuse appropriately that will account for education, monitoring programs, enforcement of laws, and recovery services.

*The Effects of Ultra-Sonic Mouse Vocalizations on the Acoustic Startle Reflex*

Nicole Wood  
*Mentor(s):* Joshua Halonen  
*Program:* Biomedical Science

The acoustic startle reflex (ASR) provides behavioral and physiological responses that are comparable between human and rodents. Based on these similarities, mouse models of hearing are used to understand auditory processes. Pre-pulse inhibition (PPI) paradigms investigate the ASR by presenting a short pre-pulse tone or noise burst before a startle stimulus. Measures of the resulting behavioral and neuronal activity to the startle stimulus provide information about how sound is processed in time. Portfors, Roberts, and Johnson (2009) found that neurons of the mouse inferior colliculus, an area of the brain that processes auditory information and is involved in the ASR, might enhance ultra-sonic vocalization (USV) processing. The aim of this study is to investigate USVs as a pre-pulse stimulus and compare PPI to the standard noise burst. Testing is performed in sound attenuated chambers, with a speaker located above custom platforms placed on piezoelectric transducers. The output of the transducers is the summed change in voltage due to the pressure exerted from the ASR. Testing consists of placing the mice on the platforms and exposing them to auditory stimuli. The presentation of the pre-pulse and ASR stimuli, and the recording of the ASR are controlled by computer. The resulting measurements of PPI with USVs as the pre-pulse stimulus will be compared to the standard noise-burst. We hypothesize that this ethologically relevant stimulus will produce greater behavioral inhibition compared to the noise burst pre-pulse. Baseline PPI data to the noise burst have been collected, which are consistent with previous findings.
Business

The Effect of Graduating in a Recession Given Different Safety Nets in Sweden and the United States
Emilia Gyork
Mentor(s): Joshua Wilde
Program: Economics
Perhaps the most prominent macroeconomic issue of the recent past has been unemployment. The effectiveness of unemployment benefits in matching potential employees to employers has been debated for many years. Given the sluggish recovery from the financial crisis of 2008, this issue has gained renewed interest. The project aims to analyze how the size of the social safety net, i.e. unemployment benefits, social insurance payments etc., affect labor market outcomes, particularly among recent university graduates. The hypothesis is that a lack of unemployment benefits and a shallow social safety net result in poor labor market matches, resulting in lowered productivity and wages in both the short and long run. Data has been collected from the Swedish Statistics Agency and the United States NCES (National Center for Education Statistics) for various graduate cohorts surveyed one and three years following graduation. These reports followed employment status and whether the employment held matched the undergraduate major; the idea being that due to financial pressures, graduates might have to accept employment outside of their major field. Although the analyses conducted thus far have shown some inconclusiveness due to few available observations, there is evidence for the notion of hysteresis; that if unemployment is high at the time of graduation the graduate is more likely to become unemployed.

An Analysis on the Advantages and Disadvantages of U.S. Generally Accepted Accounting Principles (GAAP) Converging to International Financial Reporting Standards (IFRS)
Ambily Joseph
Mentor(s): Jennifer Cainas
Program: Accounting
The US Financial Accounting Standards Board (FASB) and the International Accounting Standards Board (IASB) are working on joint projects designed to improve and ultimately converge US Generally Accepted Accounting Principles (US GAAP) to International Financial Reporting Standards (IFRS). The purpose of the convergence effort is to help improve financial reporting information for investors while also working toward the goal of one set of global standards. The convergence effort is a significant move toward achieving a common accounting framework and an important step in the globalization of business. However, the convergence is also a time consuming and costly effort. This research project primarily deals with an analysis on the advantages and disadvantages of US GAAP’s convergence to IFRS and also whether or not the United States will actually go through with the convergence project and adopt IFRS. The hypothesis is that there will be several advantages as well as disadvantages of the convergence effort and even though one set of global accounting standards sound like an ideal solution for the continuously globalizing business world, it will not be put into practice in the United States anytime in the near future. Evidence was gathered through extensive research on publications related to the topic and through personal interviews of academics and professionals that study the
convergence effort. Though the convergence project seems slightly more advantageous in theory, the practical application of IFRS worldwide still remains as a question that can only be answered in due time.

**CREATTE Project**

_The Effect That Trust Has on Business Relationships in China_

Joseph Marquis

Mentor(s): Philip Bishop

Program: Finance

Ever since the opening of trade between China and the United States, the fundamental cultural differences between the east and west have become increasingly evident. An understanding of these differences is essential for American business to succeed when dealing with China. The goal of this research project is to define and evaluate the cultural differences between the United States and China and how they impact business negotiations. This topic will be investigated by examining a variety of case studies and surveys on companies’ experiences. Results from this research indicated that the concept of trust was essential to the success or failure of a company that negotiated with Chinese companies. Methods of building this sense of trust were explained as well as the foundation of the importance of trust to the Chinese. Increasing understanding of these cultural differences will lead to more global conscientious citizens and will promote international cooperation.
Community Sciences

**CREATTE Project**

*Human Capital among the Minority Older Adult Population*

Candice Deschaine

**Mentor(s):** Brianne Stanback

**Program:** Gerontology

In the United States, many older minority group members face daily challenges that consequentially affect their human capital and overall quality of life. It is important to identify the barriers this distinct older population endures by examining perceptions on race and ethnicity, financial security for retirement, and barriers in health care. This project is focused around an essential question: how should we increase human capital among aging minority groups? To begin answering this question, relevant literature in race, ethnicity, and aging and interviews from the Otis R. Anthony oral history collection were compared to gain a better understanding of the actual life experience of aging minorities. The comparison showed the importance of family life and social support, which is supported in the research literature. One of the selected interviews that of Flora Williams, suggested that some women displayed independence in ways that was different than what the research indicated. The larger implications of this project are the importance of cultural competency training for geriatric and health care professionals so that they can have knowledge of diverse populations, understand the legacy of segregation and immigration, gain respect for all racial and ethnic groups, and develop cultural sensitivity. Cultural competency training for professionals is vital because of the role providing health education to promote and prevent diseases, ensuring better quality of care, and improving patient/physician relationships by understanding elderly minority patients’ needs may be in increasing human capital.

*The Relationships between Hearing and Cognition in Older Adults*

Amber Tetlow

**Mentor(s):** Jerri Edwards, Jennifer Lister

**Program:** Psychology/Aging Studies

In 2012 more than five million Americans were diagnosed with Alzheimer’s disease making this the most common type of dementia (Alzheimer’s Associate Report, 2012). Dementia is one of the most feared diagnoses in older adults. Thus, understanding predictive factors and prevention measures is important (Morris, 2001). Interestingly, hearing loss is a risk factor for dementia in that poorer pure tone averages are associated with increased incidence (F. Lin, 2011). Aging researchers are investigating the relationship between hearing and cognition. Some researchers have found that hearing loss is associated with poor cognitive speed of processing performance (F. Lin, 2011). Other researchers have not found a correlation between hearing and general measures of mental status (M. Lin, 2004). The aim of this study is to clarify the relationships among hearing and various aspects of cognition. A sample of 120 participants ages 65 and older completed a hearing evaluation and multiple cognitive measurements. Data were collected by interview assessments, questionnaires, and performance-based tasks. Data analyses with Pearson correlations showed a significant relationship between hearing and cognition ($r_s = .13.69$, $p < .05$). These results need to be further investigated to determine if there is causation or if there is a third variable which drives this association. The potential impact of this research will lead to new advances in discovering predictive factors and preventative interventions to delay or decrease the cognitive decline in older adults.
Education

**CREATTE Project**
*Exploring the Relationship between Gender, Family Structure, Race and Academics: A Case Study of Three Elementary Schools*
Megan Day, Courtney Taylor
Mentor(s): Tony Tan
Program: Elementary Education
In this study, our goal was to investigate the relationship between gender, race, family structure, and elementary school children’s performance in Reading and Math. We predict that these factors will be associated with a child’s performance in math and reading areas. Data on 364 children in grades K-5th was collected from three elementary schools in the Hillsborough County area. In each school over 90% of the students are on free or reduced lunch. Our data analysis showed that in Reading, 42.6% of the boys and 28.7% of the girls were below grade level; in Math, 26.3% of the boys and 24.7% of the girls were below grade level. In terms of race, we found that 9.9% of the African-American children were below grade level in Math and 20.6% in Reading; for Hispanic children, 14.3% were below grade level in Math and 17.9% in Reading; for White children, 1.6% were below grade level in Math and 4.1% in reading. Additionally, we found that for children from families with one adult caregiver, 50.7% of girls and 60% of boys were below grade level in Reading; 33% of girls and 29.1% of boys were below grade level in Math. For children from families with two adult caregivers, 41.2% of girls and 42.6% of boys were below grade level in Reading; while 35.3% of the girls and 28.7% of the boys were below grade level in Math. Overall, our data showed the being a boy of a minority background, being raised in single-parent household presents a risk for elementary school children's academic performance, especially in Reading. More research is needed to understand how these factors affect children's learning.

**CREATTE Project**
*The Influence of Science Fiction in the Dime Novel*
Jennifer Delio, Vincent Euliano, Clayton Prather
Mentor(s): Cynthia Patterson
Program: Public Health; Music Composition; Music
The dime novel era was a significant chapter in popular American fiction. However, scholarship on dime novels remains sparse, due largely to the inaccessibility of most dime novel collections. Although produced to earn a profit, the dime novel also helped improve literacy among America’s burgeoning working class. Of all the genres of dime novels popular in the early 20th century, science fiction-based dime novels prove the most intriguing to 21st century readers. In fact, Doris Lessing, a short-story writer from the mid-20th century observed, “Space or science fiction has become a dialect for our time.” The presentation of technology in the science fiction dime novels of the 20th century influenced society’s perspective on machines and industrialism; this exposure and accessibility of technology, and its potential beneficial contributions to society, encouraged invention and ingenuity. The role of technology within the dime novels in the 20th century helped prime American culture for today’s modern world. This project will evaluate the role of technology portrayed through science fiction dime novels and its influence on today’s current perspectives regarding technology. Research will be conducted from the dime novel collection in the special
collections library at the University of South Florida. Selected science fiction dime novels will be
digitized and presented through an online open-source platform, Omeka. This online website will
provide research results such as summaries, themes regarding the presentation of technology, and
contextual analysis on the digitized dime novels. The results will analyze and present the
progression of society’s perspectives of technology from the 20th century into the present day.

_Girls Who Chose Not to Enroll in Postsecondary Education while in High School_
Alicia DeVita
_Mentor(s):_ Christine Rinck
_Program: _Philosophy/Women’s and Gender Studies

High school graduates who believe they can sustain a life leveraged on earning the minimum wage run the risk of living their life at poverty level. With genderized added risk, why do many girls confirm to only a high school diploma? The belief is that school system constraints have the highest influential impact on this decision. This research project seeks to identify the most common variable that influences high school senior girls to not pursue postsecondary education. A quantitative survey will measure social, family, and school system constraints, which are topics that other researcher have considered important when evaluating these issues (Marsico & Getch, 2009; Ojeda, Navarro, & Flores, 2011). The subject population consists of 200 women, ages of 18 to 23, who did not enroll in postsecondary education and are clients of Success 4 Kids and Family. It is expected that school system and family constrains will have the highest correlation to high school girls who did not chose to enroll into postsecondary education. Determining the most relevant variable will allow the educational and social system to focus on improving these conditions, thus minimizing the symbiotic financial burden between the government and young adult women.

_Early-Grade Mathematics Education_
Eric Geimer
_Mentor(s): _Melissa Sloan
_Program: _Interdisciplinary Social Science

A large body of evidence supports the notion that mathematics education in the United States of America (USA) is inadequate in its effectiveness. There is also evidence that the scope of such deficiencies extend internationally. The worldwide mathematics educational deficit is large enough that effectively reversing this educational problem could yield great economic benefit both in the USA and around the world. This research explores potential deficiencies in developed educational mathematics curricula and methodologies that are based on mainstream educational philosophies both in the USA and throughout the rest of the “industrialized world.” Potential reasons for low-levels of mathematical achievement in the USA and the uniformly negative mathematics achievement distributions of other industrialized nations’ student populations are discussed. The determination resulting from the data explored is that the educational philosophies utilized to form early-grade mathematics curricula and related methodologies are the main reasons for low levels of interest in the subject of mathematics by student populations. Recent research on mathematical learning is explored within. Conclusions made through this exploration are provided along with a hypothesis for how a new mathematics education curriculum-methodology pair could be broadly effective at establishing student interest in and understanding of arithmetic
and geometric mathematical principles in early-grades. This hypothetical curriculum-methodology pair meant to equitably increase student achievement in regard to mathematical subject matter in early-grades relates to the methods developed and utilized by the master artists and engineers of the Early and High Renaissance eras.

*Ratemyprofessors.com: General Chemistry Students’ Contribution and Use Patterns*

Patrick McKeny
Mentor(s): Santiago Sandi-Urena
Program: Chemistry

Online rating websites such as Ratemyprofessors.com (RMP) influence college professor and course selections. However, their use often sparks skepticism among instructors because of the self-selected nature of raters. Prior research on this topic in chemistry education concluded that RMP ratings were consistent with in-class student evaluation of instruction. The objectives of this study were to determine students’ motives behind contributing to the site and to determine how students use the site to inform their decisions. 500 General Chemistry students over the course of two years completed a 50-question survey addressing RMP use patterns. Findings suggest the majority of students use RMP and found it useful in their decision making process. 67% of the users had previously read reviews about a chemistry professor. Contributors’ motives varied but were quite different from commonly held conceptions (e.g. they post to rant or rave.). The majority of contributors stated their desire “to help other students”. The contention is put forth that chemistry departments and professors may find a valuable supplemental source of information in RMP data to complement existing evaluation tools.

**CREATTE Project**

*The Passage of Time*

Yukiko Palmore
Mentor(s): Ilene Berson
Program: Early Childhood Education

As a teacher researcher, I learned to use various search strategies to locate primary sources from the Library of Congress that may promote elementary grade students' multiple literacies through the developmentally appropriate use of artifacts and historical images. I completed modules from the Library of Congress to learn how to search the online depository, analyze photographs and prints to determine their appropriateness for instruction in an elementary classroom, and select primary sources from the vast digital collections to integrate into teaching. I connected the primary sources with students' prior experiences and children's informational text to make content meaningful and relevant. I designed and implemented the resulting lesson in a classroom with children in kindergarten. I collected data, including children's work samples from pre- and post-assessments, other evidence of students’ outcomes, and reflections on how teaching strategies affected those outcomes. In my presentation I will share findings about the effectiveness of instruction and how much the students learned. In particular, my research explored images that addressed the passage of time through assembly lines. I discovered that students developed a better awareness of elapsed time because they were able to apply it to real life events. First, students applied this concept to a historical perspective—when and why assembly lines were created, and then to a current-day perspective—how assembly lines have developed for usage in today's world.
**CREATTE Project**

*An Investigation of Primary Sources: Balance Scales Then and Now*

Ellie Wastin  
Mentor(s): Ilene Berson  
Program: Early Childhood Education

This project was completed as part of the CREATTE initiative. As a teacher researcher, I learned to use various search strategies to locate primary sources from the Library of Congress that may promote elementary grade students' multiple literacies through the developmentally appropriate use of artifacts and historical images. I also learned that primary sources are a great resource to help develop students' observational and inferencing skills. I completed modules from the Library of Congress to learn how to search the online depository, analyze photographs and prints to determine their appropriateness for instruction in an elementary classroom, and selected primary sources from the vast digital collections to integrate into teaching. I connected the primary sources with students' prior experiences and children's informational text to make content meaningful and relevant. I designed and implemented the resulting lesson in a second grade classroom. I collected data, including children's work samples from pre- and post-assessments, other evidence of students' outcomes, and reflections on how teaching strategies affected those outcomes. In my presentation, I will share findings about the effectiveness of instruction and how much the students learned. In particular, my research explored images of balance scales being used to measure weight then and now. I discovered that students enhanced their multiple literacies as most students developed the ability to effectively analyze photographs from informational text that is above their reading level. I also discovered that students were more successful at making objective observations than inferences. In conclusion, scaffolding young children's skills in active inquiry with primary sources creates authentic and meaningful learning experiences.

**CREATTE Project**

*Research Using Primary Sources – Japan*

Karyn Zalman, Jessica Hagood  
Mentor(s): Michael Berson  
Program: Elementary Education

As teacher researchers, we learned to use various search strategies to locate primary sources from the Library of Congress that may promote elementary grade students' multiple literacies through the developmentally appropriate use of artifacts and historical images. We completed modules from the Library of Congress to learn how to search the online depository, analyze photographs and prints to determine their appropriateness for instruction in an elementary classroom, and select primary sources from the vast digital collections to integrate into teaching. We connected the primary sources with students' prior experiences and children's informational text to make content meaningful and relevant. In our presentation we will share exemplars of our work, showcasing the intentional exploration of images as part of the pedagogy in schools. We will discuss how our research with the Library of Congress primary sources shifted our perspective from the arbitrary "seeing" to the deliberate "looking" at visual data, thereby problematizing images as we construct meaning of information depicted through historical photos. In particular, our research explored representations of culture in primary sources. The images address the following topics: Japanese culture. For each subject area, 2 activities were planned to teach the students different things that are apart of Japanese culture.
Engineering

Expanding Circular Mechanisms
Dane Bardroff
Mentor(s): Craig Lusk
Program: Mechanical Engineering
My research program focuses on exploring different design concepts of multi-stable compliant mechanisms and the selection of possibilities that arise with each. A project was initiated to design a multi-stable device that could translate a torsional input into the expansion and contraction of a circular outer frame. The chief conditions of this project were that the device be easily actuated and relatively simple to manufacture. Although the methods used during the design process have varied and expanded as the research has progressed, the primary approach consists of modeling flexible geometry with equivalent kinematic diagrams as well as reverse engineering. Stress analysis has shown to be a useful tool for predicting the durability of the various components within each prototype. The combination of these techniques among others to construct and predict have led to two unique design concepts that have met our research goal in different ways. What we have discovered is that although it is possible for a single-layered design to perform the function we are pursuing, a multi-layer design has more potential for maintaining fluidity during expansion and contraction and additionally increases ease of actuation. We currently consider our 3-layer design to be the most practical device that achieves our research goal.

Android Application to Control Wheelchair Mounted Robotic Arm Developed at CARRT
Nivea Brookens, Fernando Celis, Kenneth Ramclam, Garrett Taylor
Mentor(s): Redwan Alqasemi
Program: ESB/Computer Engineering
The Wheelchair Mounted Robotic Arm (WMRA) developed at the USF Center for Assistive, Rehabilitation & Robotics Technologies (CARRT) laboratory is currently controlled by a SpaceBall, BCI, and a laptop GUI. In order to expand the use and efficiency of the WMRA we are developing a software application for an Android-based handheld device to help people with disabilities accomplish activities of daily living (ADL). The WMRA has 6 degrees of freedom; there are 3 translational and 3 rotational degrees. We are using the accelerometers and a magnetic sensor to control the rotational movement of the arm, and a touch screen interface to control the translational movement. The Android application will be able to move the WMRA in response to the 3D motion of the Android device via a wireless connection. It will also provide a method of opening and closing the Arm’s gripper, while providing a display for viewing the WMRA’s current environment. In order to view the current environment we will establish a video feedback connection from the onboard Kinect sensor to the Android device for remote operations. The implementation of this Android application will guarantee assistance for ADL such as picking up a book from the floor, opening a drawer, and opening a door.
**Majority Logic Synthesis and its Applications to Spintronics**  
Drew Burgett  
**Mentor(s):** Sanjukta Bhanja, Jayita Das  
**Program:** Electrical Engineering  
Due to the dominance of CMOS computing technologies over the last several decades, current digital logic synthesis algorithms are optimized to reduce the gate count and delay times for NAND/NOR logic implementation. However, some emerging computing paradigms rely on different logical structures to implement functions. In particular, multilayer nanomagnetic logic and electron dot quantum cellular automata, members of the spintronics family of electronics, rely on the majority and inversion operations alone to implement logical functions. Logic synthesis algorithms that employ only the majority and inversion operations are termed majority synthesis algorithms. This research compares the effects of employing several different majority synthesis algorithms on the gate counts and delay times of logical circuits. For the purposes of comparison, four different majority synthesis algorithms that have been proposed are applied to common logical functions, and the resulting circuits are compared in terms of delay time and gate count. Results show that, for the circuits tested, the algorithm proposed by Miller and Winder in 1962 and modified by Zhang et al. in 2007 generates circuits with the lowest average gate counts and delay times, requiring, on average, only 83% of the gates and 81% of the delay of the circuits that any of the other three algorithms require. This strongly suggests that the speed and power consumption of nanomagnetic and electron dot quantum cellular automata computing devices can be greatly optimized by employing this algorithm rather than any of the other three.

**Recombinant Biomaterials for Treatment of Chronic Wounds**  
Christie Campla  
**Mentor(s):** Piyush Koria, Yuan Yuan  
**Program:** Cell and Molecular Biology  
Chronic wounds affect nearly 5.7 million patients annually. These wounds (including diabetic and venous ulcers) may never heal or take years to do so because their normal healing process is disrupted, placing significant stress on patients both physically and financially. Our laboratory has previously developed elastin-like peptides (ELPs) with varying sequences that have been shown to induce proliferation of human skin fibroblasts, implicating that ELPs may be useful for treatment of chronic wounds. However, the mechanism through which ELPs interact with cells leading to enhanced proliferation remains unclear. This work focuses on understanding the ELP-cell interactions that lead to increased fibroblast proliferation and function. Specifically, we investigated whether ELPs need to be internalized by fibroblasts or if interactions with the cell surface are sufficient for modulating fibroblast function. We treated cells with free ELP or ELP covalently linked to the cell culture surface and assessed the fibroblast proliferation in response to these treatments using Hoechst assay. An understanding of the mechanisms involved in the modulation of fibroblast proliferation and function by ELPs will help us to develop novel ELP based biomaterials for potential application in chronic wounds and regenerative medicine.
Comparing Learning Curves in Multiple Gravity Environments
Jason Cathell
Mentor(s): Stephanie Carey
Program: Electrical Engineering
Practicing a series of tasks can teach an individual to complete tasks faster until a maximum speed is reached. This relationship can be described as a learning curve. When engineering a system that requires a user to repeat a series of tasks, such as those required by astronauts, it is important to study this learning curve. The hypothesis for this project is that in a weightless environment the learning curve will converge to a limit at a similar rate to that on the Earth’s surface, but with an increase in time. Data for this study were collected in two parts: 1) on a parabolic flight with two subjects, using a Microsoft Kinect and 2) in a lab setting with one subject, using a VICON motion analysis system. Subjects had to correctly manipulate a custom “switch” board with 6 switches (of various types), 3 different kinds of cables, a turn valve, and a momentary button in a specific order as quickly as they could without making any mistakes. The times to complete the tasks were compared between subjects. The completion times for subjects 1 and 2 in the weightless environment converged to approximately 20 seconds and 16 seconds respectively within about 4-6 trials. Subject 3 converged to 11 seconds within 3 trials. The overall average times for all three subjects were: 1) 23.16 seconds, 2) 17.43 seconds, and 3) 13.76 seconds. It can be clearly seen that subject 3 was able to complete the tasks faster with a smaller learning curve.

Technical Design, Implementation & Control of an Atomic Layer Deposition Reactor into a pre-existing UHV Analysis Chamber
Mason Chilmonczyk
Mentor(s): Rudiger Schlaf
Program: Mechanical Engineering
Atomic Layer Deposition (ALD) is a thin film manufacturing process that allows for angstrom thick layers to be uniformly placed on surfaces (including complex geometries) using self-termination reactions via unique precursor gasses (e.g. Trimethylaluminum, Water, Titaniumtetrachloride, Ammonia, etc.). Other methods such as Chemical Vapor Deposition (CVD) do not have the capability of precise thickness control and by that do not guarantee a uniform surface coating. Our design is advantageous because of the capability of studying manufactured films directly via x-ray photoemission spectroscopy (XPS), ultraviolet photoemission spectroscopy (UPS) and inverse photoemission spectroscopy (IPES). By means of these methods, the complete electronic structure (band line-up) can be studied without exposing the sample to ambient conditions. The topics of this presentation cover 1) Solidworks™ modeling and simulation, 2) the production and implementation of previously made designs, 3) microcontroller usage (Arduino™, LabVIEW™) in an effort to control the necessary parameters like temperatures, pressures, injection timing and carrier gas flow, 4) the production of a printable circuit board (PCB) designed via KiCAD™ based off of the prototyped setup, and 5) the fabrication of a boxed control to ensure reliable use for an extended period of time.
Terminal Weightlifting Device for Below Elbow Amputee
Michael Concepcion
Mentor(s): Stephanie Carey
Program: Mechanical Engineering
Recent advancements in prosthetic technology and design have led to new opportunities for persons with limb deficiencies to participate in sports. Specifically in weight lifting, a problem arises when a prosthetic device designed for an individual does not meet performance needs. An investigation into such a case led to a mechanical engineering design of a new prototype terminal device for weight lifting. After an interview with the user, his previous device was a two jaw claw that is opened and closed manually and locks using a pin. The pin can easily be misplaced or fall out during use and it is difficult for the subject to hold the claw shut while attempting to insert the pin, causing a prolonged period between weightlifting exercises. The new design centers on the device’s ability to lock and unlock its grip in order to change between various dumbbells or barbells efficiently. The terminal device is comprised of top and bottom halves attached by a hinge. They open to a 90° angle allowing for a weight to be placed inside. The top half includes a slot which fits into the bottom half. A locking ring is rotated 90° to cover the top slot from moving and thus keeps the device closed. When fully assembled the device is 3.5 inches wide and 4 inches high. Finite element analysis was done using Solidworks to evaluate the stress concentrations and create the strongest design possible. A rapid prototyped model will be created before the colloquium.

The Effect of pH on the Self-Cleaning and Optical Properties of TiO2 Thin Films Developed on Polycarbonate
Alireza Dayerizadeh
Mentor(s): Houman Yaghoubi, Arash Takshi
Program: Electrical Engineering
Titanium dioxide (TiO2) has been used as a self-cleaning agent on glass/polycarbonate windows. Past research has shown that pH plays an important role in the sol-gel synthesis of TiO2. In particular, the pH level of a TiO2 sol has been shown to influence its crystal size and formation. However, little is known regarding the effect that differing levels of pH would have on the self-cleaning properties of applied TiO2 sols. In this study, TiO2 sols with varying pH’s of 7.3, 8.3, 9.3, and 10.3 were synthesized through the sol-gel method. TiO2 deposition was based on spin coating using an anatase sol of TiO2 nanoparticles of 30 nm in size. A pre-coat of peroxtitanium complex was employed to improve adhesion and inhibit the substrate degradation. The self-cleaning properties of the substrates were studied by the degradation of methylene blue. The optical transmission of the samples were characterized by UV-vis Spectrophotometry. The results also show that the coating layer blocks UV-light but allows transmission of visible light.

Alertness Detection via Single Channel EEG
Michael Del Valle
Mentor(s): Anna Pyayt
Program: Chemical Engineering
The focus of this project is to evaluate the efficacy of a single-channel electroencephalograph in alertness detection. A single electrode EEG device is much more portable than a multi-channel
system, and the development of such a system to monitor alertness and detect sleep onset could be used in alertness-sensitive environments. To test the device’s viability, participants have their neural activity recorded via single channel EEG during a waking state and during a state of decreasing alertness as in the case of sleep onset. The waking stage EEG data from each individual participant is used as a baseline against that same participant’s subsequent EEG data. The participant is then led into a quiet, dark room to facilitate the onset of decreased awareness and/or sleep. A non-agitating light then periodically flashes for the individual to respond to. The gradual increase in error rate of these responses stands as a measure of decreasing alertness level. Concurrently, the power spectra for alpha waves are calculated from one second intervals. The variability of these power spectra per time are compared to the error rate data and the results of statistical analyses show the feasibility of alertness level scoring via single channel EEG. A device capable of real-time alertness monitoring could be used to increase safety in occupations or activities where vigilance is critical as in the case of motor vehicle activity or security.

**The Benefits of Alternative Anaerobic Digestion Processes**

Peyton Dilbeck  
**Mentor(s):** Sarina Ergas  
**Program:** Civil and Environmental Engineering

Increase in the demand for meat has resulted in the creation of large Concentrated Feeding Operations (CAFO). With the creation of these CAFO’s, there has been an increase in the amount of live-stock waste being produced; an animal of noticeable concern is swine. Untreated swine waste contains organic matter, nutrients, such as nitrogen and phosphorus, suspended solids, pathogens, odorous and volatile organic compounds, trace elements and chemicals of concern. When these wastes are disposed of via typical procedures, such as land application or Anaerobic Lagoons, they are known to cause significant strains on the environment, most commonly production of greenhouse gases and eutrophication. Thus, a need arises for proper disposal of these wastes. A treatment process known as Anaerobic Digestion (AD) can solve these problems. Anaerobic Digestion is a process in which microorganisms consume biodegradable material in the absence of oxygen, while producing biogas that can be converted into a renewable energy resource. The purpose of this project is to understand biogas production and volatile solids destruction in an AD operated at varying feed rates and Solids Retention Times (SRT). Experiments consist of testing four bench-scale bioreactors operated under conditions representative of a typical CAFO SRTs of 14, 21, 28, and 42 days. Volatile Solids Removal (VSR), pH and biogas production rate will be monitored to understand which conditions produce the most biogas, while producing a product that can safely be used as fertilizer.

**Fabrication and Characterization of Cactus Mucilage Nanofibers**

Gabriela Dunk  
**Mentor(s):** Sylvia Thomas  
**Program:** Chemical Engineering

Current nanofiber filtration systems are constructed from materials that are neither biodegradable nor biocompatible. Therefore, after years of use, these systems cannot be recycled and become hazardous to the environment. Due to this, there have been explorations into biocompatible and biodegradable nanofiltration systems using aloe vera, okra and cactus. By using biocompatible
materials for water purification and filtration, the safety of both the environment and mankind will be ensured. It is clear that a filtration system that is user friendly, cost-effective and environmentally sound is needed. In this project, the composition and ability of the cactus, *Opuntia ficus indica*, has been investigated and it has been the primary source of mucilage that is being used. The mucilage found in this plant has been found to interact with heavy metals, cations and biological substances such as K (potassium), Mg (magnesium), Fe (iron) and Na (sodium). The propositions of this project is to synthesize an environmentally accepted and cost-effective nanofiber material, introduce this material as a competent resource for water filtration and make certain that it will be sustainable and affordable around the world. In order for this project to indeed be successful, there are several steps that need to be performed. After extracting the mucilage, the nanofiber material must be formed. Constructing cactus nanofibers through electrospinning is an inexpensive method that allows a nanofiber mesh to form quickly. Throughout the process, a life cycle assessment will help determine the energy consumption and water usage in the production of the nanofiber that ultimately impact the environment and the nanofiber sustainability.

*Design of a Minimally Invasive Laparoscopic Tissue Removal Device: “MorceShaver”*

**Erik Esinhart, Adam Lytle, Daniel Kamsler**  
**Mentor(s):** Susana Lai-Yuen  
**Program:** Industrial Engineering

Laparoscopic surgery, a type of minimally invasive surgery, has increased over the past decades due to shorter patient recovery times, less pain, and less scarring. Laparoscopic surgery uses several small ports that are inserted through the abdominal wall into the peritoneal cavity, to provide the surgeon with access to necessary organs. Oftentimes, surgeons use a device called a morcellator to extract large tissue masses through these incisions by cutting the tissue into smaller segments. The morcellator consists of an exposed rotating blade that enables tissue to be cut into small parts. This exposed blade can potentially damage vital organs and is limited to a 15mm diameter. These surgeries can last many hours, combined with repetitive hand action, which may increase strain and fatigue to the surgeon which can further lead to increased risk of injury. The proposed device "MorceShaver" will provide a safer solution by increasing the size of the barrel shaft and use a larger port that is inserted in the vagina to reduce surgery time. The vagina serves as a natural portal into the abdominal cavity, and is easily distensible to accommodate larger incisions for wider diameter instruments, and leaves no visible abdominal scar. This design consists of spiral feed blades and an auger that are used to transport the tissue down the device. It also includes a retractable sheath that safely houses the blades, which provides for an adjustable blade surface area. Our device will make morcellation surgeries safer and more efficient for women.

*Removal of Arsenic Species (III and V) from Water Using Mucilage-alginate Beads*

**Mena George, Gabriela Dunk**  
**Mentor(s):** Norma Alcantar  
**Program:** Chemical Engineering

Arsenic contamination of surface and groundwater has been found in many parts of the world, including Florida. Contamination may occur through natural causes or it may be due to anthropogenic activities which may increase the oxidation process of arsenic-rich minerals releasing
arsenic into the water by recharging aquifers with ozone-treated water or ground water reservoirs.

Arsenic occurs in the environment in several oxidation states but in natural waters, it is mostly found in inorganic form as oxyanions of trivalent arsenite [As(III)] or pentavalent arsenate [As(V)]. Those two inorganic species of arsenic have very distinct toxicity and environmental properties. The purpose of this work is to combine available conventional and alternative technologies to remove arsenite and arsenate from water. We will be using two types of mucilage extracted from nopal cactus (Opuntia ficus-indica), non-gelling (NE) and gelling (GE) extracts and combining them with conventional coagulates (iron and aluminum sulfate). The mucilage and conventional coagulants will be entrapped into sodium alginate beads and used to treat the water. The concentration of arsenite and arsenate will be evaluated before and after treatment using a coupled high-performance liquid chromatography (HPLC) and hydride generation (HG) atomic fluorescence spectrometry (AFS).

**Effect of Partial A-site Substitution on Carbon Dioxide Reduction by Oxygen Absorption on Lanthanum Cobalt Perovskite-Oxide Structures**

Ryan Kent  
**Mentor(s):** John Kuhn, Yolanda Daza  
**Program:** Chemical Engineering

Today’s world encounters a growing issue with greenhouse gases, the most significant of which is carbon dioxide. The long term goal of this research is to reduce carbon dioxide emissions by conversion to carbon monoxide, which can be used in fuel production. Perovskite-oxide structures, which follow the molecular form $\text{ABO}_3$, are well studied for their high oxygen mobility and ability to be tailored for a specific purpose. The effect of partial ion substitution changes the properties of the metal oxide. $(\text{La}_{1-x}\text{M}_x)\text{CoO}_3$ $(\text{M}=\text{Sr, Ba})$ Perovskite powders were synthesized by sol-gel synthesis and analyzed by X-Ray Diffraction and Temperature Programmed Experiments (Oxidation and Reduction) for their capabilities in the reduction of carbon dioxide. From these experiments, temperatures for the reduction and subsequent oxidation were picked in order to maximize carbon monoxide production during an isothermal conversion. The effect of partial ion substitution on the A-site is compared against $\text{LaCoO}_3$ oxide. Results showed Strontium ion substitution was more effective in isothermal carbon dioxide conversion than Barium ion substitution.

**A Cytoscape Plugin for Identifying Functional Modules in Biological Networks**

Denys Kukushkin  
**Mentor(s):** Xiaoning Qian  
**Program:** Computer Science/Mathematics

The recent advances in biochemical high-throughput technology have enabled the systematic analysis of genome-scale biological networks. As interactions among biomolecules play essential roles in complex behavior of life systems, understanding the functional organization of this tremendous amount of biomolecules is one of critical challenges in modern systems biology. To assist biomedical researchers in analyzing genome-scale life systems, we develop a computational algorithm to identify network clusters as potential functional modules in genome-scale biological networks. Our computational algorithm aims to identify clusters that are as independent as possible so that they can represent potential function units in cells. This project focuses on the
implementation of the above mentioned algorithm as a functional module identification plugin for open source network analysis platform called Cytoscape. The significance of this plugin is that it can help biomedical researchers effectively analyze biological networks of their interest. Given a biological network, our plugin can perform the clustering algorithm to identify groups of biomolecules in the network as potential functional modules for further analyses of their biological significance.

**Objective Assessment and Debriefing of High-Risk Team Medical Scenarios Using Computer Vision and Pattern Recognition**

Juan Lopez Marcano  
Mentor(s): Andrew Raij  
Program: Electrical Engineering

In team training, simulations are often used to practice dangerous and difficult tasks in a controlled environment. After a simulation, team members conduct debriefings to review and assess their performance, highlight successes and failures, and identify ways to improve future performance. Although simulations and debriefings are powerful tools for team training, their effectiveness is limited by a lack of objective measures of team performance, particularly for “soft skills” such as leadership and interpersonal communication. This effort aims to improve team training by developing new sensor-based objective measures of team performance and behavior.

We have developed a system to support simulations and debriefings in a neonatal resuscitation scenario, where a newly born infant is at high-risk of death or injury. The system records audio and panoramic video while a team works to save a simulated infant. The audio is processed to extract each team member’s speech, while the panoramic video is processed to extract each team member’s movements. A user interface merges these datasets together, allowing coordinated review of both team member movements and conversations. The former allows the user to understand how positioning affects team performance, while the latter allows the user to see if communication was effective and if certain procedures, such as measuring the infant’s heartbeat, were done at the right time. In the future, we plan to further process these datasets to automatically assess important team behaviors, such as using closed-loop communication, being specific when delegating tasks to individuals, and asking for help when needed.

**Effectiveness of the Vicon Motion Analysis System for Outdoor Capture**

Kaitlin Lostroscio, Ana Lopez Marcano  
Mentor(s): Stephanie Carey  
Program: Mechanical Engineering

The Vicon Nexus Motion Capture System has highly accurate software that can be used to track subjects completing a variety of tasks. The analysis of the kinematic data collected is associated with injury prevention, optimizing performance, and future development of equipment for amputees who would like to engage in different physical activities. Past studies have been affected by subjects behaving differently in a lab setting compared to their normal daily environment. In this perspective, confined spaces may cause subjects to restrict their movements; thus, increasing the risk of collecting inaccurate data. Alternatively, if these studies were conducted outdoors, such limitations would be reduced. This study focuses on the placement of four out of eight Vicon system cameras in an outdoor setting. Typically, controlled, indoor lighting is preferred for
tracking markers, as sunlight may cause additional reflecting that can disturb the marker count visible on the computer. By taking into account fluctuating weather conditions and by prioritizing the necessity to track all markers on a subject, a procedure for outdoor recording was established. The software itself has masking and strobe intensity features, as well as settings for exposure and frame rate, which can be used to optimize calibration in various lighting conditions. Then, by adjusting tripod height, camera angle, and system position, the ideal framework for conducting tests in an external environment can be located. Testing was performed in shadowed regions, sunny conditions, and with/without background movement to define a range of the system’s working conditions.

*Increasing Your Walking Efficiency with an Attachable Device to Your Feet*

**Benjamin Matlack**

**Mentor(s):** Kyle Reed  
**Program:** Mechanical Engineering

We developed a device worn on the feet that propels the wearer forward or backward while they are walking over ground. The goal was to aid in the rehabilitation of stroke victims suffering from asymmetric and inefficient walking patterns. The initial results showed positive results in changing gait patterns when worn on only one foot. In addition to correcting gait, this version uses two shoes to help healthy individuals walk faster and with less effort than normal walking requires. The ability to walk around using less effort could be a beneficial tool for those on the go constantly throughout the day. The Gait Efficiency Enhancing Shoe (GEES) is a completely passive device that requires no external power and attaches to each of the user’s feet. The vertical force that naturally occurs based on the weight of user walking is used and converted into a horizontal motion using a novel spiral-shaped wheel. By wearing the GEES, all the user has to do is walk like they normally would and the device propels them forward by approximately 7 cm more than they would during a regular walking stride. Based on initial testing, the GEES shows great potential to be useful, but some design modifications are necessary to improve the comfort and stability for the user.

*Tracer Study on Bioretention Systems*

**Valerie Mauricio-Cruz**

**Mentor(s):** Sarina Ergas, Thomas Lynn  
**Program:** Mechanical Engineering

When storm-water flows over impervious surfaces it cannot naturally infiltrate into the ground. Instead, storm-water runoff flows into local water bodies that we use as resources. As it travels to the water bodies, it accumulates harmful pollutants. The impacts produced by storm-water runoff can be managed through the use of Low Impact Development (LID) technologies, such as bioretention systems. These systems remove common pollutants found in storm-water runoff while minimizing disturbance to the natural environment. Having an understanding of the hydraulics within bioretention systems provides assurance that there is enough contact time between the filter media and the pollutants and, it helps in the design process of bioretention systems to control flooding. In order to assure that bioretention systems are effective and that the hydraulics within it are flowing as expected, the purpose of this research is to investigate how dispersion affects the hydraulic conveyance within bioretention systems. My methods are to conduct a conservative
tracer study on a pilot-scale bioretention system. The tracer, potassium chloride (KCl), will be added into the system using the pulse input method, where the tracer is added to the system all at once. The reactors will be operated at a hydraulic retention time (HRT) of one hour, for three to four hours. Effluent samples will be collected every five minutes and the conductivity of each sample will be measured to monitor the tracer throughout the system. The expected results are to see that bioretention systems demonstrate hydraulic characteristics similar to plug flow reactors.

**The Effect of InVO₄ Coupling on the Photocatalytic Activity of Anatase and Mixed Phase TiO₂ for Organic Decomposition**

Cheryl McCane  
**Mentor(s):** John Kuhn  
**Program:** Chemical Engineering

To increase sustainability of water systems, focus must be turned to the removal of persistent contaminants, including dyes, pesticides, and cyanobacterial metabolites. Photocatalysis, an Advanced Oxidation Process, has greater potential for treating persistent organic contaminants than traditional methods such as chlorine and potassium permanganate. TiO₂ is an effective, inexpensive, and stable photocatalyst used for the decomposition of organics, however; it is limited by its band gap (3.0–3.2 eV) which primarily absorbs in the ultraviolet portion of the spectrum. This *project is innovative* because it will use the indium vanadate semiconductor, InVO₄, alloyed to TiO₂, to increase visible range photoactivity. TiO₂ occurs in several crystalline phases (e.g. anatase, rutile, and brookite). The objective of this study was to determine if the effect on photoactivity of InVO₄ alloying was consistent for pure phase and mixed phase TiO₂. Pure anatase and mixed phase TiO₂ (Degussa P25) were used. Batch reactions were carried out at atmospheric pressure and ambient temperature in 1-L pyrex reactors stirred at 250 rpm. The light source was “Daylight Spectrum” florescent bulbs. Photocatalytic activity was determined by monitoring methyl orange concentration using UV-Vis analysis at 15 min intervals. From the data collected, the effect of InVO₄ coupling on the photoactivity was not consistent between anatase and P25 TiO₂. Decomposition by the anatase composite was retarded, but decomposition by the mixed phase composite was enhanced. Although these results were unexpected, current research implicates decomposition may occur via two different mechanisms, which may explain why the coupling of InVO₄ affected the phases differently.

**Detecting Blood Coagulation On-Chip**

Drew Neihart  
**Mentor(s):** Anna Pyayt  
**Program:** Chemical Engineering

Determining the speed and dynamics of blood coagulation is crucial in monitoring the status of patients with coagulative disorders. The two dominant methods in coagulation testing are prothrombin time (PT) and thrombelastography. We propose a fabricated On-Chip sensor design based on diffraction from a thin waveguide. The sensor would use diffraction to prevent reflective interference and accurately sense changes in optical properties which blood undergoes during coagulation. An optical sensing method could combine the wealth of dynamic data obtained from thrombelastography with the speed and low cost of PT. Optical properties can be measured accurately on a much smaller scale than physical properties such as clot strength, requiring a
significantly smaller sample (< 1 drop). Our optical sensor could test whole blood samples for coagulation instead of the comparatively large amount of separated plasma required in other methods, reducing time, cost and labor intensity. The sensor was simulated in a whole blood environment using a finite difference time domain optical simulation program. By exploiting the optical changes of blood during coagulation and unique optical properties at the micrometer scale, environments of coagulated and uncoagulated blood can be differentiated.

**Effect of Organic Carbon on the Precipitation of Minerals from Anaerobically Digested Swine Waste**

Oscar Pena  
**Mentor(s):** Sarina Ergas  
**Program:** Civil and Environmental Engineering  
Anaerobically digested swine waste is rich in nutrients which, if released, may be environmentally harmful. Nitrogen (N) and Phosphorus (P) are particularly deleterious as they promote eutrophication of receiving water bodies. Moreover, the release of P essentially forsakes a mineral that is becoming increasingly scarce as phosphate mines deplete. Precipitation, prior to release, can help reduce the amount of nutrients and allows for the recovery of P. Struvite (MgNH$_4$PO$_4$·6H$_2$O), in particular, proves to be a desirable precipitate as it addresses both N and P in addition to serving as a fertilizer through which P is reused. Previous research confirms the recoverability of struvite, among other phosphate and carbonate minerals, from the waste. However, Lin (2012) found that precipitation results between synthetic and real wastewaters were not in agreement. Organic carbon, measured by chemical oxygen demand (COD) in the waste, has been pointed to as a possible cause for this discrepancy. The objective of this research is to explore the effect of COD on the precipitation of struvite in an effort to provide insight into increasing its recoverability. Three synthetic wastewaters with varying organic constituents were compared. Preliminary results suggest that COD in the form of acetic acid inhibits the formation of carbonate minerals. Comparison between previous and current work also indicates struvite inhibition to be sensitive to small increases in Ca:P ratios. Future work will focus on adding another dimension of comparison and ensuring reproducibility.

**Reliability Analysis and Implications of TECO Generators**

Jasper Quach  
**Mentor(s):** Bo Zeng  
**Program:** Industrial and Management Systems Engineering  
Coal generators at Tampa Electric Company (TECO) are multibillion assets that are expected to run constantly to generate electricity for base load. However, because the generators are old, they degenerate from time to time resulting only in a 75-85% availability year round. In our research, we first perform statistical analysis on the reliability data collected from four coal generators in TECO Big Bend station. This is to identify factors and their patterns that cause generator unavailability. Then, we study the connection between unavailability (reliability) and maintenance. In particular, we focus on improving the coal generator availability by optimizing the maintenance schedules, and incorporate our reliability analysis into fuel supply chain management for cost reduction. As a result, this research will ultimately increase power reliability, reduce cost, and meet demand.
Remote Controlled Multi-directional Rotating Platform for Stage Performances
Brent Savage
Mentor(s): Redwan Alqasemi
Program: Mechanical Engineering
This project involves the design and development of a multi-directional platform with an independently rotating top to be used onstage during theatrical and dance performances. The project is the result of collaboration between the University of South Florida’s School of Theatre and Dance and the Center for Assistive, Rehabilitation and Robotics Technologies (CARRT). The problem has been to development a robust, remote controlled, compact, transportable, and inexpensive moving platform with a rotating top. This platform adds an additional choreographic element to the unique style of dancing performed by faculty and students of the School of Theatre and Dance, which involves the use of a variety of mobility devices and performers including dancers with disabilities. The platform is designed to hold up to five-hundred pounds with an independently rotating top while the base moves forward/backward, sideways, or diagonally using Omni-directional wheels. The existing design has a removable top surface, folding wing sections to collapse the unit down to fit through an average size doorway, and detachable ramp ends for wheelchair access. The top of the platform is driven by a compact gear train designed to deliver maximum torque within a limited space. The current structural, drive system, power system, and control system designs will be presented here.

Single Cell Detection Using Photonic Crystals
Justin Stewart
Mentor(s): Anna Pyayt
Program: Chemical and Biomedical Engineering
Due to numerous technological advancements the focus of many researchers has shifted from analysis of cell groups to individual cells. As a result, detection of a single cell presence is required for effective analysis, targeting, and delivery of drugs on a single cell level. A method utilizing a photonic crystal is proposed for detection of a single cell. This approach might be incorporated into lab-on-a-chip devices. The system was modeled using specialized finite difference time domain (FDTD) software, where transmission spectra were extracted from various environments with and without a cell. Spectral features of the light propagating in the photonic crystal are differently influenced by the presence of a buffer and of a cell. Simulations showed that the resonance spectral features with peak transmission depended solely on the refractive index of the environment. The presence of the cell demonstrated no impact on peak location; however, presence of the cell resulted in noticeable change in peak intensity. These results demonstrated that not only could single cells be detected in this manner, but information regarding cell surroundings may still be extracted without cellular interference.

Design and Construction of Macromolecular Patterning System Control Components
John Stratton, Christopher Allemang
Mentor(s): Rudiger Schlaf
Program: Electrical Engineering
Electrospray deposition (ESD) is a technique used to create thin films of biological and organic material, by the non-destructive injection of macromolecules into vacuum. Examples of biological
Thin film applications include biosensors, medical implants, and photovoltaics. The electrospray process generates a fine aerosol by the application of a high electric field between a substrate and a needle, through which an ionic solution is pumped at a low flow rate. The macromolecular patterning system employs this process in a system consisting of three differential pumping stages. The focus of this project was to construct two control components of the patterning system; the injection stage controller, and the vacuum pump controller. The injection stage controller is used to control the flow rate of the solution into the system, and the temperature of the vacuum chamber inlet, via a syringe pump and heater cartridges/temperature sensors, respectively. The vacuum pump controller was created to control the operation of three roughing pumps and two turbo pumps from a single location, it was then appended to monitor and display pressure levels through RS232 communication and non-linear voltage outputs, with other devices. The systems are built upon the Arduino™ platform, and controlled via LabVIEW™. Circuits of the two systems were designed using KiCAD™, prototyped on breadboards, and final designs were constructed on printed circuit boards. Arduino™ code was developed and integrated into the existing LabVIEW™ user interface.

**Design of a Stair Storage System**

**Sarah Tudor**  
**Mentor(s):** Stephanie Carey  
**Program:** Mechanical Engineering  
The James A. Haley Veteran's Hospital in Tampa, Florida has recently opened a mobile outreach clinic which provides health services to those veterans in Hillsborough, Hernando, Polk, and Pasco counties. It can also serve communities in times of disaster. The bus uses a detachable 80 pound set of stairs for entering and exiting the bus. The set of stairs has to be manually detached and lifted up and inside of the bus every time the bus is relocated. This is a very strenuous task on the bus driver. A gear and pulley system located in the rear of the bus will be presented here to alleviate the strain caused by manually storing the set of stairs by providing a mechanical advantage. This system will be easy to use and can be implemented in this mobile outreach clinic as well as in future buses. The design's input motion is turning a crank shaft, which will have a ratchet mechanism so that the ladder will not drop if the user accidently lets go of the crank. The crank shaft will turn a set of gears and pulley. The pulley on the output shaft will wind up a rope which is attached to various points on the ladder. Stresses and fatigue induced on the various components, weight, and cost are all used in this design. Calculations show that the result of designing this stair storage system will allow an 80 pound task to be completed using only 5 pounds of force.

**Micro-Scale Part Manipulation on a Liquid Interface through Interface Curvature Effects**

**Jose Vasquez**  
**Mentor(s):** Nathan Crane, Jose Carballo  
**Program:** Mechanical Engineering  
The goal of this work, is to provide insight on using liquid interfaces for micro-scale manipulation. This project is centered on determining the equilibrium distances of micro-scaled parts due to the capillary interaction on a fluid-fluid interface. This is accomplished by inserting a hydrophobic 1-2 mm diameter glass rod through the hexadecane-water interface, causing change in the curvature.
of the interface. This change in curvature causes a downward meniscus to form around the rod. Introducing a micro-scale part in the interface causes the capillary forces to attract the part towards the rod. We are interested in determining the equilibrium distances of individual micro-scaled parts as a function of rod diameter, part dimensions, and part density. Determining this equilibrium distance, allows us to understand the geometry effects on part-rod interactions at the hexadecane-water interface. We will present an experimental system for measuring the equilibrium distances and some initial results.

**Inactivation of Ascaris Suum Eggs in Mesophilic Anaerobically-digested Swine Waste**

Ileana Wald  
**Mentor(s):** James Mihelcic  
**Program:** Civil and Environmental Engineering

Global meat consumption has grown significantly over the past few decades, which has led to an increase in nutrient rich waste from the agricultural sector. Small-scale anaerobic digestion of livestock wastes can provide basic disinfection of waste, fertilizer and biogas that can be used as a fuel for cooking, lighting and boiling contaminated water in developing communities. However, the presence of *Ascaris lumbricoides* eggs (parasitic nematode roundworm) in waste poses a major health risk of spreading enteric diseases if the sludge effluents are inadequately treated. *Ascaris* eggs can survive for long periods in soil and sludge and are resistant to conventional methods of disinfection. This study seeks to understand how the operating conditions for anaerobic digestion systems promote the inactivation of *Ascaris* eggs without sacrificing biogas production. *Ascaris suum* (*A. suum*) eggs were used as a model for *Ascaris lumbricoides* and swine waste was used as feed for the bioreactor. A bench-scale anaerobic digestion reactor (SRT=21 days) was inoculated with *A. suum* eggs and operated under steady-state conditions previously determined for optimal for biogas production for 14 days. The reactor was monitored for *A. suum* egg viability, biogas production, VSR, pH, alkalinity, ammonia, phosphorous and VFA concentrations during the experiment. Nylon mesh bags with small pore sizes were used to contain the eggs while still exposing them to the conditions inside the reactors. Results showed 98% inactivation of eggs in the control and 29% in the reactor after 14 days. The findings show the eggs can survive longer than expected in the reactor and that the reactor operating conditions may aid *A. suum* viability.
Humanities

Tendencies of Diction and Etymological Features in John Milton’s Paradise Lost
Mary Bless
Mentor(s): Nicole Discenza
Program: English
John Milton, author of the epic poem Paradise Lost, was appointed Secretary of Foreign Tongues in England because he was an avid reader and writer in many languages and he was fluent in English, Latin, Greek, Hebrew, and French. The Oxford English Dictionary often cites Milton’s work to demonstrate the usage of English words since his understanding of words was based on the study of several languages. I would like to research the origins of the words he used in Book One of Paradise Lost. I plan to systematically enter terms into the OED to research which languages Milton draws from the most. I expect that he will use more words with Latin roots, but it is possible he used a more varied mixture between Latin, Greek, and Hebrew, especially as the poem deals with themes derived from Christian and Jewish doctrine. In regards to this, I expect Latinate language to make up the majority of his choice in diction as the poem is more of a contemporary contextualization than a translation. I will also be weighing the results of etymological data against a concordance of Milton’s work to determine the frequency of different terms. This will ensure that if, for instance, he uses 10 distinct Latinate words but uses a single Greek word 10 times, such favorability will be accounted for. I would also like to put my findings into a wave map format if possible.

Dion Boucicault and Oscar Wilde: A Study of Inspiration
Vicki Entreken
Mentor(s): Matthew Knight
Program: English/Creative Writing
Dion Boucicault was an actor, director, and playwright who wrote over 150 plays between 1840 and 1890; and, although he was one of the most popular figures on the English stage for half a century, his work is now largely forgotten. Oscar Wilde is considered one of the greatest playwrights in modern literature, and his timeless masterpiece, The Importance of Being Earnest, is still studied in literature classes and played out in theatres today. Boucicault is no longer studied; however, though he never shared Wilde’s lasting literary fame, the sonorous presence of his work and its impact on nineteenth-century audiences, including Wilde himself, should not be forgotten. This project demonstrates that Boucicault influenced Wilde. Utilizing unpublished plays in the Dion Boucicault Theatre Collection in the USF Library’s Special Collections, this paper will prove that Wilde attempted to emulate Boucicault through his use of real-life situations; his inclusion of humanitarian concerns; and his emphasis on three humorous themes: mistaken identity, the institution of marriage and feminine wiles. In addition, Wilde duplicated specific writing and editing practices utilized by Boucicault. By referencing their work in parallel, findings show occasions where their lives intersected and instances where they may have collaborated. The results of these findings will prove that Wilde, through his personal relationship with Boucicault, the ubiquity of Boucicault’s plays in theatres, and Boucicault’s example of relentless writing practices inspired young Oscar and, by extension, changed the face of the literary world. If Boucicault had
not impressed upon a “Wilde” child the art of the theatre, there would be nothing remaining of Importance.

**CREATTE Project**

*The Issues of Gender Roles and Stereotyping in Science Fiction and Fantasy*

Brittany Galloway  
Mentor(s): Amy Clanton  
Program: Health Science

My research compares science fiction and fairy tales and how each genre portrays gender roles and stereotyping, especially of women. I will analyze works such as “The Princess and the Goblin” (1872) by George MacDonald, “The Priestess who Rebelled” (1939) by Stanley Kay, and “Do Androids Dream of Electric Sheep?” (1969) by Philip K. Dick. I will apply important concepts from gender theory, including gender roles and gender stereotyping, and analyze how society perceives the behaviors of characters of different genders. For example in the science fiction story “The Priestess who Rebelled” a woman leaves her territory to become independent and ends up becoming a “damsel in distress” who is saved by a strong, young man. The story minimizes the woman’s agency by undermining her quest for independence. Gender stereotyping is portrayed in the fantasy story “The Princess and the Goblin,” which begins by focusing in detail on how a princess is supposed to look: “Her face was fair and pretty, with eyes like two bits of night sky, each with a star dissolved in the blue.” The issue of gender roles and stereotypes in science fiction and fantasy literature has only recently become a topic of scholarship, although many authors in these genres have depicted society’s expectations for men and women. This topic is important because we can look at how society views women through how they have been depicted in science fiction and fairy tales.

*The Creation of "New Eden" in the Vitae of St. Cuthbert and St. Brigit*

Maria Johnson  
Mentor(s): James D’Emilio  
Program: Humanities

Saints’ Lives (Vitae) are biographies that proclaim the power of holiness. Their authors, known as hagiographers, describe miracles, like healing and exorcism. In two Vitae from early medieval Ireland and Britain, Cogitosus' Life of Brigit and Bede's Life of Cuthbert, animal miracles are prominent. Here, animals become righteous and tame servants of man. Why would Bede and Cogitosus include these distinctive miracles? Some argue that they "Christianize" popular pagan traditions; others read them as allegories of human conduct, not as events significant in themselves. I argue that the hagiographers' true focus is on the saints' obedience, mimicking that of Jesus whom Paul characterized as the "new Adam." Thus, saint become like Adam, with proper dominion over animals and close communion with them. The animals' miraculous characteristics represent a return to a more Edenic state. Together, the saint as Adam and the miraculously "enhanced" animals constitute what I call the "New Eden." To show this, I studied how the hagiographer described, arranged, and commented on miracles in light of patristic commentaries on the "New Eden" and accounts of the Desert Fathers of Egypt and Syria. Lastly, through secondary research, I developed a larger understanding of nature miracles in the early Middle Ages.
The paper ultimately shows that the "New Eden" is an ideal for saints; they return to their pre-Fall state and ultimately regain their position as dominator over animals.

**Gaía and Ethics**  
Matt Kibitlewski  
Mentor(s): Mark Hafen  
Program: Philosophy

**Intro:** I am a philosophy major and have been whole heartedly vested in the environment since I was young. I hope to bring together a strong sense of ethics to this project all the while making it accessible to those that are not in the philosophy field. For what is the point of gathering data and presenting it if the laymen cannot understand it; to change someone the path must be as clear as possible. **Goal:** The agriculture industry, more specifically supermarkets, is full of facades that in many ways hinder the consumer from viewing not only the true production process of food but also the ethical and environmental consequences. Consumers are in many ways ‘detached’ from nature. The goal of this project is to bring the issues of ethical responsibility to the foreground and to show that a detachment from nature will result in hindering sustainable effects. **Results:** What I have found from my research is that certain packages of products, for example a package of precut turkey, aide in the detachment of the consumer from nature. Down to the precut slices of turkey; which present an imaginary realm to the consumer about what exactly turkey is, and where they come from etc... This imaginary realm where products are presented shrouded in a façade is where the consumer actually is shopping. **Conclusion:** The way the consumer interacts with nature at a supermarket has to change in order for the consumers itself to 1) take responsibility for the purchases they make and 2) for an increased connection to nature to flourish.

**CREATTE Project**  
**19th Century Phrenology**  
Matthew Krause  
Mentor(s): Marty Gould  
Program: English – Literary Studies

This project was completed as part of the CREATTE initiative. In my research project, I will demonstrate how phrenology was used in Victorian England prior to Charles Darwin published *On the Origin of Species* on November 24 1859. This method of determining one’s personality by examining the size, shape and proportions of one’s skull is examined anthropologically. Rather than merely discrediting this pseudo-science for its arbitrary and bigoted rationale (reasons contemporary literary academics have discrediting it for almost two centuries) this project inspects the average Victorian’s notion of skull shapes and their relation to personality. Research utilized to ascertain the nature of this cultural phenomenon come from middle/upper-class periodicals, medical and otherwise published between 1830 and 1859, when phrenology was most studied and most accepted within Great Britain as a serious science. The poster aspect of this project proves to illustrate how phrenology worked back in the 19th century. Although it has since been dismissed, many literary works during this time period refer to phrenology and make assumptions based on its assumptions. This poster aims to enlighten avid and casual readers of 19th century literature, British and otherwise, of what these phrenological references look like physically.
Marcus Aurelius on Religion and Superstition: Political Pragmatism and Social Unity
Vincent McCoige
Mentor(s): Julie Langford
Program: History/Philosophy
On the surface it seems difficult to reconcile Marcus Aurelius’ religious tolerance and efforts at inclusivity with his persecutions of the Christians and other minority cults. However, upon closer examination we will see that he held a deeply pragmatic political view of proper religion as a social stabilizer, stemming from what seemed to be an academic agnosticism. This will be demonstrated through comparison of Aurelius’ policies to his contemporaries, as well as examination of more modern scholarship on his tolerance and persecution, with special attention paid to his reaction to various cults and the purposes he saw them serve in his empire.

**CREATTE Project**
Children’s Education in Victorian Novels and Periodicals
Angelica Melecio, Cory Engle
Mentor(s): Marty Gould
Program: Literary Studies
In his discussion of the reading habits of 19th-century Britain, Richard Altick states, “The kind of literature that was most in demand was the kind that somehow reflected, as newspapers did, the world”; that is to say, Victorian writers were fascinated with themselves, and expressed this fascination in their depictions of contemporary society. This tendency towards “Realism” in Victorian fiction provides a unique opportunity for studying 19th-century Britain’s views on “education,” particularly as expressed in Charles Dickens’s Hard Times and Mary Elizabeth Braddon’s The Doctor’s Wife. These novels are even more significant when viewed in discourse with periodical magazines – another 19th-century invention – as these mediums tended to blend fact and fiction in ways that reward close comparison. Our preliminary cross-examination of these novels and periodicals has exposed a particularly harsh, “fact-based” type of education prevalent in 19th-century Britain, and significantly, one that was deeply stratified by class and gender: Males’ education placed greater emphasis on outdoor activities; females were often instructed in domestic “duties”; and the lower classes engaged in more tactile, artisan-based programs than their middle-class correlates. All education, naturally, was closely intertwined with religion. The very nature of this particular approach to literary criticism and cultural studies entails a rewarding and enriching research experience that will be beneficial to the work and its writers. In this paper, the research experience will be documented along with an analysis of primary and secondary sources, which will help to explain the representation of education in 19th-century Britain.

Collecting Memory: Oral History of the Hillsborough County Sheriff’s Office
Mechelle Morgan
Mentor(s): Philip Levy
Program: History
The Hillsborough County Sheriff’s Office has been in operation since 1845. With that time comes a rich history. However, as crime fighting is their top priority, the history of the department had fallen to the wayside. As part of an effort to curb this loss of knowledge is the conducting of oral history projects with different members of the Sheriff’s Office. The first of these interviews was
with Senator Malcolm Beard, Sheriff from 1965-1978 and this paper will discuss both the procedures and outcomes of the interview. We hoped that asking questions about how he became involved in law enforcement, we would be able to better understand his perceived role in the agency. Also questions about what it was like to be in other areas of law enforcement allowed for better knowledge on positions that are no longer. By asking the Senator questions such as this, we were able to learn much more about his life. We hoped that we would gain an insight into a part of his life and were able to gain knowledge not only on his life but also how politics and law enforcement worked during the 1950-70’s. As Senator Beard was the man who brought professionalism to the agency, we were interested in finding out his reasons for this change. Learning what he considers his greatest accomplishment was humbling and enlightening.

**CREATTE Project**
*Depictions of Race and Culture in Science Fiction by Women*
Claudette Okyere
Mentor(s): Amy Clanton
Program: Biomedical Sciences
My research will investigate depictions of race and culture in science fiction; I will analyze *Angels Unawares* (1966) by Zenna Henderson and *Fledgling* (2005) by Octavia Butler. Both authors are American women but they differ in race: Octavia Butler is an African-American whereas Zenna Henderson is White, and as women they are traditionally underrepresented among authors of science fiction. The purpose of this study is to analyze how the topics of race and culture have evolved in science fiction from the years of 1966 to 2005. Through meticulous analysis and close reading, I will demonstrate how each author shows ideas of racial and cultural difference. I will also note the depiction The Other in these works. Further, I will support my analysis through research of secondary sources such as the article “Science Fiction Culture” (2000) by Dirk Remley. Conclusively, I aim to present how race and culture, topics that are typically obscured when people think of science fiction, are central and evolving topics in this genre.

**CREATTE Project**
*The Evolution of Research*
Amanda Paradis, Amy Haywood
Mentor(s): Marty Gould
Program: English
In our research course, we have been exploring the cultural contexts of Victorian fiction. We have developed research methods that help us answer questions about the novels we study by using the popular magazines as a cultural archive. By writing a series of research reports that connect novels and periodicals, we have been able to uncover a clearer picture of what life was like in the nineteenth century. By developing broad research questions, we have narrowed down our searches to relate back to the novels we have read and develop new ways of analyzing important textual themes. In our presentation we will show how we have refined our research methods with each report in order to both expand the scope of the search and more precisely target the most relevant results. We will also show how a particular aspect of life in the nineteenth-century evolved over the years, not only through the periodicals but as seen in our novels as well. Lastly, we will show how our research questions have evolved with each report to guide our searches. As a result, our
presentation will conclude on the importance of using different research methods, the necessity to combine the analysis of fiction with periodical evidence, and how a certain issue evolved through both fiction and magazines.

**CREATTE Project**

*The History of Chinese Written Language and Influence on Japanese Kana*

Rachel Perry  
Mentor(s): Philip Bishop  
Program: International Studies  
All that is known concerning the origin of Chinese written language, hanzi (kanji), are theories, but the influence of this spectacular system is nothing if not evident. In modern times, it is believed that the Chinese kanji system is the oldest continuing writing system and many countries derive their written language from it. In this presentation, I will introduce the known history of kanji as well as etymology and evolution of its characters. Included in this history is the spread of these symbols to influence the alphabets of surrounding countries, primarily Japan. I will show this invaluable influence by focusing in particular on the use and adaption of kanji by the Japanese and end by comparing the current systems of both countries.

**CREATTE Project**

*Gender Roles*

Lien Phan, Maureen Gavin  
Mentor(s): Amy Clanton  
Program: Biology; Communication Science and Disorders  
Our analysis investigates fantasy short stories including stories from Andrew Lang’s collected work of international fairy tales, *The Red Fairy Book* (1890), including “The Death of Koschei the Deathless,” “The Three Princesses of Whiteland,” as well as Robert Young’s short story *L’Arc De Jeanne* (1965). We will compare how these texts reflect gender roles, identity, and stereotyping, as well as ideas of essentialism and social constructivism. Furthermore, we will investigate the depiction of societal expectations based on gender and positive or negative responses towards characters that go against cultural expectations. It is important to recognize how men and women are seen or treated differently by society, and the reader can see the point of view of society in the way the stories present gender roles. These works give the reader a reflection of the culture and what is considered normal based on gender. As some of the most traditional forms of literature, fantasy and fairy tales clearly depict changing gender norms.

*Nietzsche's Last Human and Modern Society*

Sophia Pothen  
Mentor(s): Ali Elamin  
Program: Biomedical Sciences  
Through close readings of the “Prologue” to his *Thus Spoke Zarathustra* and several other works, I will explain the German philosopher Friedrich Nietzsche’s warnings to and hope for humanity. In 1885, Nietzsche forewarned of modern society’s gradual degradation into what he described as the “last human beings” - a problem that occurs due to humanity’s tendency to live without questioning norms, traditions, and beliefs, as well as due to their overvaluing of comfort and
happiness. Through a comparison between Nietzsche’s last human being and contemporary U.S. society, I will show that we are well on our way to becoming what Nietzsche warned us against. However, Nietzsche also offers a hopeful vision to inspire us to avoid this danger. I will explain Nietzsche’s hope that humans can rise out of the mediocrity of the last human and instead pursue self-overcoming or self-mastery in order to achieve the overman. The presentation will push the audience to question the half-hearted lifestyle of today’s society as well as the meaning of being human. I will conclude that, to a large extent, Nietzsche was correct about humanity and will invite the audience to think about his solution to the mediocrity that he believes is characteristic of last humans. It is crucial to understand and appreciate Nietzsche’s challenge to individuals to overcome themselves by pursuing self-mastery and free-spiritedness, and thereby to begin the careful walk across the long rope that separates the human from the overman.

A Hierarchy of Power: Examining the Propositions Surrounding Sexuality in Ayn Rand’s The Fountainhead
Stephanie Potthoff
Mentor(s): Taylor Mitchell
Program: English Literature
Ayn Rand’s work and her philosophy of Objectivism are topics that typically cause debate. Her ideas surrounding individualism are often seen as radical and scholars have examined the implications of her work on economics and to a lesser extent on the individual itself. What conversation exists in the literature on characters in her works focuses on the male characters and how they interact with the world, how they change and affect it. A perspective of Rand’s work that has been glossed over is that of gender issues and sexuality which are heavily prevalent, especially in “The Fountainhead.” Every aspect of her writing integrates to create an interwoven network of foundations to explicate her philosophical principles, including her concentration on sexual relationships. Rand creates new notions of sexual interest and love that connect directly back to her own principles of self-reliance and in doing so flip those classic notions that can be seen in other fields such as psychology and sociology. Through the growth of Dominique Francon, we see a discord with archetypal development of relationships from social sciences and the development of relationships through a succinct understand and possession of self. In this project I argue that Rand uses the sexual relationships of three different men with Dominique to create a hierarchy of power of men to illustrate her philosophy of Objectivism.

The State of Mind: Questioning Identity and Imperceptible Crucial Aspects of Life
Andrea Roger
Mentor(s): Susan Mooney
Program: Literature
In the modernist short stories “Odour of Chrysanthemums” by D. H. Lawrence and “Bliss” by Katherine Mansfield, the minds of the protagonists experience a realization of who they and others actually are as people. My study compares the life of the mind in these stories through an examination of narrative style and symbolism. The authors’ narrative style incorporates how the life of the mind is perceived in life-changing moments. The syntax and third-person point of view lets the reader inside the characters’ thoughts and emotions, at times resulting in a stream of consciousness. Further, I compare symbols to reflect how the minds of the main characters view
their lives. Lawrence and Mansfield use flowery symbols to illustrate the women’s sexuality in marriage. The symbols demonstrate how the women are suppressing their sexuality because their marriages are based on companionship. My research shows how narrative style relates to identity and how the symbols incorporate how the mind works; they also help us interpret the women’s lives. My presentation includes research from literary critics of Lawrence, Mansfield, and modernism, such as Michael Bell and his “Metaphysics of Modernism.” As Bell explains, Modernism is an era in which authors are concerned with how the mind works in literature. I argue that Lawrence and Mansfield demonstrate how the mind works with emotions and thoughts to question identity and unobvious but crucial aspects of life.

**Matriarchal Marketing: The Emperor, the Empress, and the Army**
Jenni Royce
Mentor(s): Julie Langford, Eleni Manolaraki
Program: History/Anthropology

During the reign of Emperor Septimius Severus (193-211 CE), his wife Julia Domna received the title of Mater Castrorum, or Mother of the Camp. Because of this, most scholars have assumed that Julia Domna had a close relationship with the military. Recent research has found that the Mater Castrorum title was little used by the imperial administration when talking to the military or by the military itself, but was common in the administration’s communications with civilian populations. Langford theorized that the title was used by the imperial administration not to persuade the military but to inform to civilian populations that he and his family had the unwavering support of the military (2013). This impression would discourage any political dissent among civilian populations and shows a far more nuanced use of propaganda in the Roman Empire than earlier scholars imagined. My research investigates the later empresses named Mater Castrorum to determine whether the title was employed in the same fashion as under Severus. After examining the coinage and inscriptions mentioning this title, I found that the imperial administration seldom employed the title, certainly not in coinage and rarely in inscriptions. Civilian and military populations used it often in their dedicatory and milestone inscriptions. These empresses lived during the 3rd century CE, a period marked by economic decline and nearly continuous civil war. My findings suggest that the nature of ideological negotiations between the imperial administration and various populations shifted dramatically during this period. My research suggests that in times of crisis, the populations talked back to the administration, thus actively participating in ideological negotiation and making their desires more obvious to the imperial administration. This research therefore helps to shed light on a time period during the later Roman Empire that is not well documented in current scholarship.

**CREATTE Project**
*An Analysis of the Socio-Cultural Influences on the Nick Carter Detective Dime Novel Series*
Stephen Strenges, Adnan Campara, Beryl Johnson
Mentor(s): Cynthia Patterson
Program: International Studies; Biology; Mass Communications

The term dime novels refer to short stories that were a dominant part of U.S. popular culture during the 19th and early 20th centuries. The novels were popular for their price of around 10 cents and targeted primarily the young, working class population. Detective stories were just one
popular dime novel genre – others include western, adventure, sports, military, and romance tales. The USF Libraries Special Collections division houses one of the largest dime novel collections in the country, and our study will analyze just one series within the detective novels in USF’s extensive collection. The purpose of our study is to analyze the societal and cultural influences throughout the publication period of the Nick Carter detective series. Our analysis focuses on the Nick Carter series because its series endured for over 20 years, a significant length of time for many dime novel series. We will be presenting our findings through an open-source web developing software called Omeka. This multi-page website will provide downloadable digitized editions of several Nick Carter dime novels from representative years of the series long publication run, in addition to plot analyses, and brief reviews of the scholarly literature on the genre of the detective dime novel. Because little research exists on the subject of dime novels, we wish to offer an insight into how these dime novels reflected and shaped the socio-cultural milieu of the late 19th and early 20th century America. Published during a time of rapid industrialization and a huge influx of immigration, this neglected popular cultural form reveals a significant amount about prevailing contemporaneous attitudes towards race, class, and gender in American culture.

*Preparing for Future Hope: Analyzing the Hidden Clues in the Sociology of Science Fiction Stories*

JoAnn Tebo

*Mentor(s):* Melanie Griffin

**Program:** Interdisciplinary Social Science

Science Fiction is often cited as an incubator of thoughts and inventions. These constructs are derived from the host cultures. The aspirations of a culture shed light on their understanding of both their past and present. This presentation examines how science fiction, from various cultural backgrounds, represents the cultures it proceeds from and their aspirations. It evaluates the responses of Earth cultures in encountering the Other by examining the sociological implications of these encounters as an expression of the author’s unique cultural heritage. The University of South Florida Library in Tampa, Florida, and its Special Collections Science Fiction and Fantasy collection provided the materials examined for this project. The work was created as part of an exhibition for the Special Collections Department. The methods include literature searches, narrative inquiry and literary analysis following the framework of a series of questions and evaluations based on research by Hamdan, Vengadasamy, Yusof & Hashim (2012) in “Ideas in Science Fiction: Probing Contemporary Contexts through Science Fiction Texts.” This presentation analyzes the impressions and reactions of Earth natives and the sociological constructs they are based upon. The results reveal the cultural antecedents of the characters and the universal attitudes exhibited with other peoples. Conclusions are discussed, especially as a factor of understanding our unique and collective attitudes, as members of the human race, before we encounter other civilizations.
Researching a Holocaust Survivor's Experience
Elyse Warren
Mentor(s): Barbara Lewis
Program: History/International Studies
Introduction: The atrocities that occurred in Latvia under the Nazi and Soviet regimes during the Holocaust have received marginal scholarly documentation in comparison to that of the Holocaust in Poland and Germany. Public access to records and documentation is minimal due to loss and privatization of records during Soviet occupation resulting in scarce research on the subject. The goal of this project is to take the written testimony of German Holocaust survivor Erika Mannheimer and produce an interactive online exhibit for students to witness her story and access timelines and scholarly essays on each place she discusses in her account. Method: Correspondence between international and domestic university scholars and contact with the United States Holocaust Museum, Riga Archives, and various Concentration Camp Memorials was utilized in gaining the information necessary for the essays on the Concentration Camps and Ghettos Erika was an inmate of. In addition, was extensive use of our library’s resources and interlibrary loan from international facilities. Reference to records and artifacts provided by the survivor’s son Richard Oppenheimer was essential to contextualizing her story as well. Results: Contextualizing and piecing together the missing fragments of the survivor’s diary. Conclusion: To curate an interactive online exhibit in the form of a Facebook page that will include a series photos and scholarly essays related to the survivor’s testimony. The Facebook format is a familiar setting for students and will provide easy access to documents for research on the Holocaust.

**CREATTE Project**
Rabbit Holes, Thimbles, and Yellow-Brick Roads: The Evolution of Gender Roles in Changing Media
Elizabeth Weatherly, Chelsea Stulen
Mentor(s): Amy Clanton
Program: English; Art
This project was completed as part of the CREATTE initiative. Taking a classic story and “reinventing” it has a long history in literature, and as a society we are continually reusing the same stories over and over again. For our presentation, we will be discussing the representations of three classic characters and their portrayals in many forms of media: first, Alice, a young girl who falls down a rabbit hole; second, Wendy, a young girl whisked away by a flying boy; and third, Dorothy, a young girl who is swept away in a storm to a foreign land. All three characters were created by men, and all three stories follow the same overall pattern of taking a character from a normal world to a strange and fantastical land. These three characters’ stories have been recreated in film, television, and videogames; however, most of these recreations don’t faithfully adopt the portrayals of these characters in the original texts. As time has progressed, these characters have changed along with society and matched the changes in cultural values and gender roles. Through our study of these different media, we will present how the different representations have changed with society since the books’ initial publication.
Marine Sciences

**Organic Carbon Burial Rates in Mangrove Soils: Tampa Bay in a Global Context**

Shaza Hussein  
**Mentor(s):** Joseph Smoak, Joshua Breithaupt  
**Program:** Environmental Science and Policy  

Wetland ecosystems are among the most biogeochemically active ecosystems and represent the largest component of the terrestrial biological carbon pool. Mangrove forests are wetlands which characterize the transition zone between upland and marine environments along the tropic and sub-tropic coastlines. Recent studies have revealed that these wetlands play a significant role in global carbon cycling as high quantity producers and buriers of organic carbon (OC), storing up to four times as much carbon as their terrestrial counterparts and therefore serving a vital role in mitigating climate change. This research examines OC burial rates in a mangrove forest along the coast of Tampa Bay, Florida. Two 50-cm deep cores of 10-cm in diameter were collected, freeze-dried, and sectioned for homogenization and analysis. Soil accumulation rates were determined by measuring the deposition of \(^{210}\text{Pb}\) in the soil over time and gravimetric analysis was conducted through aliquot sampling of each interval for wet, dry, and loss-on-ignition (LOI) weights. Total organic carbon was measured at Florida International University Southeast Environmental Research Center Lab using a Finnigan Delta C EA-IRMS (with TC/EA). Our results will determine the age, mass accumulation rate, soil accretion rate, total organic matter (OM), and total OC of our samples for comparison with similar site studies and the global mean values. We hypothesize that the Tampa Bay mangrove ecosystem will have higher OC burial rates compared to global mean rates due nutrient inputs.

**Real-time NASBA Assay for Discrimination among Four Common Florida Grouper Species**

Dominik Lipinski  
**Mentor(s):** David John, Robert Ulrich, John Paul  
**Program:** Biology  

The purpose of this research has been the development and application of a species-specific molecular genetic test capable of distinguishing Florida’s four most common grouper species. A real-time nucleic acid sequence-based amplification (RT-NASBA) assay for detection and discrimination of four primary Florida grouper species has been developed. These are gag grouper (**Mycteroperca microlepis**), red grouper (**Epinephelus morio**), scamp grouper (**M. phenax**), and goliath grouper (**E. itajara**). The assay targets a sequence from the mRNA transcript of the cytochrome oxidase subunit I (COI) gene which is specific for each of the four species of grouper. Methods used to address our goal involved the design of a NASBA assay of oligonucleotides including species-specific beacons and optimization of NASBA methodology. Each specific beacon served as an oligonucleotide probe that gave off fluorescence upon hybridization to the targeted sequence. Two different hardware platforms, namely EasyQ and a portable NASBA analyzer, were used. In combination with a short RNA extraction procedure from tissue prior to nucleic acid amplification, our EasyQ as well as the handheld NASBA devices selectively and consistently detected targeted molecules for each of the four grouper species, while excluding non-target grouper species. This RNA based COI gene technology presents an analytically competent addition or substitute to DNA sequencing. The assay was successfully applied to rapid detection and confirmation of the four grouper species, and is therefore a useful tool for the study of identification and confirmation of grouper in the seafood industry as well as in marine conservation biology.
Psychoeducational Implications of Neurodevelopmental Disorders in Early Childhood: A Case Study of OMS
Ricci Allen
Mentor(s): Heather Agazzi
Program: Biomedical Science
Objectives: The purpose of this poster is to provide healthcare providers who work with children with neurodevelopmental disorders an overview of the psychoeducational implications associated with this population and offer information on neuropsychological assessment and intervention planning. Methods: We will use the International Classification of Functioning, Disability and Health for Children and Youth as a framework for understanding outcomes for young people with developmental disabilities. Specifically, a description of childhood opsoclonus-myoclonus syndrome (OMS) will be presented, with an emphasis on known psychoeducational implications and assessment and intervention planning. A case study of a preschool-aged child with OMS will serve as a practical illustration of psychosocial and behavioral effects of neurodevelopmental disabilities. Results: Childhood OMS was selected because it is a rare disease that is often misdiagnosed, resulting in a delay in medical treatment causing stunted neurodevelopmental and motor growth. Conclusion: Neuropsychological assessment and early intervention is critical to improving long-term outcomes for children with neurodevelopmental disorders. Because of the rarity of OMS, children are often misdiagnosed at disease onset resulting in lost time for treatment. The long-term neurological and behavioral sequelae of OMS affects a child’s functioning in society. Use of the ICF-CY framework may facilitate communication between healthcare providers, caregivers and educators in their efforts to create plans for children with neurodevelopmental disorders. This information is useful in the fields of medicine, psychology, nursing, speech & language pathology and physical/occupational therapy.

Characterization of a Family of CAAX Proteases in Staphylococcus aureus
Gary Camper
Mentor(s): Lindsey Shaw
Program: Microbiology
Staphylococcus aureus is a Gram-positive facultative anaerobe that causes a wide variety of human disease, ranging from skin infections and food poisoning; to more life threatening illnesses such as toxic shock syndrome and endocarditis. Since the development of antibiotics, S. aureus has displayed the uncanny ability to acquire resistance to these agents in a relatively short period of time, giving rise to strains such as methicillin-resistant Staphylococcus aureus (MRSA) and vancomycin-resistant Staphylococcus aureus (VRSA) strains. In addition to highly antibiotic-resistant hospital-associated (HA) MRSA strains, there is an increase in community-associated (CA) MRSA strains, which infect otherwise healthy individuals. S. aureus is so successful, in part due to the many virulence factors it possesses. Many of these factors are inserted into the cell envelope, or secreted in the extracellular milieu. In many bacteria, CAAX-proteases are responsible for processing secreted proteins at prenyl groups on CAAX motifs, where C is cysteine, A is any aliphatic amino acid, and X is any amino acid. In this study we have characterized the function of the 5 CAAX-proteases in S. aureus: SACOL1036, SACOL1830, SACOL2018, SACOL2306, and
SACOL2470. We present transcriptional profiling, along with phenotypic assays which reveals a number of sensitivities to existing antimicrobial agents. As these proteases likely have overlapping roles, we also explore the viability of multiple CAAX-protease mutants in CA-MRSA *S. aureus* strains. Collectively our data suggests that these enzymes play an important role in the growth, physiology and resistance of this important human pathogen.

**Necrotic Cells Trigger ENaC Suppression in Human Alveolar Epithelial Cells**

Annie Castillo, Toaa Abuelenen  
**Mentor(s):** Narasaiah Kolliputi, Prasanna Tamarapu Parthasarathy  
**Program:** Biomedical Science

Acute Lung Injury (ALI) is a syndrome caused by trauma to the lungs resulting in widespread damage to the structures of the alveolar capillary membrane. ALI is characterized by rapid breathing, hypoxemia, and pulmonary edema. Epithelial sodium channels (ENaC) are associated with clearing the accumulation of fluid from the lungs, thus making them the main avenues for resolution of pulmonary edema. Studies have identified necrosis, a localized cell death, as a pathway contributing to ALI. However, the effects of necrosis on ENaC in the lungs are unknown. We hypothesize that exposing lung epithelial cells to necrotic factors in vitro leads to a suppression of ENaC. Necrosis was induced in A549 (Human alveolar epithelial cells) and THP-1 (monocytes) cells through repeated two-minute cycles of freezing and thawing. Whole cell lysates or supernatants obtained from necrotic A549 or THP-1 cells were added to a lawn of A549 cells and incubated at 37°C for 20 hours. Levels of ENaC protein expression were analyzed using Western Blotting. There was a substantial decrease in ENaC protein expression in A549 cells treated with both necrotic A549 and THP-1 whole cell lysates. Increasing suppression of ENaC was apparent with increasing cycles of freeze and thaw, compared to controls (Non-necrotic). Our findings indicate that necrosis triggers a suppression of ENaC, therefore suggesting that necrosis leads to the alveolar fluid build-up, a characteristic feature of ALI. The exact mechanism of necrosis remains unknown, however, elucidation of this pathway could provide future opportunities for development of new treatments for ALI.

**Diminished MCM Helicase Levels Leads to Dramatic Chemosensitization in Gastrointestinal Tumor Cell Lines**

Roy Elias  
**Mentor(s):** Mark Alexandrow  
**Program:** Chemistry

Gastrointestinal cancer accounted for approximately 17% of new cases in 2012. These cancers are characterized by high mortality rates, as the 5 year survival of a gastrointestinal tumor averages 10%\(^1\). This demonstrates the dire need for novel therapeutic approaches. The purpose of this study was to evaluate the MCM helicase as a potential drug target in gastrointestinal tumors. The MCM helicase is believed to unwind DNA before replication. While an excess of MCM helicases has long been observed in replicating cells, a function for these extra proteins remained unclear. A recent finding, however, has demonstrated a need for these excess MCM helicases to overcome replicative stressors in replication. This finding is extremely pertinent to cancer as many chemotherapeutic agents act to impede replication. This led to the hypothesis that eliminating the excess MCM helicases in cancer cells would lead to hypersensitization to chemotherapy. To test
this hypothesis, RNA interference was used to eliminate the extra MCM helicases. Cell viability post siRNA treatment was monitored to ensure only the excess MCM helicases had been eliminated. The efficacy of four common chemotherapeutic drugs on three different gastrointestinal cell lines with their extra MCM helicases removed was then evaluated. A dramatic increase in chemosensitization across all cancer cell lines was observed. These findings suggest that the targeting the MCM helicase can be an effective new treatment in cancer. This method could lead to higher current treatments being applied at lower doses, increasing the therapeutic index and reducing systemic toxicity.

**Genomic Sequencing as a Novel Mechanism for Comprehensive Analysis of Polymorphisms in Primary Immunodeficiency Disease**

Kristina Gemayel  
**Mentor(s):** Gary Litman  
**Program:** Biochemistry  
Genomic sequencing is quickly proving itself as a revolutionary tool in medicine and clinical diagnosis. In the present research, exome sequencing is utilized to further study a highly complex pattern of mutations involving lambda5 and the lambda5 pseudogenes that produce multiple aberrant alleles that give the impression of being introduced through gene conversion, and indicate a novel mechanism of primary immunodeficiency disease. In a full term female patient, an exome sequence has been carried out using Illumina® technology. A total of $5.5 \times 10^9$ total bases have been acquired from $55.2 \times 10^6$ reads, which represents a 53-fold average genome coverage (Otogenetics Corp.). Preliminary analyses of the lambda5 sequences in the patient using DNANexus confirm the same four variant alleles that were identified by conventional exon priming and sequencing. The observed genetic lesions seen in both comprehensive screen of gene amplicons and the exome sequence of the patient is entirely consistent a gene conversion event.

**Effects of the Arginine Alpha-Ketoglutarate and the Ketogenic Diet on Amyotrophic Lateral Sclerosis**

Craig Goldhagen  
**Mentor(s):** Dominic D’Agostino  
**Program:** Microbiology  
Amyotrophic Lateral Sclerosis (ALS) more commonly known as Lou Gehrig’s disease, is a neurodegenerative disorder of motor neurons causing progressive muscle weakness, paralysis, and finally death from respiratory failure. There is currently no cure or effective treatment for ALS. Motor neuron death results from impaired energy metabolism, which is linked pathophysiologically to mitochondrial dysfunction. Metabolic therapy that produces hyperketonemia enhances mitochondrial function and may represent a therapeutic approach for ALS. In this study we hypothesized that alternative fuels in the form of ketone bodies, specifically arginine-alpha-ketoglutarate (AAKG) and the ketogenic diet (KD), will increase motor function and survival in a mouse model of ALS (SOD1G93A mice). ALS mice were fed a diet with metabolic substrates and cofactors containing the main ingredient of AAKG (10% weight) and a KD (80% fat) high in medium chain triglyceride (MCT oil), that is metabolized into ketone bodies. Treatment with AAKG or the KD improved motor performance assessed using an accelerating rotorod. Our preliminary results demonstrate that metabolic therapy with AAKG and KD
attenuates ALS-specific motor impairment in a mouse model of ALS. Ongoing experiments are being done to determine if the metabolic therapy prolongs survival. In conclusion, supplemental AAKG or the KD is a feasible metabolic therapy that may prolong motor function and quality of life of ALS patients.

**Artificial Cells with Nano-engineered Surface**

**Tyler Hickerson**

**Mentor(s):** Anna Pyayt

**Program:** Chemical Engineering

Here we present two types of biocompatible microparticles decorated with both high and low-aspect ratio nanowires designed for maximization of the surface area while maintaining the same volume. The cores of the particles are made from a paramagnetic material, so that collection of these magnetic particles can be relatively easily performed with a magnetic field in many media, including human body. The particles are highly fluorescent, and therefore can be easily tracked both in-vitro and in-vivo. Furthermore, high-aspect ratio nanowires can penetrate the cell membrane. These nanowires can be functionalized with medication, so that the particles decorated with them can be used for intracellular drug delivery. Particles with low aspect-ratio nanowires provide high specific surface area for capturing and/or extracellular delivery of large quantities of payloads without causing damage to cells or penetrating cell membrane.

**Screening of New Drugs for the Treatment of Alzheimer’s Disease**

**Twisha Jani**

**Mentor(s):** Umesh Jinwal

**Program:** Biology

**Introduction:** Alzheimer’s disease (AD) is a neurodegenerative disorder. One of the factors involved in the disease is accumulation of microtubule associated protein tau. Tau protein plays a critical role in the stabilization of microtubules. In AD tau disengages from the neuronal microtubules and aggregates leading to neuronal death and ultimately severe memory loss.

**Hypothesis:** Novel drugs identified from the drug screen could open new avenues for the development of more effective drugs to cure or delay AD progression.

**Methods:** Stably tau transfected HeLa cells were treated with various drugs from the NIH Drug Library or a vehicle DMSO control. Cells were harvested 24 hours post drug treatment by using M-PER lysis buffer. After protein estimation, samples were loaded on to a gel; and gel electrophoresis was performed. Gels were then transferred onto membranes and treated with antibodies. Lastly, the membranes were exposed onto X-ray film to measure the reduction of the tau bands.

**Results:** Cells treated with F3 and F4 drugs showed a potent reduction in tau protein level compared to the vehicle control treated cells.

**Conclusion:** Among several screened drugs, so far 2 potent tau-reducing extracts were identified. These drugs will be taken for further analysis in various Tau based AD models.
Protein Purification and Crystallization of a Cyclin-Dependent Kinase CDK16
Zein Kattih
Mentor(s): Ernst Schonbrunn
Program: Cell and Molecular Biology
Cyclin-dependent kinase 16 (CDK16, PCTAIRE1, PCTK1) belongs to the PCTAIRE protein kinase subfamily, which contains serine to cysteine substitutions in the PSTAIRE motif of the C-helix in CDKs. CDK16 is regulated via phosphorylation-controlled cyclin binding, specifically cyclin Y (CCNY). The CDK16 gene is found on the X chromosome in a region increasingly associated with a number of genetic diseases. CDK16 is predominantly expressed in the testis and brain and is associated with B-cell development in the pancreas. When tested, CDK16-knockout mice were viable but infertile due to resulting irregularities in spermatozoa. Importantly, CDK16 has been found in mammalian neural regions, especially in Purkinje and pyramidal cells in the hippocampus. As PCTAIRE kinases have only been found in animals, it has been speculated that they have a significant function in neurons. Moreover, high levels of expression have been demonstrated to contribute to impaired learning in rats. Structural studies of CDK16 will allow the biochemical and structural characterization of human CDK16. To facilitate structural elucidation, recombinant CDK16 was overexpressed in E. coli, purified by fast protein liquid chromatography (FPLC) and subjected to co-crystallization experiments with a kinase inhibitor library. Evidence from the structural studies will be used for the structure-based design of CDK16-specific inhibitors as chemical probes to interrogate the function of CDK16 in normal and diseased cells.

Computational Ecology: Elucidating Novel Chemical Defense Mechanisms of Antarctic Sea Sponges
Fiona Kearns
Mentor(s): Bill Baker
Program: Chemistry
In 2000, it was discovered that the Antarctic Sea Sponge, Isodictya erinacea, produces a novel secondary metabolite, erebusinone. Researchers observed the species remained relatively free of predation in its environment despite a lack of defense spicules. A possible defense mechanism related to erebusinone biosynthesis was thus postulated. Supporting this hypothesis is the structural similarity between erebusinone and xanthurenic acid, a known endogenous molt inhibitor in crustacean species. Herein, we propose that erebusinone interacts with select cytochrome P450s in a manner similar to xanthurenic acid thus inhibiting the production of ecdysteroids released at various developmental stages in crustacean hemolymph. This hypothesis will be validated via computational modeling. Since neither the sequence nor crystal structure of crustacean P450s in the ecdysteroids pathway are known, we have initially focused on building homology models. Insects and crustaceans have been shown to have similar regulatory pathways. Thus, we have constructed protein models for the Drosophila melanogaster strain CYP314A1 and CYP315A1. Models have been refined and tested with a combination of structure prediction tools and Molecular Dynamics simulations. Further, docking studies are being carried out to determine the key interactions between xanthurenic acid / erebusinone and P450’s heme binding site. Results from the current work should elucidate the binding modes and possible reaction mechanisms of xanthurenic acid and erebusinone with the respective P450 enzymes.
Asymmetric Synthesis of Amitifadine: A New Approach via Co(II) Metalloradical Catalysis
Jennifer Le
Mentor(s): Peter Zhang, Xin Cui
Program: Biomedical Sciences

Major depressive disorder is among the leading causes of disability in developed countries, affecting 16.6% of American adults. Amitifadine, an azobicyclo[3.1.0]hexane, is an investigational antidepressant that functions as a triple reuptake inhibitor of serotonin, norepinephrine, and dopamine. This drug promises to have fewer side effects and greater efficacy than the therapeutic agents that are currently available. Therefore, it is important to develop an efficient synthesis for this antidepressant candidate. Essential to this compound’s function as an inhibitor of the twelve-transmembrane receptors is a synthetically-challenging cyclopropane ring with two contiguous chiral centers. Previously, the Zhang group has developed a system for the asymmetric cyclopropanation of olefins utilizing cobalt(II) complexes of chiral amidoporphyrins. In 2006, Merck scientists developed a synthesis for Amitifadine via a single-stage process without isolation of intermediates. However, this synthesis requires a chiral starting material, suffers from moderate trans versus cis selectivity, and involves a difficult recrystallization process. To address these weaknesses, this work aims to develop a new synthesis using only achiral starting materials and cobalt(II) porphyrin catalyzed asymmetric cyclopropanation as the key step. In order to optimize the cyclopropanation step, a large library of porphyrin catalysts was screened under different conditions. The structures of subsequent intermediates were confirmed using NMR spectroscopy, HPLC, and X-ray crystallography. Results indicate that this new method can achieve efficient synthesis of the final pharmaceutical product with high enantiopurity and diastereocontrol. This work provides direct evidence for the application of the cobalt(II) metalloradical catalysis towards drug development.

MicroRNA-16 Regulates Pulmonary Artery Smooth Muscle Cell Proliferation and Apoptosis
Tran Luong
Mentor(s): Narasaiah Kolliputi
Program: Cell and Molecular Biology

Objective: Pulmonary artery hypertension (PAH) is characterized by a rise in pulmonary vascular pressure and excessive proliferation of human pulmonary artery smooth muscle cells (hPASMCs). Serotonin mediates hPASMC’s contraction and proliferation through serotonin transporter (SERT). Recently, microRNAs have been shown to be involved in pathogenesis of PAH. MicroRNA-16 targets SERT and CyclinD1. Our previous results show that miR-16 was downregulated in hypoxic PAH mice. In the present study we investigated the phenotypic consequences of overexpression of miR-16 in hPASMCs in vitro. Methods: hPASMCs were commercially obtained and cultured according to manufacture instructions. Cells were transfected with plasmid containing miR-16 expressing or control vector by electroporation. Post transfection, cells were treated with different concentrations of serotonin. Proliferation, contraction, membrane potential, and apoptosis assays were performed to assess the effects of miR-16 in PAH. Results: hPASMCs transfected with miR-16 decreased the expression levels of cyclin D1 and SERT when compared to controls. Additionally, there was a significant suppression in proliferation, enhanced increased in apoptosis and TMRE in miR-16 overexpressed hPASMCs when compared to vehicle transfected cells. Decreased levels of Smad2/3 and PCNA were observed in miR-16 transfected
hPASMCs. Conclusions: Overexpression of miR-16 significantly suppresses proliferation, increases apoptosis, modulates contraction, and decreases mitochondrial membrane potential in the presence of serotonin. Further, miR-16 overexpression downregulates SERT and CyclinD1 levels, which mediates PASMC's proliferation. Taken together, our results indicate miR-16 is a potent regulator of proliferation and apoptosis of PASMCs and it could be used as a novel treatment strategy in PAH.

**Effects of 5-aminoimidazole-4-carboxamide Riboxime (AICAR) and Rapamycin on Mitochondrial Dysfunction in Mouse Embryonic Fibroblasts (MEFS) Modeling Rapid Aging**

**Kenyaria Noble**
**Mentor(s):** Patrick Bradshaw, Vedad Delic

**Program:** Biology
Aging and aging related diseases, such as Alzheimer’s and Parkinson’s disease, have been associated with mitochondrial dysfunction. Mitochondrial dysfunction is characterized by increased reactive oxygen species (ROS), decreased mitochondrial membrane potential, and decreased ATP production. Here we show protective effects of AICAR and rapamycin on E1A-transformed mouse embryonic fibroblasts (MEFs). MEFs were isolated from knock-in mice containing a D257A mutation in the mitochondrial DNA (mtDNA) polymerase gamma (POLG) gene, which results in the lack of proofreading activity and accumulation of missense and deletion mutations in mtDNA. The mice were constructed in attempt to discern the role of mtDNA mutations in the aging process, since these mutations also accumulate with age. AICAR, an intermediate in purine de novo synthesis, is a potent activator of AMP-activated protein kinase (AMPK) pathway and is commonly known as “the exercise drug”. AMPK alpha subunit (aak-2) overexpression has been shown to extend lifespan in C. elegans. Rapamycin, an activator of the mTOR pathway, is an immunosuppressant commonly used in organ transplantation and cancer therapy and can extend the lifespan of mice. AICAR and rapamycin treatments of WT and POLGD257A MEFs in low glucose with pyruvate increased ATP levels. These treatments decreased oxygen consumption in POLGD257A MEFs and increased oxygen consumption in WT MEFs. The results indicate that mtDNA mutations causing mitochondrial dysfunction alter the effects of the mTor and AMPK signaling cascades on electron transport chain activity. Future experiments will determine the phosphorylation status of mTor and AMPK and their targets to determine how decreased mitochondrial function alters kinase signaling.

**The Role of Reelin Processing in Synaptic Function of the Hippocampus through Autocrine Signaling**

**Caroline Northup**
**Mentor(s):** Edwin Weeber, Justin Trotter

**Program:** Biology
Dysfunction of cortical gamma-aminobutyric acid-ergic (GABAergic) interneurons and haploinsufficiency of Reelin are hypothesized to contribute to cognitive impairment in patients with schizophrenia. The precise mechanisms by which declines in reelin and GABAergic dysfunction contribute to the cause of schizophrenia have not been thoroughly investigated. However, their mechanisms of action may be interrelated. This study determined that Reelin directly influences the function of GABAergic interneurons. Combinations of biochemical,
Electrophysiological, and behavioral approaches were used to understand how Reelin signaling onto GABAergic interneurons influences hippocampal function. Researchers found that increasing Reelin in vivo upregulated the levels of the GABA-synthesizing enzyme GAD67, while reducing GAD67 levels with a genetic deficiency of Reelin. Dab 1, the downstream adaptor protein, was expressed by a sparse subset of GABAergic interneurons throughout the forebrain. This suggested that Reelin may directly modulate inhibitory neurotransmission through autocrine signaling. This hypothesis was tested by producing GABAergic interneuron-specific dab1 knockout mice to prevent Reelin signaling exclusively in GABAergic interneurons. Forebrain development was normal in these mice. However, adult mice had impaired hippocampal synaptic plasticity and alterations in learning and memory. These data are the first to describe a role for Reelin as a regulatory of inhibitory interneuron function and strongly suggest that reduced Reelin levels and GABAergic interneuron dysfunction in schizophrenic patients are interrelated.

**Optimization of a Novel InCell-Western Technique for the Screening of TDP-43 Targeting Drugs**

**Diego Peralta**

**Mentor(s):** Umesh Jinwal

**Program:** Microbiology

Introduction: Amyotrophic lateral sclerosis (ALS) disease is characterized by degeneration of motor neurons leading to muscle weakness, disability, and finally death. Currently, this disease has no cure. One of the major factors in ALS disease progression is the abnormal accumulation of the RNA-binding protein, trans-active response DNA-binding protein 43 (TDP-43) in nerve cells. The accumulation of TDP-43 leads to a loss of cellular function; thereby it impairs the viability of the affected nerve cells. Hypothesis: Developing a new high-throughput technique like InCell-Western (ICW) will expedite the drug discovery efforts either to cure or delay the ALS disease progression. Methods: N9 microglia cells expressing TDP-43 were passed in 96-well plates. At ~90% confluency, cells were fixed with formaldehyde and blocked with Odyssey buffer. Various amounts of TDP-43 antibody were added to different wells to identify the optimal amount of antibody for ICW. After overnight incubation cells were washed and treated with infrared-labeled second antibody for 1 hour. Finally, plates were read and analyzed on Odyssey Infrared Imager and software. Results: ICW data analysis showed 1:1000 dilution of TDP-43 primary antibody is enough for the detection of TDP-43 signals. Conclusion: We have optimized TDP-43 antibody amount and various conditions for the ICW technique. Our next goal is to screen a drug library to identify novel drugs for ALS by using newly developed TDP-43 based ICW technique.

**The Effects of Caloric Restriction on Isolated Brain Mitochondrial Function in a Transgenic P301L tau Mouse Model of Alzheimer’s disease**

Tam-Anh Phan, Sandra Zivkovic

**Mentor(s):** Patrick Bradshaw, Vedad Delic

**Program:** Biomedical Sciences

INTRODUCTION/HYPOTHESIS: Caloric restriction (CR) has been shown to delay aging and many aging-related diseases in animal models. Therefore, we placed Tg4510 transgenic P301L tau Alzheimer’s mice on a CR diet, sacrificed the mice at 8 months of age, and measured many facets of cerebral cortical mitochondrial function to determine if mutant tau causes mitochondrial...
dysfunction in this model and if CR mutes any of the effects of tau expression on mitochondrial function. Methods: Rupturing mitochondria by mechanical means, differential centrifugation at low speed to remove debris and large cellular organelles, centrifugation at high speed to isolate and collect mitochondria. Respiration was measured using a Clark oxygen electrode. Mitochondrial membrane potential was measured using the dye JC-1. ROS production was measured using 2',7'-dichlorofluorescein diacetate. RESULTS: P301L tau mice mitochondria showed a higher membrane potential (MMP) than the wt. Higher membrane potential, and inability to achieve maximum oxygen consumption when given excess ADP likely indicates that P301L tau mice mitochondria were unable to use the high MMP optimally for oxidative phosphorylation. These results are likely explained by ATP synthase dysfunction in P301L tau mice mitochondria. The alpha subunit of ATP synthase plays a key role in ATP production. CONCLUSIONS: P301L tau mitochondria were unable to obtain optimal respiratory rates in the presence of ADP. P301L tau mitochondria were able to generate and maintain a high MMP but were unable to use it effectively for ATP synthesis. Caloric restriction does not improve P301L tau-induced mitochondrial dysfunction, but does have a small positive effect on wt mitochondria.

*Development and Characterization of Alpha-Synuclein Stable Cells for Therapeutic Targeting of the Polyamine Pathway*

Devon Placides  
**Mentor(s):** Daniel Lee  
**Program:** Biomedical Science  

Synucleinopathies are disorders characterized by intracellular and extracellular alpha-synuclein (a-syn) aggregation and pathology. One of the main diseases associated with a-syn pathology is Parkinson’s disease (PD). Current therapeutics for PD only provides symptomatic relief, however still pathology continues. In addition, the mechanism of a-syn pathogenesis in synucleinopathies remains elusive. Recent studies have shown that polyamines which are involved in many biological processes promote a-syn aggregation. The goal of this study was to develop a stable cell line that overexpresses a-syn in an effort to screen drugs and identify molecular targets and pathways that impact a-syn. The cells were stably transfected with wildtype a-syn using lipofectamine with G418 positive selection. Once the cells were stably transfected several agents were used for drug screens including agents that modify polyamine levels (i.e. DENSPM) and kinases. Western blot analysis showed a decrease in casein kinase II (CK2) and polo-like kinase II (PLK2) (two proteins shown to phosphorylate a-syn at the serine 129 position) following DENSPM treatment. Furthermore, DENSPM also slightly reduced a-syn levels. DBR, a CK2 inhibitor, decreased a-syn phosphorylated at the serine-129 position. Ongoing experiments involve additional drug screening. Overall we suggest targeting the polyamine pathway as a therapeutic strategy for modifying a-syn levels.

*Crizotinib’s Potential to Treat Other Diseases besides Non-Small Cell Lung Cancer by Arresting Cell Cycle in G2/M and Inducing Apoptosis in Human Cancer Cells*

Isaac Raplee  
**Mentor(s):** Jiazhi Sun  
**Program:** Cell and Molecular Biology  

In 2011 the FDA quickly approved Crizotinib, a first ever inhibitor of the ALK/MET tyrosine kinase receptor, for the treatment of non-small cell lung cancer (NSCLC). Tyrosine kinase
inhibitors have been shown to act on other molecular targets due to their off-target effect. TKIs also act pathways that run parallel to TKR activation, e.g. nuclear receptor pathways. We propose that Crizotinib acts on other molecular targets in addition to the primary ALK/MET target(s), such as Akt pathway. There is a complex network of kinases that work together to regulate important cellular processes. These off targets may be exploited for the treatment of other diseases including additional cancers and metabolism disorder. By utilizing the chemical-protein interactome approach to calculate and visualize off-target proteins and Crizotinib binding affinities we have discovered the top five off-targets for Crizotinib. After the off-target proteins were established, flow cytometry analysis and apoptosis assays were carried on. The top five proteins with the highest binding affinity for Crizotinib were Lck, HDAC 7A, MAPK3, S6K and PPAR-γ, with Z’ scores of -2.2778, -1.5384, -1.4672, -1.1242 and -1.6145 respectfully. This shows that Crizotinib has a broad range of interaction between not only TKs but also serine/threonine kinases and nuclear receptors. Preliminary results of the flow cytometry analyses and apoptosis assays show Crizotinib arrest cells cycle in the G2/M and induces apoptosis in different human cancer cells. Based on these data Crizotinib affects other pathways besides those directly involved with the ALK/MET and potentially treats other cancers, besides NSCLC.

Screening for Modulators of Hydrolysis Activity in XLMR-linked Protein Acyl Transferase, DHHC9 R148W
Phillip Sanchez
Mentor(s): David Mitchell, Robert Deschenes
Program: Cell and Molecular Biology
The reversible posttranslational modification of palmitoylation regulates intracellular localization of Ras, a small GTPase implicated in many cancers and disorders such as XLinked Mental Retardation (XLMR). Mutant Ras Protein Acyl Transferase (PAT) DHHC9 R148W was previously discovered to be linked to XLMR and serves as a viable drug target for inhibition. A highthroughput screen has been developed utilizing a fluorescencebased NAD coupled assay. Small molecule and natural substance libraries are used to probe hydrolysis activity of the thioester bond created during formation of the palmitoylPAT complex. Initial screens have been promising, identifying palmerolides as possible candidates for future study. We aim to identify further hits and broaden our candidates for mutant PAT inhibition.

CD36 Mediation of the β-Amyloid Signaled Neuro-Inflammation Following Traumatic Brain Injury
Meaghan Staples
Mentor(s): Cesar Borlongan, Naoki Tajiri
Program: Biomedical Sciences
Traumatic brain injury (TBI) affects over 1.7 million people in the United States annually resulting in over 50,000 fatalities. TBI is the result of a blow to the head resulting in a primary insult. This primary injury is followed by a secondary insult resulting from biomolecular changes and the inflammatory response within the injury site and surrounding tissue. β-amyloid accumulation, a hallmark of Alzheimer’s disease, has recently been observed following TBI. A class B scavenger protein, CD36 has been shown to mediate the microglia response to accumulated β-amyloid by promoting sterile inflammation and the release of pro-inflammatory cytokines and reactive oxygen.
species (ROS). To observe the potential relationship between \(\beta\)-amyloid initiated inflammation and CD36, adult, male, Sprague-Dawley rats were euthanized and brain tissues harvested three days after moderate controlled cortical impact (CCI). Antibodies against the CD36, \(\beta\)-amyloid, the cell proliferation marker Ki67, and the neural stem cell marker nestin, were used for staining in the cortex, subventricular zone (SVZ), and hippocampus of TBI and control rats. Preliminary results showed the presence of CD36 positive cells predominantly at the site of injury, with additional CD36 positive cells on the contralateral side, following a controlled cortical impact. However, the relationship between the \(\beta\)-amyloid initiated neuro-inflammatory response and CD36 in acute TBI pathology are not well understood. This study reports the potential of CD36 as a biomarker and screening tool for stem cell based clinical therapies in acute TBI.

**Structure Based Inhibitor Discovery against Beta-lactamase in Countering Bacterial Resistance**

Nick Torelli  
**Mentor(s):** Yu Chen  
**Program:** Biology/Chemistry

Antibiotic resistance is a worldwide epidemic that is growing in magnitude. One of the main resistance mechanisms against \(\beta\)-lactam antibiotics, the primary antibacterial chemotherapeutic agents, is the production of serine \(\beta\)-lactamasases in Gram-negative bacterial pathogens. These enzymes hydrolyze \(\beta\)-lactam antibiotics such as penicillins and thereby render them unreactive with their original targets, the penicillin binding proteins essential for bacterial survival. There is an urgent need for inhibitors that can restore susceptibility to \(\beta\)-lactam antibiotics in multi-drug-resistant Gram-negative pathogens. My research project has consisted of cloning TEM-1, a \(\beta\)-lactamase commonly observed in clinic, and using virtual screening to identify novel, non-covalent inhibitors against this protein. Using the computational program DOCK, I have screened the ZINC database of commercially available small molecules against two binding pockets of TEM-1. From the 500,000 fragment (MW < 250 Dalton) and 5 million lead-like (250 < MW < 350 Dalton) compounds of ZINC, I have identified top ranking compounds that have high potential for binding and inhibition. These compounds will be tested using a biochemical assay. True inhibitors can potentially be developed into new antibiotics in the future to counter drug resistance caused by \(\beta\)-lactamases.

**Calcineurin Inhibitor FK506 Dephosphorylates Cofilin and Reduces A-Beta Generation**

Courtney Uhlar  
**Mentor(s):** David Kang, Jung Woo  
**Program:** Biomedical Sciences

The major defining pathological hallmark of Alzheimer’s disease (AD) is the accumulation of the toxic Amyloid b (Ab) protein, derived from the proteolytic processing of the Amyloid Precursor Protein (APP). We have previously shown that the scaffolding protein RanBP9 promotes Ab generation and induces cofilin dephosphorylation. Cofilin is a key actin severing protein involved in reorganization of the F-actin cytoskeleton and mitochondria-mediated apoptosis. The activity of cofilin is controlled by phosphorylation and dephosphorylation of Serine-3 by Lim Kinase (LIMK) and Slingshot (SSH1), respectively. SSH1 activity is in part regulated by another phosphatase calcineurin, which serves to activate SSH1, leading it its activation and dephosphorylation of cofilin. Because RanBP9 induced the dephosphorylation of cofilin via SSH1 activation and
increased Ab generation, we hypothesized that inhibition of calcineurin could also inhibit Ab generation. To test this hypothesis, we treated Chinese Hamster Ovary (CHO) cells stably overexpressing APP with or without the calcineurin inhibitor FK506. Indeed, we found that FK506 reduced the phosphorylation of cofilin while decreasing Ab generation by altering α- and β-secretase processing of APP. Our results suggest that inhibition of calcineurin by FK506 or other calcineurin inhibitors may be viable therapeutic approaches to prevent or treat Ab pathology in AD.
Natural Sciences

Spatial Mollusk Biodiversity in the Gulf of Mexico; Does Diversity Decrease with Depth?
Jessica Acosta, Nicholas Paasche
Mentor(s): Gregory Herbert
Program(s): Interdisciplinary Natural Science; Geology
The Gulf of Mexico is heavily used for tourism, fisheries, and oil exploration, but little is known about the distribution of biodiversity resources across this region. This research establishes a first-look at biodiversity hotspots for gastropod mollusks across the West Florida shelf, encompassing habitats from the state’s Gulf coastline to depths over 300 meters. We used two quantitative approaches to analyze gastropod diversity. Rarefaction estimates species richness at a given place and allows for standardization for sampling intensity. The second metric, live-dead fidelity, measures differences in composition between the standing (live) community and dead remnants (empty shells) as a way to assess change over time. Both rarefied species richness and live-dead fidelity were visualized using spatial interpolation (ARC), which produces a map of diversity at specific sampling stations and predicted or interpolated diversity between stations. We predict a simple relationship between depth and diversity, with hotspots appearing closer to the shoreline, where benthic productivity is highest. Initial results show that biodiversity is patchy and lower near urban centers and river outflows.

Economic Technique for the Isolation and Purification of High Quality Plasmid DNA
Melissa Adams
Mentor(s): Jia-Wang Wang
Program: Biomedical Sciences
Plasmid isolation and purification is necessary for research in molecular biology. Plasmids are circular, extra-chromosomal DNA often used as vectors to amplify DNA. Plasmids have many purposes in various applications such as gene therapy and recombinant DNA technology. The most efficient technique to isolate plasmid DNA from bacterial cells is alkaline lysis with SDS followed by purification via column chromatography. Although many laboratories follow a similar, general procedure for alkaline lysis, each scientist may have a preferred, unique technique. Many of the current methods involve time consuming protocols using expensive instruments and result in impure products. In this method, cultured bacterial cells are lysed using a series of alkaline lysis solutions, a key component of which is SDS. The plasmid DNA is separated from the rest of the cell fragments, including the chromosomal DNA. Phenol/chloroform extraction and centrifugation is used for the removal of insoluble impurities to avoid blockage in the first round of column chromatography. A second round of column chromatography is performed to desalt the purified plasmid DNA to avoid DNA loss and other remaining impurities introduced by alcohol in the isolation procedure. Compared to other available methods, these steps lead to a very pure product, which is important for further study and application, particularly in order to avoid risk of inhibitory and toxic effects. This technique is a very useful mechanism for the necessary isolation and purification of plasmid DNA; it is economical, time-saving, and reliable with a high yield of high quality product.
Association of RPS19 with AROS and Role of RPS19 in Heat Shock Response
Candice Aiosa
Mentor(s): Sandra Westerheide
Program: Biology
Organisms have developed numerous methods to adapt and survive when faced with different stressors. Heat shock response (HSR) is an example of one such method and has been widely studied. Heat shock factor 1 (HSF1) is the master regulator of this response and up-regulates genes induced upon stress. Normally, HSF1 can be found in the cytoplasm as an inactive monomer. Under stress, it trimerizes, translocates to the nucleus, and binds to heat shock elements (HSE) in the promoter region of heat shock protein (HSP) genes. Upon acetylation, HSF1 loses affinity for the DNA and transcription attenuates. HSPs are chaperones which facilitate the correct folding of denatured proteins. An increase in chaperone expression has been linked to treatment in neurodegenerative diseases while a decrease may be useful for cancer treatment. It has been found that the deacetylase SIRT1 is a regulator of this response. SIRT1 regulators, DBC1 and AROS, have been shown to impact HSF1 activity as well. AROS was originally discovered due to its association with small ribosomal protein 19 (RPS19) and was deemed RPS19 binding protein (RPS19bp). RPS19 mutations have been linked to Diamond-Blackfan anemia in humans. We hypothesize that RPS19 also plays a key role in the complex regulating HSR by forming a complex with other regulatory proteins. Thus far, we have found that RPS19 expression increases upon HS and that HSF1 is recruited to the rps19 promoter.

Highly Efficient Synthesis of Azocompounds by Metalloradical Catalysis
Thiago Arzua
Mentor(s): Li-Mei Jin, Peter Zhang
Program: Chemistry
Azocompounds are organic compounds used as dyes for the recording layer of DVD-R discs, they are also the main component of liquid crystal films capable of image storage, and are even connected to the inhibition of certain steroids’ biosynthesis. The photochemistry behind those compounds has an enormous potential that can be applied in diverse fields of science. Nevertheless, those proprieties are still not fully comprehended, mainly due to difficulties in their synthesis. The best current method of azoformation requires the catalytic oxidation of anilines in a basic environment. This method suffers from low yields, with many side products and a poor substrate scope. It is, thus, highly desirable to develop a new efficient method for the synthesis of azocompounds. Looking to fill this gap, this project proposes a more efficient synthesis. The method presents a highly effective catalytic system based on a Co(II) metalloradical catalyst of fluoroaryl azides, producing the corresponding azocompound with high yields, and high diastereoselectivity. The products are then characterized by $^1$H NMR, $^{19}$F NMR, $^{13}$C NMR, IR Spectroscopy and X-Ray Crystallography. Preliminary results point to an environment friendly new method of azocompounds synthesis – since N$_2$ is the only byproduct – with no side reactions, and that occurs at mild conditions. By being broad and simple, such a new synthesis protocol could be a key step into a new type of photochemistry, which can have applications ranging from biological systems to the possible photosensitive devices of tomorrow.
Bacteria Prevalence in our Water Samples
Ilma Asif
Mentor(s): Mark Hafen
Program: Public Health
This research project was intended to bring light to environmental issues we are not always conscious of. The EcoMentor students picked their individual research project and worked alongside high school students in order to bring awareness. My personal project was focused on the amount of bacteria prevalence in our water sources. The goal was to see if there was enough bacteria where there could be hazardous health affects to the population. I predicted there would be a significant amount depending on where the water sample was retrieved from, however most likely not enough to cause health effects that would put the population at major risks. My methods consisted of a lot of personal online research, focusing on case studies and recordings of health outbreaks which seemed to stem from water based sources. I also communicated with the City of Tampa’s Water Department, and was able to obtain some good insight on bacteria prevalence and hazards regarding the city’s water supply. I am still finalizing my results but I feel they will be what I predicted; there is a significant amount of bacteria in our environment but not enough to cause significant health issues.

Role of PLSCR1 in Modulating Cell Death Responses and EGFR Function/Trafficking in Epithelial Cancer Cells
Hussain Basrawala
Mentor(s): Meera Nanjundan, Karthik Kodigepalli
Program: Biomedical Sciences
The current state of epithelial cancer treatment remains limited in its effectiveness for improving patient survival. To develop improved long-term positive outcomes for these patients, it is critical to investigate the function of dysregulated genes in cancer development. One particular protein that plays a role in modulating cellular survival is Phospholipid Scramblase (PLSCR1, amplified at 3q23 in ovarian cancers). PLSCR1 has been proposed to modulate phosphatidylserine (PS) externalization in apoptotic cells, growth factor mediated signaling events, and cancer progression. Herein, we have evaluated the role of PLSCR1 in modulating As2O3 (a chemotherapeutic agent used in treatment of APL) mediated cell death response. Via western analysis, apoptosis assays, and autophagy assays, we determined that knockdown of PLSCR1 in HEY ovarian cancer cells markedly increases cleaved PARP (apoptosis marker) and reduces LC3-II levels (autophagy marker) suggesting that PLSCR1 can influence As2O3-induced cell survival responses. Furthermore, we propose that PLSCR1 may regulate the internalization and nuclear movement of EGFR in cancer cells. We have previously reported that both EGFR and PLSCR1 co-internalize upon EGF stimulation. As an initial step, we have now optimized the subcellular fractionation methods and generated relevant PLSCR1 mutant/deletion constructs to elucidate the potential importance of the structural domains of PLSCR1 in regulating EGFR function and localization. Ultimately, improving our understanding of the role of PLSCR1 in epithelial cancer progression will surely contribute to the advent of more effective treatments for patients with aggressive epithelial cancers.
Metabolomic Screening of an Endophytic Fungus through Competitive Co-culture with Aspergillus niger

Riley Bednar, Shaney Penas
Mentor(s): Bill Baker, Christopher Witowski

Program: Microbiology

Secondary metabolites are an invaluable reservoir for novel pharmaceutical compounds, particularly for new antibiotic leads. Competition for resources among organisms often elicits the production of secondary metabolites as a defensive measure to ward off antagonists. Such interactions result in the activation or overexpression of biochemical pathways leading to the biosynthesis of new compounds, analogues or titer enhancement of minor metabolites. Exposure to competitors through co-culturing may stimulate the expression of previously unknown compounds. Solid-state co-culturing offers a unique method to trace the identity, quantity, and point-of-origin of secondary metabolites produced during exploitative competition. Aspergillus niger and an endophytic fungus from the Caribbean sponge Xestospongia muta were co-cultured on agar plates and their regions of interaction and individual mycelium extracted. Fractions were subjected to Kirby-Bauer assays to determine positive bioactivity against Bacillus subtilis and A. niger. Liquid Chromatography-Quadrupole Time of Flight analysis (LC-QToF) was used to compare metabolomic profiles between control and co-cultured conditions in both fungi to reveal upregulation of metabolites. For further analysis, compounds will be isolated and elucidated using Nuclear Magnetic Resonance (NMR) guided fractionation.

Cytoprotection Assay of Two Oxidative Stressors in C. elegans

Philip Bowers
Mentor(s): Sandra Westerheide, Jessica Brunquell

Program: Biochemistry/Integrative Biology

Cells encounter a number of stressors that require the induction of various survival mechanisms to promote adaptation to stress. Two of the main mechanisms cells use to survive are the heat shock response (HSR) and the oxidative stress response (OSR). The HSR is a highly conserved stress response that is activated by protein damaging stress, and is responsible for maintaining protein homeostasis as mediated by the master transcriptional regulator heat shock factor 1 (HSF1). The OSR arises from an imbalance of reactive oxygen species (ROS) and functions to restore the redox balance as mediated by the transcription factor Nuclear Factor Erythroid-derived 2-Related Factor 2 (Nrf2). By using C. elegans as a whole model organism it is possible to study the interactions between these pathways by assaying for survivability upon coupling various stressors. We show here that a minor oxidative stress followed by a lethal heat shock (HS) proves to be cytoprotective in wildtype (N2) C. elegans. Understanding the manner in which these two central stress response pathways affect one another could be beneficial in better understanding cross-talk in mechanisms used to survive stress.
Solid Phase Separation Utilizing HKUST-1 MOF
Alex Cole
Mentor(s): Bill Baker, Jacqueline Fries
Program: Biomedical Sciences

Metal Organic Frameworks (MOFs) have recently received much attention as tools for analytical separation. MOFs are a form of organic molecules, stacked into crystalline structures by inorganic linkers such as metal ions. MOFs have previously been shown to have the capability of gaseous separation and absorption. For natural product research, where small molecule isolation is of primary interest, it was hypothesized that these MOFs could be used in a new form of solid phase separation. The pore size for HKUST-1 is known to be 9.5 Å, a considerably larger size than most MOFs. Although smaller pore sizes have proven efficient at hydrogen absorption, a larger pore size was selected in an attempt to capture these larger organic molecules and potentially filter out unwanted molecules of similar polarity. As natural compounds such as highly polar sugars, salts, and highly non-polar fatty acids saturate samples, it would be highly beneficial if HKUST-1 were capable of separating such compounds from natural products of interest. The following experiment utilized HKUST-1, a three dimensional crystalline structure synthesized with benzene-1,3,5-tricarboxylic acid and a copper linker. Assorted compounds, including organic molecules ranging from 100-950 amu were loaded onto a column packed entirely with HKUST-1 in an attempt to influence separation throughout the pores. HKUST-1 was subject to multiple MPLC trials and monitored with LC/MS. Suggesting that MOFs have the capability to capture organic molecules of such magnitudes may demonstrate the substantial uses of MOFs as an inexpensive and practical instrument in analytical separation.

High Throughput Screening of Antimicrobial Compounds against Staphylococcus aureus
Rebekah Cook
Mentor(s): Lindsey Shaw
Program: Biology

Staphylococcus aureus is a highly adaptable organism that has become a successful pathogen through its ability to acquire resistance to a wide variety of antibiotics (e.g. methicillin resistant S. aureus; MRSA). It is one of the leading causes of hospital and community acquired infections, and can cause devastating disease anywhere in the human body; ranging from localized skin lesions to septic shock. Recently, an ordered transposon library of mutants has been created (the NARSA collection), comprised of inactivations of all the non-essential genes of S. aureus. To make use of this collection in the study of S. aureus disease and physiology, we have developed a 96-well plate based screening assay using eight mechanistically different antibiotics. Firstly, we determined the effects of each of these drugs on the growth and susceptibility of eight different wild-type strains of S. aureus, by exposing them to varying concentrations of the different agents. This assay was then used to test a collection of mutant strains from the NARSA library that we projected would have key roles in growth and physiology. Using these eight mechanistically distinct antibiotics, we have identified numerous differences in growth and susceptibility in the NARSA library mutants. As such, our work not only shows that our method is effective in high-throughput screening many different strains of S. aureus, but also identifies key genes/pathways as being attractive targets for future study.
Amphibian Behavioral Resistance to Chytridiomycosis
Kaitlin Deutsch
Mentor(s): Jason Rohr, Matthew Venesky
Program: Environmental Science
Chytridiomycosis, the fungal disease caused by *Batrachochytrium dendrobatidis* (Bd), has been linked to global amphibian declines. Although Bd infection often leads to mortality, amphibians may exhibit resistance behavior to reduce their Bd load. We conducted two experiments to test whether Oak Toads (*Anaxyrus quercicus*) can use behaviors to reduce their infections and whether these behaviors are innate or learned. In experiment one, we placed individual toads in an arena containing Bd+ and Bd- substrates and tested whether toads could detect and avoid Bd. We then experimentally cleared the toads of their infection and repeated this experiment on the same individuals multiple times. If toads have an innate avoidance of Bd, we predicted that they would spend more time on the Bd- side of the container. If avoidance is a learned response, we predicted that toads would avoid Bd but only after being previously exposed and infected. We then conducted a second experiment to test the relationship between behavioral resistance and infection load. We predicted that individuals who spent proportionally more time using behaviors that minimize contact with a Bd+ substrate (e.g., standing on their tippy-toes or on the wall) would have lower Bd infections. If behavioral resistance is a learned response, we predicted that toads would increase their resistance behavior as the experiment proceeded. Results did not show an increase in resistance behavior over time, but did display an increase in avoidance behavior. This indicates that toads can detect and avoid Bd and that this behavior is learned, not innate.

The Effects of Fungicides and Chytrid on the Tree Frog
Whitley Dillon, Geurdine Alcius
Mentor(s): Jason Rohr
Program: Cell and Molecular Biology; Biology
Fungicide use has increased greatly in recent years while most aquatic toxicological research on pesticides continues to focus on herbicides and insecticides. Globally, many amphibian populations have experienced declines and a well-established contributor to these declines is the chytrid fungus *Batrachochytrium dendrobatidis* (Bd). Fungicides could be killing Bd and improving amphibian health, but only if this indirect effect of the fungicide outweighs the direct effect of the fungicides on amphibians. Hence, we need to understand the net effect of fungicides on amphibian-Bd interactions to understand whether fungicides have beneficial or harmful effects on amphibians, the most threatened vertebrate taxon on the globe. We evaluated the net effect of environmentally common concentrations of common fungicides (Chlorothalonil, Azoxystrobilin, Mancozeb, or solvent control) and Bd on Gray tree frogs (*Hyla versicolor*) using a combination of mesocosm and laboratory experiments and simultaneous and sequential exposures to these two factors. The fungicide exposure did cause Bd mortality, but the frogs were more likely to die when exposed to the fungicides and Bd than either factor alone. These results emphasize the importance of considering the combined, net effects of multiple stressors to adequately assess their impacts on taxa of conservation concern.
**Mixture-based Combinatorial Libraries as a Tool for the Discovery of Novel Antibacterial Agents against ESKAPE Pathogens**

Renee Fleeman  
**Mentor(s):** Lindsey Shaw  
**Program:** Microbiology  

The CDC estimates that approximately two-thirds of all hospital-acquired infections in the US are caused by the ESKAPE pathogens: *Enterococcus faecium, Staphylococcus aureus, Klebsiella pneumoniae, Acinetobacter baumannii, Pseudomonas aeruginosa, and Enterobacter cloacae*. These organisms are resistant to the majority of our antibacterial arsenal; making the discovery of novel compounds effective against them vital. To this end, we screened forty combinatorial libraries, containing 45,000-700,000 compounds each, leading to a total of >2.8 million different agents. Two libraries, 1952 and 2161, were active against all six ESKAPE pathogens, whilst 2157 was active against five pathogens, and 1954, 1955, 2160 and 2079 were active against four pathogens. A further 17 libraries were active against anywhere from 1-3 pathogens, with the remaining sixteen libraries displaying no activity. The top seven libraries, which affected 4-6 pathogens, were tested further for specific MIC concentrations. From this we determined that the most active compounds were from 2157, a bis-cyclic guanidine scaffold library. Specifically, this library had an MIC ≤0.5 μg/mL against *S. aureus*, and an MIC of 5 μg/mL against *A. baumannii, E. faecium, and E. cloacae*. Further bis-cyclic guanidines were synthesized that demonstrated bactericidal activity against multiple ESKAPE pathogens. These new compounds were also examined using MIC, MBC, and MBEC assays. In vivo efficacy was explored using a Galleria mellonella model of infection. Our results identify important hits for the future development of antibacterial agents, and prove that usefulness of screening very large synthetic combinatorial libraries for the development of antimicrobial agents.

**Total Nitrogen in Florida Water Sources**

Dena Garcia  
**Mentor(s):** Mark Hafen  
**Program:** Public Health  

Total Nitrogen (TN) is a naturally occurring nutrient that is essential for the sustainment of life. TN is composed of nitrites, nitrates, ammonia, and organic nitrogen. However, excessive levels of nitrogen allow for the formation of algae, which decomposes and causes eutrophication. The regulation and control of TN levels are vital ensure the protection of our water. In 2009, the EPA found Florida’s nutrient control measures to be ineffective in protecting the aquatic life. The goal of this research project is to determine the efficacy of Florida’s TN control measures by testing the total nitrogen levels in various bodies of water throughout Florida. The EPA has recommended the average TN levels in water to be between 2mg/L - 6mg/L. I will be testing samples with a Total Nitrogen kit that has a detection range of 0.5 - 35mg/L. The kit measures the sum of all forms of nitrogen found in the water samples. My water samples will be from drinking water, various lakes including Lake Okeechobee, the Hillsborough River, the Tampa Canal, Hillsborough Bay, well water, retention ponds, and Apollo beach. To test the samples, I have TN kits that contain Hydroxide LR digestants, persulfate reagents, vario reagent, and Acid reagent. Using my TN kit containing, I have created a range of standard solutions with known concentrations of Nitrogen. I then measured their wavelengths with a spectrometer to develop a calibration curve. The
calibration curve provides a visualization of the wavelengths compared to the amount of Nitrogen found in the solution. I will be testing my samples for their wavelength and comparing them against the standard solution using the calibration curve. From my results and research, I can determine which bodies of water that contain the highest concentrations of TN and then infer possible causes of high nitrogen levels based off of the geographic location of the bodies of water. I expect my results to show a higher concentration of TN and a lower pH in retention ponds due to the run-off and lack of regulations. Numerous studies have found TN levels that exceeded the EPA’s recommendations. One study found several of Florida’s most lakes to be eutrophic even without the influence of human activity (Bachmann et al., 2012). Another study found a significant increase in TN concentrations in the watershed of Lake Okeechobee and supported the need for nutrient control in Florida’s water (Zhang et al., 2011). This project will bring light to the need for more effective nutrient control measures in Florida’s water and increase the awareness of water quality.

_Elastically Powered Feeding in the Mexican Salamander Pseudoeurycea leprosa_

Emily Hagen  
Mentor(s): Stephen Deban  
Program: Integrative Biology

Many plethodontid salamanders have independently evolved elastica-

lly-powered ballistic tongue projection as a means of maintaining high efficiency feeding at a wide range of temperatures. In these elastic systems, muscle contraction causes a buildup of tension followed by a rapid release of the stored energy, projecting the tongue forward with a much higher power output than expected from muscle alone. This project specifically focuses on the Mexican species _Pseudoeurycea leprosa_ and combines kinematics with morphological data to determine whether ballistic tongue projection is present. Feeding events were filmed with a high speed camera at 10° and 20° Celsius for five individuals. Images were analyzed to determine maximum velocity, acceleration, and power output of the tongue. Different tongue components were examined to compare specialization with performance. These components included the mass of the projector and retractor muscles, mass of the tongue, and length of the tongue skeleton. Morphological specialization suggests adaptations for a far-reaching, fast tongue projection, and the large power outputs observed in this study suggest that elastic energy powers tongue projection in _P. leprosa_.

_Magnetite Fe3O4/Ag Nanostructures with Tunable Silver Shell_

Mohammad Hamdan  
Mentor(s): Xiao Li, Siqi Sun  
Program: Chemistry

Surface enhanced Raman spectroscopy (SERS) is an effective technique in chemical and biomedical study. When molecules are adsorbed on the nano-size metal surface, the Raman signals are strongly enhanced. This study involves developing a novel SERS substrate of Fe₃O₄@Ag magnetic nanostructures which will be employed for biomarker detection and sample pre-concentration. Fe₃O₄ nanoparticles with size of 10 nm have been prepared successfully in aqueous micellar medium at 80°C. To make Fe₃O₄ sensitive in SERS, Fe₃O₄ are coated with silver as shell, and the shell thickness of nanostructures becomes tunable through the adjustment of the ratio between Fe₃O₄ to silver precursor salts. Surface morphology and structure of these nanostructures
Identification and Analysis of a Novel Enterohemorrhagic Escherichia coli O157:H7 Common Pilus Promoter
Carly Harro
Mentor(s): James Riordan
Program: Cell and Molecular Biology
Colonization of the human intestine by commensal Escherichia coli is enhanced by the production of the E. coli common pilus (Ecp) adherence factor. Recent studies have shown that Ecp production by pathogenic E. coli may provide an advantage in colonization over commensal E. coli during infection. Importantly, production of the Ecp has been demonstrated in enterohemorrhagic Escherichia coli O157:H7 (EHEC), and has been shown to be required for efficient adherence to epithelial cells during colonization. The first gene of the ecpRABCDE operon encodes a transcriptional regulator (EcpR) that positively regulates its own transcription, and promotes transcription and production of the downstream gene, ecpA, encoding the major Ecp subunit EcpA. However, the distance between the ecpR and ecpA genes suggests the presence of regulatory elements that control ecpA directly. Therefore, it was hypothesized that an additional promoter was able to direct transcription of ecpA, independent of the promoter upstream of ecpR. To test this, promoter-lacZ transcriptional reporter fusions were created using the regions upstream of ecpR and ecpA to test for promoter activity, coupled with western blot analysis to detect EcpA in both wild-type and ecpR promoter mutant strains. Here, we show that an additional promoter exists downstream of the ecpR translational start site, capable of driving transcription of ecpA, and that its activity is independent of an intact ecpR promoter. These results reveal a new model for regulation of the ecp operon, and suggest a new role for EcpR in the production and regulation of the E. coli common pilus.

Diffusion of Sorbates in SIFSIX-2-Cu-i
Adam Hogan
Mentor(s): Brian Space
Program: Chemistry
One of the most pressing issues of this century is global warming. Global warming has the potential to cause cataclysmic changes in the weather of the Earth if left unchecked. This is why research into stopping global warming at its source, the emission of greenhouse gases, is currently being conducted. Metal-Organic Frameworks (MOFs) are versatile porous structures that can be tuned to selectively sorb greenhouse gases, among other things, from a mixture of flue gas coming from a coal power plant. It is the goal of this research to investigate the role diffusion plays in the separation of these gas mixtures in a recently discovered MOF SIFSIX-2-Cu-i. Diffusion is simulated using a popular molecular dynamics code extended to include explicit polarization. All sorbates diffuse through the channels of SIFSIX-2-Cu-i slower than what would be expected of a noninteracting channel; however the diffusion of CO₂ is several orders of magnitude slower than what would be expected and compared to other sorbates. This slow diffusion may have implications in the ability of strongly selective MOFs to capture CO₂ from flue gas.
The Effect of Drag on Feeding Movements: Salamander Tongue Projection in Aquatic and Terrestrial Environments
Derrick Hudson
Mentor(s): Stephen Deban, Christopher Anderson
Program: Environmental Biology
Within the salamander family Plethodontidae, adult forms can inhabit both terrestrial and aquatic environments. Many taxa use jaw prehension while feeding underwater, however some use tongue projection, which is generally more typical of terrestrial feeding strategies. Performance of tongue projection during underwater feeding events is likely to be heavily affected by increased drag. To better understand how the environment affects tongue projection performance in adult salamanders inhabiting both terrestrial and aquatic habitats, we examined feeding performance in four plethodontid taxa feeding in and out of water. *Desmognathus marmoratus* (aquatic; low-power tongue), *D. quadramaculatus* (amphibious; low-power tongue), *Pseudotriton ruber* (amphibious to terrestrial, high-powered tongue), and *Eurycea guttolineata* (largely terrestrial; high-powered tongue) were selected due to their differences in ballistic tongue projection mechanisms along with the variation in habitat associated with each species. We found that taxa with a high-powered tongue projection mechanism showed greater performance declines in the aquatic environment than those with a low-powered tongue projection mechanism. The performance decline of the high-powered tongue projection suggests that a more significant impact of drag from water on the high-powered mechanism could be a reason why a low-powered tongue projection mechanism seems to be prevalent among the more aquatic taxa. This trade-off between high performance and reduced performance loss due to drag suggests that the transition from water to land played a significant role in the evolution of the high-powered tongue projection mechanisms within the Plethodontidae.

Functional Morphology of the Smallest Ballistic Tongue
Segall Israel
Mentor(s): Stephen Deban
Program: Integrative Biology
An elastic-recoil mechanism in the tongue-projection system has evolved independently in three lineages of plethodontid salamanders. This mechanism increases performance and provides thermal insensitivity to projection, allowing an advantage over muscle-powered movements at lower temperatures. We hypothesized, based on its morphology and phylogenetic relationships, that the miniaturized bolitoglossine *Thorius*—one of the smallest vertebrates—uses an elastic tongue-projection mechanism like other bolitoglossines (e.g., *Bolitoglossa*). We asked if its small adult size (~20 mm SVL) limits its ability to modulate its tongue movements as do other plethodontids or has other performance consequences. Morphological examination revealed a reduced number of myofibers in its tongue muscles (e.g., 68 fibers in the retractor muscle), and unusual folding of the hyobranchial apparatus. Highspeed imaging (15 kHz) and inverse-dynamics analysis of the tongue projection and retraction movements revealed that tongue projection in *Thorius* is ballistic and elastically-powered, and shows low thermal dependence (Q10 of peak velocity <1.5), while retraction is muscle powered and nonelastic. *Thorius* modulates its tongue movements in response to prey distance and appears to suffer no significant performance consequences of its reduced body size.
Seasonality and Sex-specific Changes in Physiological Integrator Networks of Free-range *Passer domesticus*
Chloe Josefson
Mentor(s): Lynn Martin
Program: Integrative Biology

It is necessary that individuals have a mechanism on the organismal level to sense and change their physiological states to adhere more closely to environmental challenges, as it is very unlikely that one phenotype of any given species will be suitable for all environments across all situations. Phenotypic plasticity is the ability of a single genotype to produce several viable alternative morphological, behavioral, or physiological forms in response to the individual’s external environment. Integrators, such as steroid hormones or chemokines, act as intermediaries between external environmental pressures and internal homeostatic change, as they have effects that have a large impact on the entire organism, allowing them to direct phenotypic change. Further, the integrator receptors themselves are conducive to fostering connections among different axes, as the receptor cells and tissues also have receptors for other integrators, allowing the formation of networks. Currently, the majority of research involving integrators examines one single axis and not in the context of part of a broad-ranging network. The goal of the present study is to further examine these integrator networks in wild avian species. Through using free-range house sparrows (*Passer domesticus*), we are able to further understand the nature of integrator networks during two different life history stages of molting and breeding, as well as examine sex-specific differences in phenotypic control. Corticosterone, luteinizing hormone, testosterone, and interleukin-1β were used as molecular proxies to examine the hypothalamic-pituitary-adrenal axis (HPA), the hypothalamic-pituitary-gonadal axis (HPG), and the immune system, respectively.

Three Dimensional Measure of the Degree of Diversity Exhibited by CDDI’s Global Compounds based on Distinct Fingerprinting Methods
Christopher Konig
Mentor(s): Bill Baker, Ryan Young
Program: Biomedical Sciences

Natural products and secondary metabolites are biomolecules, which are validated by nature. Toxicity is commonly found to be a particular property of these chemical compounds. Such produced compounds are often used for chemical defense by the living organism. Here, an attempt is made to measure the degree of diversity exhibited by the Center for Drug Discovery and Innovation’s (CDDI’s) 151 global compounds. Three distinct fingerprinting methods are applied to each compound after minimizing the total energy via multiple computational iterations of a density functional theory algorithm utilizing Schrödinger’s Molecular Modeling Suite. All multi-processor optimized calculations are run on the University of South Florida’s High Performance Research Computing’s CIRCE Cluster. A viable set of steric, electro-magnetic, and medicinal properties define the variables of the first custom fingerprint. The circular analysis of each atom’s chemical environment within a molecule up to 7 covalent bonds composes the second fingerprint (Molprint 2D). The third fingerprint (MetaPrint 2D) predicts sites of xenobiotic metabolism in humans. Statistical test scores computed by principal component analysis of all compounds for the first observed dimension are plotted for each fingerprint on a distinct axis of a Cartesian coordinate system. Each dimensional distribution is analyzed and reported. The degree of
occupancy of chemical space is reflected by the extent and magnitude of test scores on each axis. A degree of diversity found in CDDI’s compound library provides a reflection of the laboratory team’s joint effort to establish a broad base for drug design and discovery purposes.

**Tailoring GMI of Ultra-soft Ferromagnetic Melt-extracted Microwires for Advanced Sensor Applications**

Trang Luong  
**Mentor(s):** Manh-Huong Phan  
**Program:** Civil Engineering

Due to the increasing requirements of novel sensing applications, developing a new generation of magnetic sensors has been the subject of extensive research. The giant magneto-impedance (GMI) effect of soft ferromagnetic materials has been proposed for the development of high sensitivity magnetic sensors for its superiority over traditional sensors [1, 2]. GMI is the large change in the ac impedance of a soft ferromagnetic material subject to an external dc magnetic field. Magnetic microwires have been experimentally shown to be one of the most attractive candidate materials for use in GMI-based sensors [3]. Current research in this field is focused on tailoring the GMI effect and its field sensitivity in these microwires. In this study we show how the GMI effect and field sensitivity can be tailored in a new class of Co-based melt-extracted microwires over a frequency range of 0.1 MHz – 5 MHz by proper annealing of their amorphous counterparts. The GMI effect has been found to increase with increasing frequency, reaching the maximum value of 500 % at 5 MHz. This value is much larger than that obtained for Co-based glass-coated microwires [3]. These results indicate that the melt-extracted microwires are desirable for a wider range of industrial and bio-engineering applications.

**Computational Studies of rht-Type Metal-Organic Frameworks**

Kyle McDonald  
**Mentor(s):** Brian Space, Tony Pham  
**Program:** Chemistry

Metal-Organic Frameworks (MOFs) are class of porous materials which consist of metal nodes and organic linkers. These materials are ideal for many applications including gas storage and separations, catalysis and drug delivery. These compounds can be functionalized on the pore wall to increase the affinity of a small molecule for the framework; consequently, computational studies can be used to determine the structural units and functional groups that attract certain small molecules. By understanding the functional groups that attract certain small molecules with a high affinity, new MOFs can be designed to optimize the material for certain applications. To achieve this, fragments are selected from a MOF framework and partial charges are fit to the electrostatic surface of the fragment. In order to obtain a true charge distribution, electrostatic partial charges for each selected fragment are fitted to reproduce the potential, as calculated by ab initio methods. This is done for a large number of fragments in order to achieve good agreement of the associated electrostatic partial charges. PCN-61 and PCN-66 are a class of rht-type MOFs which will be the subject of these partial charge studies for gas storage and separations applications. With a better understanding of the functionalities in the framework which attract the gas molecules, optimized isostructural derivatives of these MOFs can be developed.
**Enhanced Intracellular Survival of Group A Streptococci in Macrophages Infected with Microsporidia**

Alicia Nassar  
**Mentor(s):** My Lien Dao  
**Program:** Biology  

**Background:** Bacterial and opportunistic fungal infections are prevalent in immunocompromised and immunosuppressed patients. The fungus microsporidia can escape from the phagosome and replicate within parasitophorous vacuoles in the macrophages, whereas Group A Streptococci (GAS) can survive in these cells. The effect of mixed bacterial/fungal infection on the host cells has not yet been addressed.  

**Working Hypothesis:** The present study has focused on determining the effect of microsporidial infection on the survival of GAS (*S. pyogenes*) in macrophages. It is hypothesized that the blocking of phagolysosome fusion and escape of microsporidia into the cytoplasm and their replication in parasitophorous vacuole may provide an auspicious environment for GAS survival.  

**Methods:** A murine leukemic macrophage-like cell line, designated RAW264.7 was infected with *Encephalitozoon* microsporidia, and then the uninfected control cells and infected cells were inoculated with the same number of GAS. The number of live intracellular bacteria was determined and compared between these two groups. The location of microsporidia and that of GAS was determined by in situ immunohistochemical staining.  

**Results:** The macrophages that were infected with microsporidia (*Encephalitozoon cuniculi*) contained twice the number of viable intracellular GAS ($1.67 \times 10^5$) as compared to the uninfected control cells ($9.7 \times 10^4$), with *p*-value <0.005. Microsporidia and GAS were found to be segregated into distinct areas within the macrophages.  

**Conclusion:** Results from the present study has confirmed our hypothesis, and supports the need to diagnose and treat immunosuppressed patients for microsporidial infection in order to avoid potential complications that could be associated with mixed fungal and bacterial infection.

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**Extraction and Elucidation of Active Compounds from Endophytic Mangrove Microbes of the Florida Everglades**

Luis Perez-Mena  
**Mentor(s):** Dan Utic  
**Program:** Chemistry/Biomedical Sciences  

**Tau proteins modulate stability of microtubules within the central nervous system and cause dementias in humans when defective; as phosphorylated proteins, they play a role in the development of fibrous plaque and eventual neuronal death within brain regions that coordinate cognition in Alzheimer’s disease (AD). Thus, their inhibition via active natural products could prevent the spread of neuron degeneration within the CNS. Laurent Calcul PhD has explored the effectiveness of natural products such as curcumin, geldanamycin, and paclitaxel as candidates for AD treatments. Following the same approach, several fungi samples were isolated from everglades mangroves, grown in enriched media, epigenetically modified with histidine deacetylase (HDAC) to incur the production of secondary metabolites, and tested for activity against the tau protein. All samples with effective hits against the protein were scaled up in 1.4 liters of enriched broth, and their secondary metabolites were isolated using appropriate solvents and techniques ranging from lyophilization and solvent extraction to filtration and liquid partitioning. The crude extracts were then purified into fractions through medium pressure liquid chromatography (MPLC) and...
high performance liquid chromatography (HPLC), based on the sample’s UV light absorption and evaporative-light-scattering signals. NMR and Mass Spectrometry revealed similarities across the spectra corresponding to fractions from different tau-active-fungi, implicating marked compound characteristics or subunits that may account for their inhibitory properties. The active compounds involved were studied for their characteristic structures, composition, and potential to hinder the onset of Alzheimer’s disease.

**Dereplication Library of Cytotoxic Compounds**

Liliana Pimentel  
**Mentor(s):** Bill Baker, Ryan Young  
**Program:** Chemistry

Drug discovery has always investigated natural products in the development of medicinal compounds and even more so in recent years. Namely, secondary metabolites from endophytic fungi which have historically shown promising antibacterial and anticancer properties as exemplified by Penicillin and Taxol respectively. However, for every isolated compound with favorable bioactivity against a disease, there are hundreds more that are known to be too toxic for human consumption and so to re-isolate a compound only to later find it is one of these cytotoxins is both costly and time consuming. Thus, my research aims to composite a dereplication library that contains data from an optimized method on high-pressure liquid chromatography coupled to a tandem mass spectrometer that can quickly identify the presence of nuisance fungal cytotoxins in rapid screening of crude samples from bio-guided fractions. The initial run uses pure standards of these compounds under the parameters set by the current method. Depending on the resulting chromatogram and mass ionization spectra, the parameters are continually modified until optimization is achieved in separating co-eluting compounds reflected by appreciable resolution in retention times on the chromatogram and fingerprint characteristics in the fragmentation pattern of the mass spectra. Because desired products exhibit the same toxicity towards bacterial cells to as these cytotoxins do to human cells, it is no surprise they are also similar in structure and mass. Thus, the resulting optimized method is fine-tuned to prevent the redundant pursuit of useless compounds and overall a more effective drug discovery process.

**Functional Roles of EVI1, Located at 3q.26.2, and It’s Regulation via Ras/PI3K in Ovarian Cancer Development**

Anila Rao  
**Mentor(s):** Meera Nanjundan  
**Program:** Biomedical Sciences/Psychology

Epithelial ovarian carcinoma (EOC) is a major cause of cancer mortality in women; NCI has estimated that 14,030 women will succumb to EOC in 2013. EOC is characterized by extensive regions of genomic aberrations, specifically amplification at 3q26.2 (harboring EVI1 (ecotropic viral integration site-1)), which is an early event in EOC development. We have now also identified multiple EVI1 splice variants (MDS1/EVI1, EVI1<sup>Del190-515</sup> and EVI1<sup>Del427-515</sup>) in EOC. These specific EVI1 variants differentially regulate ovarian cell functional responsiveness in the absence (cyclin E1 expression and motility) and presence of TGFβ (PAI-1 expression). It is notable that TGFβ signaling is dysregulated in EOC. To identify the signaling cascades through which EVI1 expression is regulated, we utilized normal surface ovarian epithelial cells (T80) overexpressing Ras
and ovarian cancer cells treated with inhibitors targeting MAPK and PI3K (signaling mediators
dysregulated in cancer). Our results demonstrate that overexpressed H-Ras in T80 leads to elevated
EVI1 splice variants at both the RNA and protein levels. Furthermore, LY294002 (PI3K inhibitor)
but not U0126 (MAPK inhibitor) alters EVI1 RNA and protein expression. These results implicate
Ras and the PI3K pathway in modulating EVI1 expression. Since EVI1 variants elicit altered
expression in advanced stage EOC and they modulate the functionality of ovarian cells, it is
remarkable that EVI1 expression can be modulated via Ras and PI3K. Thus, we propose that
development of novel strategies to target EVI1 would be critical to alter its expression and
function, which may improve ovarian cancer patient survival.

Isolation and Identification of Secondary Metabolites from Bacterial Cultures
Stephanny Reyes
Mentor(s): Michael Veri
Program: Biology
As a response to microbe-microbe interactions, bacteria produce chemical defenses in an attempt
to survive and outcompete neighboring organisms. These secondary metabolites have been
considered of practical importance in antibiotic susceptibility determination because of the
aspiration that it could potentially be used to treat human infections. The goal of this study is to
produce microbial responses from cultures of bacteria and determine if these chemicals are potent
enough to inhibit the growth of pathogens. To accomplish this task, cultures of bacteria are grown
from surface to bottom sediments obtained from Palmer Station, Antarctica and other labs in
different regions of Florida. After culturing, the bacteria is isolated and frozen. After freezing, the
organisms are lypholized, extracted, and ran through a micro filter. The resulting solution
undergoes Medium Pressure Liquid Chromatography (MPLC) and the desired 50 mg/ml
concentration for the fractions obtained from the MPLC are made. A Kirby-Bauer disk diffusion
assay is then performed using concentrated paper discs composed of the fractions to determine if
any of the fractions inhibit the growth of the pathogen. If so, 1H NMR and HPLC is performed
on the specific fraction to obtain its structure. So far, 58 organisms have been grown and 40
organisms have been Kirby-Bauer assayed. Of these, 27 fractions from a total of 14 organisms had
36 hits across all pathogenic organisms tested. One formula of a compound found was
C_{18}H_{31}N_{3}O_{5}. For now, we are still working on determining structures of all isolated compounds
and determining if they are “new” compounds.

Does the Unique Desmognathine Jaw Morphology Enhance Bite Force?
Jason Richardson
Mentor(s): Stephen Deban
Program: Biology
Analysis of bite force in vertebrates provides insight into performance of behaviors such as defense,
combat, and prey capture and processing. Desmognathine salamanders consume crustaceans and
other salamanders, prey items which require powerful jaws for subduing and crushing. The jaws
are also used in territorial encounters. The robust jaw and skull morphology and unique jaw
mechanics of desmognathines, in which the cranium is flexed ventrally while the mandible is
locked in place by ligaments originating on the atlas, suggest that these salamanders can produce
higher bite forces than comparably sized salamanders. Desmognathus quadramaculatus is an ideal
species in which to test this hypothesis because of its large size (70-120 mm SVL) and willingness to bite. In vivo voluntary bite force was measured during feeding bites using a custom-built piezoelectric bite meter, in both D. quadramaculatus and in the comparably sized Pseudotriton ruber, another salamander-feeder with a more generalized jaw morphology. Desmognathus was found to generate forces over ten times greater than Pseudotriton (8.49 vs 0.59 N on average). A static model of cranial flexion in Desmognathus reveals that the force of the large quadratopectoralis muscles that flex the cranium is amplified over eight times and transmitted by the atlantomandibular ligaments to the mandible via a pulley apparatus.

**The Salicylate-inducible Genotypic Antibiotic Resistance Phenotype of Escherichia coli**

Alyssa Rolfe  
**Mentor(s):** James Riordan  
**Program:** Cell and Molecular Biology  
Background: Salicylate, a major metabolic derivative of the non-steroidal anti-inflammatory drug (NSAID) aspirin, has been shown to induce heritable (genotypic) resistance to multiple antibiotics in the Gram positive bacterial pathogen *Staphylococcus aureus*. This salicylate-associated genotypic antibiotic resistance (SAGAR) phenotype is abrogated in the presence of the antioxidant glutathione and during growth under anaerobic conditions. In an attempt to clarify the mechanism underlying this phenotype, this study tested for the presence of the SAGAR phenotype in the well-studied Gram negative model of *Escherichia coli*. The dependence of SAGAR in *E. coli* on an aerobic environment was also examined. Methods: the number of ciprofloxacin resistant (*Cip*<sup>R</sup>) CFU/ml was calculated for *E. coli* strain K-12 MG1655 plated to Tryptic Soy Broth containing 1.5% agar (TSA) and 0.1 µg/ml (2X MIC) Cip alone or in combination with varying concentrations of sodium salicylate and grown aerobically or anaerobically at 37°C static. A gas lock chamber was used for anaerobic growth. Counts were converted to frequency at which *Cip*<sup>R</sup> mutants appear and compared by a t-test. Results: addition of salicylate (500 µg/ml) to TSA under aerobic conditions increased *Cip*<sup>R</sup> frequency by 3.3-fold (200 µg/ml salicylate) and 52-fold (500 µg/ml) for *E. coli*. Comparatively, addition of salicylate (200 µg/ml) to TSA under anaerobic growth increased *Cip*<sup>R</sup> frequency by 20-fold. Conclusions: The SAGAR phenotype previously described for *S. aureus* is also present in *E. coli*. SAGAR-dependent *Cip*<sup>R</sup> was sensitive to the concentration of salicylate, and to oxygen. Contrary to observations in *S. aureus*, SAGAR-dependent *Cip*<sup>R</sup> was enhanced by anaerobic growth for *E. coli*.

**Detailed Petrologic Characterization of the Whitesides Granite, Western NC: Resolving Assimilation from Magmatic Variability in an Ancient Pluton**

Keir Sanatan  
**Mentor(s):** Jeffrey Ryan  
**Program:** Geology  
The Whitesides granite is thought to be a syntectonic pluton that intruded rocks of the olistostromal Ashe Metamorphic Suite (AMS) around ~470 Ma. The unit is strongly deformed, with regional folding and subsequent erosion segregating it into a series of NE-trending lenticular outcrops. The Whitesides Granite is traditionally described as trondhjemitic/tonalitic due to its strongly leucocratic appearance, and is commonly treated as a single coherent body despite its outcrop pattern and indications of variability at both outcrop and handsample scale. Toward
understanding this variation, we are examining Whitesides Granite exposures in several different localities (Walnut Creek Road; US 64 near Highlands, NC; US 64 east of Cashiers, NC; US 107 N of Cashiers, NC; the NFS Panthertown Wilderness area), using both field mapping and geochemical analysis techniques. Detailed geologic mapping of contacts between the Whitesides Granite and surrounding AMS in Panthertown point to extensive migmatite development along its margins, with extensive stoping and incorporation of AMS metapelites and amphibolites. Even far from contacts, petrographic studies indicate significant variation in plagioclase/K-feldspar ratios, in plagioclase compositions, in the presence of muscovite, and in Fe-bearing minerals (variable amounts of biotite (~0-10% modally), occasional appearance of hornblende). This variation suggests a compositional range extending to Qtz diorite, monzonite, and granite via IUGS classification. This variation may reflect the effects of assimilation of diverse AMS lithologies, or it may record primary variability in the Whitesides pluton. We are using Whitesides and AMS mineral chemistry data, and bulk compositions of the Whitesides granite from these localities to try to document the extent of its petrologic variability, toward constraining its parental magmatic composition(s) and petrogenetic history.

Just Keep Swimming: Temporal Change in Parasite-induced Tadpole Behavior
Roger Stern
Mentor(s): Jason Rohr, Brittany Sears
Program: Chemistry
Immunology is typically attributed to variation in host responses to parasites but behavior is also an important component of parasite-coping strategies. Parasite-induced behaviors can contribute to resistance, decreasing the prevalence or intensity of parasites, but such behaviors can also influence tolerance, the ability of a host to prevent deleterious effects of infection. When exposed to larval trematode parasites, called cercariae, tadpoles exhibit several stereotyped swimming behaviors. To investigate changes across time, we monitored three swimming behaviors (evasive, angled, and normal) in five species of tadpoles (Osteopilus septentrionalis, Gastrophryne carolinensis, Bufo terrestris, Hyla cinerea, and Rana grylio) exposed to varying densities of cercariae (0-30 per tadpole) over the course of one hour. Frequency of evasive behavior was significantly impacted by time, as was normal swimming. Furthermore, there were significant interactions between time and species which affected evasive, normal, and angled swimming. Exposure to cercariae and cercarial density also interacted with species and time to significantly affect all three behaviors. These results suggest that time affects parasite-responsive behaviors in a manner specific to host species, which could have important implications for species differences in resistance and tolerance.

Characterization of Oxygen Consumption in Alpha-synuclein Mutated Neuronal Cells Modeling Parkinson’s Disease
Yen Ta, Yumeng Zhang
Mentor(s): Patrick Bradshaw, Vedad Delic
Program: Biomedical Science
Parkinson’s disease is one of the most prevalent neurological diseases in the aged population. It is characterized by abnormal protein aggregates, known as Lewy bodies, in dopaminergic neurons of the substantia nigra. Alpha-synuclein protein is major component of Lewy bodies. As intrinsically disordered proteins, alpha-synucleins have many possible functions, including protection of
neurons from apoptotic stimuli. Certain mutations in alpha-nuclein genes will cause alpha-synuclein to form helical aggregates, which interrupt normal cellular activities, and cause cell death. Recently, researchers have shown that these mutations are major factors in the familial form of Parkinson’s disease. Though the exact role of alpha-synuclein remains poorly understood, we hypothesize that it is associated with promoting oxidative stress by compromising the inner mitochondrial membrane and the resultant over-production of Reactive Oxygen Species. Our experiment focused on determination of oxygen consumption in neuronal cells that have specific mutations in alpha-synuclein gene. These include syn-A30P, syn-E46K, and syn-A53T, as well as WT21, over-expression due to triplication of alpha-synuclein gene. We hypothesized that all mutants, including WT21, will have reduced oxygen consumption due to mitochondrial dysfunction associated with PD. Respiratory rate was measured using a Clark type oxygen electrode. Results showed a slight reduction in oxygen consumption observed in syn-E46K, and syn-A53T. However, a substantial increase was observed in WT21. One possible explanation is presence of alpha-synuclein in the mitochondrial matrix compromises the mitochondrial inner membrane, resulting in increased oxygen consumption. This disruption of mitochondrial membrane and increased oxygen consumption can result in ROS, a hallmark of PD.

**Chemical Investigation of Antarctic Tunicates Lissoclinum sp. and Aplidium cf. variabile**

Stephanie Villalobos  
Mentor(s): Bill Baker  
Program: Chemistry/Marine Biology  
This experiment is concentrated on two samples of tunicates, *Lissoclinum sp.* and *Aplidium cf. variabile* collected at Palmer Station in Antarctica. Many marine invertebrates produce secondary metabolites (organic compounds not used for growth, development, etc. of the organism) during their life cycle. Exploring the secondary metabolites of an organism from such a remote part of the world could yield new, undiscovered compounds. Processing the two tunicates is done through a series of different techniques. The samples are first freeze-dried then extracted in two different solvents (-6 [MeOH:DCM] and -7 [MeOH:H₂O]). After this the crude extracts can be separated by Medium Pressure Liquid Chromatography (MPLC) so they can be divided up into fractions based on relative polarity. A1H NMR spectrum can then be obtained for each fraction (this allows for preliminary viewing of what possible compounds could be in the sample based on hydrogen atoms/bonds present). The next step is to put each sample through High Performance Liquid Chromatography (HPLC) for purification, through Liquid Chromatography Mass Spectrometry (LCMS) for a mass, and back into the NMR to get the 1H NMR and 13C NMR spectra of the purified fractions. Going through all of these steps and instruments will aid in the structure elucidation of the secondary metabolites, hopefully yielding a new compound. By continuing with this research, the goal is to discover new compounds in these two samples.

**Synthesis of Anti-plasmodial Meridianin A analogs**

Keith Zimmerman  
Mentor(s): Bill Baker, Ryan Young  
Program: Biomedical Sciences  
The malaria parasite *Plasmodium sp.* kills approximately 2,000-3,000 people per day1 and resistance to the once widely used drug chloroquine has spread to most areas affected with the
disease, so new drugs are required to overcome this resistance. Preliminary screening for anti-malarial activity demonstrated that the marine natural product, meridianin A (1) isolated from the sponge Psammopemma sp., inhibited growth of P. falciparum with IC50 = 12 μM. The goal of this study is to continue with this research to determine if the preliminary promising bioactivity of meridianin A can be improved. Several 3-pyrimidylindole compounds were synthesized and screening was conducted to determine IC50 values toward P. falciparum. This was done using transgenic P. falciparum clone 3D7 expressing luciferase diluted to 0.5% parasitemia and 1.5% hematocrit. The IC50 values were determined for both chloroquine resistant and susceptible strains of P. falciparum by nonlinear regression analysis of Relative Luminescence Units (RLU) after 50 μL of Promega’s Luciferase Assay Substrate was added after treatment of 90 μL 0.5% parasitized erythrocytes at 1.5% hematocrit with 10 μL of the test compound diluted to concentrations from 100 to 0.098 μg/mL. This research will determine which 3-pyrimidylindole compound demonstrates the highest activity against P. falciparum. The impact of these findings could lead to development of an effective malaria treatment in areas where chloroquine use is no-longer possible due to resistance.
Nursing

The Impact of a Simulated Auditory Hallucination Experience on Nursing Students' Attitudes toward People with Mental Illness
Sara Dominic, Ula Armashi, Summer Abukhodeir, Jessica Benette, Janel Canty, Brittany Durant, Ashley Huesman, Cintli Jauregui, Kathryn Garcia, Maria Klammer, Jaymie McAllister, Jessica Nemerovsky, Desiree Monnot, Larissa Pollock, Noor Tamari
Mentor(s): Debra Gottel
Program: Nursing

Stigma is a major contributor to poor healthcare outcomes experienced by people with mental illness. Although many nursing students chose to enter the profession because of caring attitudes, those attitudes do not necessarily include people with mental illness. Nursing students’ attitudes toward people with psychiatric diagnoses include fear of unpredictable behavior, dislike, distrust, and beliefs that personal weakness caused the illness. Simulated experiences have been found to be helpful in promoting more positive attitudes and clinical skills among nursing students towards the general population. Limited studies have been conducted regarding the efficacy of simulated experiences specifically in psychiatric nursing. The aim of this study was to measure the influence of a simulated auditory hallucination experience on nursing students’ attitudes towards people with mental illness. We hypothesized that there would be a positive shift in attitudes towards people with mental illness after the completion of the simulated hallucination experience. The study is a pre and post-experience survey which was administered to 107 nursing students enrolled in a psychiatric nursing course, with results analyzed utilizing a paired t-test. Analysis of pre- and post-intervention scores revealed significant positive changes in the mean scores on the items regarding compassion and willingness to work with people with mental illness. No significance was found in students’ perception of difficulty of working with people with mental illness. The study supports the hypothesis as well as indicates a need for educators to increase efforts on skill-building in students working with people with mental illness.
Physical Sciences

Cytotoxicity of Oligomeric versus Oligomer-free Intermediates of Amyloid Fibrils
Michelle Edwards, Lirije Kabashi
Mentor(s): Martin Muschol
Program: Biomedical Sciences
Plaques composed of insoluble unbranching protein fibrils are linked to various diseases including Alzheimer’s disease, Prion diseases, Huntington’s disease, and type 2 Diabetes. Understanding what causes certain proteins to aggregate into disease-related fibrils and gaining insights into the mechanisms of their cellular toxicity to cells are important steps in support of drug design for treating these diseases. The goal of our experiments was to quantify the degree to which different types of transient aggregates emerging during amyloid fibril growth are toxic to cells. Using hen egg white lysozyme, we grew amyloid fibrils in vitro under different growth conditions known follow two distinct assembly pathways that produced different populations of intermediate assembly products. In the monomeric pathway, a lag period without detectable aggregation is followed by rapid nucleation and growth of long stiff fibrils via linear polymerization. In the oligomeric pathway, in contrast, compact globular intermediates known as oligomers form immediately upon partial denaturation of lysozyme and then condense into curving linear protofibrils. Samples from the oligomeric pathway were obtained at multiple time points. Their cytotoxicity was determined using a Lactate Dehydrogenase (LDH) assay with HeLa (cervical cancer) cells. Introduction of oligomeric intermediates to cell cultures caused more LDH to be released into cell media than native monomers at equivalent concentrations; cytotoxicity of each aggregate species increased in a concentration dependent manner. More importantly, we determined whether and how cytotoxicity varied as function of the type/maturity of various aggregate types. (oligomers, protofibrils, late-stage fibrils).

Trace Element and Sourcing Analysis of Prehistoric Ceramics from Northwest Florida using Portable X-ray Fluorescence Spectrometry
Hannah Feig
Mentor(s): Robert Tykot
Program: Anthropology/Chemistry
Portable X-ray fluorescence spectrometry (pXRF) is a useful analytical technique in archaeology in the source determination of materials used to create prehistoric ceramics. The non-destructive technique uses an X-ray beam to excite electrons in a sample and measures the energy of secondary X-rays to generate a plot readout of elemental composition in parts per million (ppm). Analyzing trace elements Rb, Sr, Y, Nb, and Zr can give indication as to where clay and temper material used to make ceramics originated. This research aims to use new pXRF machine settings to obtain more accurate analytical sourcing data for ceramics. Pottery samples from a site in northwest Florida were reanalyzed using new settings, then compared to previously obtained data on the same sample set. A linear correlation of numerical data unique to each element was found. This statistical relationship can be applied to previous sourcing studies as a method of translating between data sets without reanalysis of thousands of samples, and will be able to provide new and more accurate sourcing data for further analysis. This study is important for better understanding prehistoric trade routes and the lives of past peoples. It contributes to sourcing studies previously done at the
University of South Florida for sites in northwest Florida and is helpful for optimizing pXRF as an analytical method for archaeological ceramics sourcing.

Quantum Information Processing with Cold Fermi Gases in the Fast Pairing Regime

Bryce Hotalen
Mentor(s): Razvan Teodorescu
Program: Electrical Engineering

It is widely recognized that the main difficulty in designing devices which could process information using quantum states is related to the decoherence of local excitations about a ground state. Solutions to this problem have been proposed relying on (non-local) topological excitations, carrying fractional electronic charge. However, a practical implementation of these proposals using special Landau levels in fractional quantum Hall systems has proven elusive. We propose a different physical system, based on cold Fermi atoms, where non-abelian anionic excitations can be realized and manipulated, and whose implementation might be achieved with current available technology. The physical system we propose consists of cold Fermionic atoms, trapped in an optical lattice, and driven to create Cooper pairs through the Feshbach resonance. This research is focused on the development a mathematical model of such a system that preserves unitarity and which has representations that are dense in the Hilbert space, limiting the theoretical difficulty of achieving quantum computation based on this model. If our developed model were to be successfully implemented experimentally this would be a big leap forward in the field of quantum computing. A successful quantum computer would have major impacts on many fields such as national security, and pure scientific research.

Synthesis of Chiral Porphyrin Linkers for Use in MOFs

Sean Johnson
Mentor(s): X. Peter Zhang
Program: Chemistry

Porphyrin-based metal-organic frameworks have been widely studied and have shown great potential, but to my knowledge there have not been accounts of using chiral porphyrin linkers. Metal organic frameworks have shown useful in many applications such as catalysis, separation, and gas storage. The use of chiral organic linkers in these frameworks has significant applications in asymmetric catalysis and stereoselective separations. With this in mind, chiral porphyrin-based metal-organic frameworks could also show applications of asymmetric catalysis or stereoselective separation of pharmaceutically important molecules in a more selective manner. This project is intended to synthesize new chiral porphyrin linkers in collaboration to produce chiral porphyrin-based metal-organic frameworks. Chiral porphyrin linkers are prepared through a variety of modern synthetic methods, including Lindsey [2+2] porphyrin condensation and Buchwald-Hartwig cross coupling reactions. Carboxylate moieties are chosen as the linking units for the construction of the frameworks. With these chiral porphyrin linkers, the applications of porphyrin-based metal-organic frameworks will be expanded to optically pure molecule productions and enantioselective chemical processes.
Mechanisms of Stability of Fibers Electrospun from Peptides with Ionized Side Chains
Nicole Le
Mentor(s): Donald Haynie
Program: Biomedical Sciences
Non-woven electrospun fiber mats made of polypeptides are increasingly considered attractive for basic research and technology development in the life sciences, medicine and other areas. Here, co-poly(L-glutamic acid4, L-tyrosine1) (PLEY) was adopted as a model polymer for a study of the mechanisms of fiber stability. Crosslink density has been quantified by a dye-based method. Fiber morphology, elemental composition and stability have been assessed by microscopy and energy-dispersive X-ray spectroscopy (EDX). The results have been interpreted with reference to the pH dependence of the UV absorbance and fluorescence of PLEY chains. The study has revealed that fiber stability in an aqueous medium is crucially dependent on the extent of side chain ionization, even after polymer crosslinking.

Fabrication of Silica Core Silver Shell Nanoparticle as a SERS Active Substrate
Janet Mara
Mentor(s): Xiao Li, Sungyub Hab
Program: Biomedical Sciences
Core-shell nanoparticles with dielectric materials (SiO$_2$) have attracted much interest due to the application to biological sensing, photonic crystal, catalysis, surface enhanced Raman scattering (SERS) and so on. Since surface plasmon resonance frequency of core-shell nanoparticle is tunable by changing the size of core and the thickness of the shell, core-shell nanoparticle can exhibits excellent SERS activity. In this work, SiO$_2$ core Ag shell nanoparticle is synthesized using combination methods of a seed-mediated growth process and a further silver reduction step. We assemble core-shell nanoparticles on a glass slide to test its SERS activity with Rhodamin 6G molecule. We concluded from our results that under our conditions, SiO$_2$@Ag nanoparticle is a highly active SERS substrate compared to Ag nanoparticle.

Mathematical Modeling, Methods and Analysis of Native Language Learning Dynamic Processes
Andrew Reilly
Mentor(s): Gangaram Ladde
Program: Mathematics
Language is a basic tool to communicate thoughts, feelings, and ideas affecting the communicator and the members of the community and the fellow member of the society. It is very important to know the various factors and environments that influence an individual’s proficiency in language. In this work, we formulate a principle of the native language learning process, and develop a mathematical model of native language learning process. The analytic properties of the model are examined and are shown to be consistent with prior related research. Moreover, the mathematical model provides sufficient conditions for assumptions about the level of language proficiency as a function of time. This has been further justified by finding the closed form solution process of the mathematical model. Finally, this model is also extended to incorporate random environmental perturbations on the dynamic learning process. The numerical and simulation results are also presented to exhibit the nature of effects. An examination of the five parameters that govern the
native language learning dynamic process yields further insight to what drives learning and how these parameters interact with each other. A more complete understanding of language learning is portrayed by this work without requiring overbearing assumptions.

Zero Dimensional Metal-Organic Material Organic Polymer Composites: A Dodecyloxy Copper Nanoball Dispersed in Methacrylate Polymers
Faysal Rifai
Mentor(s): Julie Harmon
Program: Biomedical Sciences
Zaworotko and his researchers classify metal-organic materials, MOMs, containing metals and organic ligands arranged in various ways [1]. The simplest are discrete, zero dimensional structures such as metal-organic polyhedra, nanoballs and metal-organic polygons. More extended structures are coordination polymers with periodicity in one, two and three dimensions, referred to as 1D, 2D and 3D. Herein, is discussed the synthesis, processing and characterization of a series poly(methyl methacrylate) (PMMA) and poly (hydroxyethyl methacrylate (PHEMA) composites with a zero dimensional nanoball (NB), [(DMSO)(MeOH) Cu$_2$(benzene-1,3-dicarboxylate-5-OH)$_2$]. The nanoballs were sonicated in the monomers and polymerized in situ. A comparison study was made between the hydrophobic PMMA-NB and hydrophilic PHEMA-NB nanocomposites. The composites were analyzed via differential scanning calorimetry (DSC), microhardness and dielectric analysis (DEA). The dodecyl groups significantly alter the solubility of the nanoballs, imparting hydrophobicity to the surface of the nanoball. Structure property relations are discussed in terms of interactions between the polymer matrices and nanoball surfaces and interiors. These OC$_{12}$ NB composites and our earlier studies on a hydroxyl NB polymer composites are the first studies to date that probe relaxations and conductivity in discrete, zero dimensional polyhedral metal-organic polymer composites. This work forms the basis for future applications requiring tailored mechanical properties.

Effect of Supplemental Metabolites on C.elegan Aging
Mariam Saifee
Mentor(s): Patrick Bradshaw, Neil Copes
Program: Cell and Molecular Biology
Many diverse biological processes such as metabolism have been studied in C. elegans because of their short life span and easily detectable signs of aging. Mitochondrial mutations, dietary restrictions, and the effects of the external environment in relationship to the longevity of C. elegans have also been examined. However, life span assays on C. elegans with supplementation of vital metabolites has not been extensively researched. Therefore, a novel study has been designed to screen for metabolites that can significantly extend the C. elegans life span. In order to initially select metabolites for this screen, preliminary comparisons of the up and down-regulation of particular metabolites in C. elegans at various stages of their life cycle were made through metabolomics. Gluconic acid, methionine, pyruvate, adenine, and valine were among these two hundred metabolites which showed a difference in regulation and were chosen as candidates for screening. After conducting and initial screen, the supplemental metabolites significantly affecting the longevity of the C. elegans will be re-evaluated through further screening to confirm findings. If more than one metabolite succeeds in increasing life-span, a combination of those metabolites may
also be considered as potential candidates for future screens. Due to the similarities between C. elegans metabolism and other eukaryotes, the findings of this study could provide a foundation for prospective screening on more complex eukaryotes such as mice. Possibly, the benefit of these findings can eventually be extended to human metabolism and aging.

**Proteomic Insight on Quality Changes in Response to High Temperature Stress in Organic and Conventional Strawberry Fruit**

Ratna Suthar  
**Mentor(s):** Cecilia Nunes, Stanley Stevens  
**Program:** Chemistry  
Consumers have come to perceive that organic produce possess better quality than conventional produce. However, few studies have effectively compared both selections by taking into consideration the area of production, type of cultivar and maturity at harvest. The application of proteomics in postharvest research is recent but appears to be promising for identifying proteins associated with quality changes as a result of physiological stress. This study compares quality of organic and conventional strawberries in response to high temperature stress using both a physicochemical and proteomic approach. Organic and conventional strawberries of the Festival cultivar were harvested, exposed for 3 days to optimum (2°C and 90% RH) and stressed conditions (20°C and 40% RH). Color, texture and chemical composition were evaluated at harvest and after 3 days by traditional physicochemical methods. Preliminary physicochemical results show organic strawberries were more sensitive to temperature stress by exhibiting a higher increase in phenolic compounds, decrease in firmness and darker pigments. Further analysis will compare ascorbic acid content, individual sugars and proteomic data. Protein will be extracted using a phenol-based method followed by quantification and identification via gel-free proteomic analysis. Correlation between physicochemical evaluation of color, texture and nutrients along with proteomic analysis will allow for investigation of enzymatic pathways associated with degradation of quality attributes. The goal of this study is to provide fundamental insight into factors that affect the protein profile. Potentially identifying biomarkers of fruit quality will provide groundwork for further research in extending shelf life of horticultural products.
Public Health

**CREATTE Project**

*Desired Qualifications for Landing an Environmental/Occupational Health Job in Florida*

Aryan Beharry, Sophie Cene, Nardo Munoz  
Mentor(s): Rene Salazar  
Program: Public Health  

A career in Environmental/Occupational Health (EOH) focuses on the control of various hazards and their impact on humans in work and non-work settings. As part of the CREATTE course initiative, a study was carried out to evaluate the types of environmental/occupational health jobs available by region, the qualifications required by prospective employers, and the salary level and benefit packages offered. This study utilized various job-listing websites to identify available jobs throughout Florida and categorized specific components of each (education, salary, experience, etc.). Job-specific details were collected from specified regions and recorded on a spreadsheet. The research showed that there were 104 jobs available in the north, 96 in the central, and 20 in the south. A bachelor’s degree was typically the minimal level of education necessary for qualifying for an EOH job in Florida, particularly in metropolitan cities. These results confirm that education increases the opportunity for finding an EOH job in Florida. The findings also indicate that someone who wants to work in Florida would have a better opportunity of attaining such a job in the north and central regions, and expect an average salary of $30,000 depending on what kind of EOH job the applicant is seeking.

*Maintenance of Primary Hepatocyte Phenotype in a Microfluidic Device*

Richard Crouse  
Mentor(s): Steven Maher, Wajeeh Saadi  
Program: Cell and Molecular Biology  

*In vitro* liver models are powerful tools used to understand liver function, disease, and metabolism of novel therapeutics. Current liver models are often complicated and incomplete in that they do not recapitulate the liver microenvironment, lacking nonparenchymal cell types and liver architecture. Here we describe a liver model that supports long-term hepatocyte culture within a simple channel bi-layer device. The model has shown stable hepatocyte albumin production for 3 weeks of culture (indicative of desired hepatocyte function). Hepatocytes in these devices show proper induction of P450 phenotype for one week, illustrated by CYP3A4 activity, a sign of hepatocyte drug metabolism. Moreover, we compared microfluidic devices of various complexities, and showed that the microenvironment and device architecture is important for the albumin phenotype. Hepatocytes cultured within the microfluidic device are supportive of *Plasmodium vivax* (one of the causative agents of malaria) development, serving as a proof of principle that the device is suitable for liver disease studies. Future studies include the addition of other cell types to the device to make a more complete model and the multiplexing of the device for use in antimalarial drug assays.
**CREATTE Project**

*Hearing Loss Caused by Personal Listening Devices in the Workplace: Where does it really Occur?*

Nicole Dinescu, William Velasquez, Lauren DuComb

Mentor(s): Rene Salazar

Program: Chemistry; Public Health

Personal listening devices (PLDs) such as MP3 players and iPods, have been shown to cause harmful effects to one’s hearing. An increasing number of studies focus solely on the recreational use of these devices, but have ignored PLD use in the workplace. In industries, such as construction or landscaping, where elevated noise levels may persist, long-term exposures can induce hearing loss. The utilization of PLDs in the workplace may increase the risk of hearing loss, specifically in noisy environments where PLDs may be used at higher volumes to compete with background noise. There is minimal research identifying occupations or employers with policies either accepting or prohibiting use of PLDs for employees at work. The scarcity of data may be attributed to lack of studies performed to date, or perhaps employers wishing not to share any information that could possibly suggest violation of government regulations. Lack of peer-reviewed information concerning PLD-use associated hearing loss in the workplace prompted this research. This study was the first of a multi-phase project aimed at identifying the industry sectors and worker populations in which PLD-use is most common, so as to determine the extensiveness of the problem and possible intervention measures.

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Overview of Efforts to Recontact Patients Evaluated through the Genetic Risk Assessment Service (GRAS) about Advances in Genetic and Genomic Testing

Diego Lozano

Mentor(s): Tuya Pal

Program: Biomedical Science

Introduction: Advances in genomic technology enable us to provide additional testing options for patients previously tested for inherited cancer syndromes. Patients currently evaluated through the Genetic Risk Assessment Service (GRAS) at Moffitt are offered these tests, however prior patients may also benefit from these advances. Purpose: We sought to recontact patients previously evaluated through the GRAS service from 2007-2011 to inform them about additional testing options. Method: A form letter was generated to outline recent advances in genetic/genomic testing, which explained the additional BRCA large rearrangement and next generation testing options and reviewed by Risk Management. Through search of the electronic database in which all visits to GRAS are recorded, a list of eligible patients to be sent the letter was generated. Results: In total, 1,131 prior patients were contacted by letter. Of the letters sent, 130 were returned as undeliverable. Of the remaining 1001 letters, patients made an appointment in 25 cases, of which 17 completed the appointment. Nine of these patients pursued additional testing, with 7 of these patients testing negative for large BRCA rearrangements. Of those patients who tested negative for the large rearrangements, 5 are proceeding with additional next generation panel testing. Conclusion: Patients who attend evaluation to the GRAS represent a group in whom advances in genetic and genomic technologies may have clinical implications. Our efforts represent a means by which these patients may learn about other newly available testing
technologies that may clarify their cancer risk and optimize their options for cancer risk management.

**Missing Incidents in Children with Autism Spectrum Disorder: Antecedents, Descriptions, and Consequences**
Milora Morley
Mentor(s): Meredith Rowe, Laura Smith
Program: Public Health
Background: Over 50% of children who have been reported missing with autism spectrum disorders (ASD) exhibit core symptoms contributing to behavioral problems. These include altered intuition, obsession, and repetitive behaviors. There is a gap in the literature with previous studies only examining techniques to prevent missing incidents. In a hallmark study done by the Interactive Autism Network Project, greater than 50% of children recruited went missing and they were found to have difficulty communicating and other cognitive deficits. Study Aim: The antecedents, descriptions and consequences of these missing incidents remain unknown. Thus, the aim is to explore factors that precipitate missing incidents in children with ASD. Methods: A retrospective study design was used to collect data on children (N = 50) with ASD who lived in the U.S.A. News articles were found using keywords of “wandering, elopement, lost, autism, autism spectrum disorders” in searches with Google, Nexus-Lexis Academic, and autism blogs. Descriptive and bivariate analyses were used to identify disposition of child if found, circumstances related to exit, and time missing. Results: Early findings suggests: 1) length of time missing does not correlate with survival; 2) drowning is the major cause of death and typically occurs close to home; 3) caregiver distractions are a common antecedent; 4) and core symptoms of ASD precipitate missing incidents in children with ASD. Conclusion: Identifying patterns associated with the antecedents, descriptions and consequences of missing incidents will benefit caregivers and the ASD community. Continuous studies will determine the benefits of technology in preventing fatalities.

**Molecular Identification of Acinetobacter species by PCR**
Vinoth Muthalagappan
Mentor(s): Aparna Tatavarthy
Program: Biomedical Sciences
Acinetobacter species are Gram negative bacteria that can cause severe infections. According to the Centers for Disease Control and Prevention, more than 700 US soldiers have been infected by Acinetobacter baumannii since beginning the Iraq war. Due to increased outbreaks in hospital settings and its multidrug resistance, it is essential to identify prominent gene sequences in these bacteria for rapid detection of the organism in outbreaks and minimize the spread of infection. Two specific genes are commonly used to identify A. baumannii, the ompA and the bla_oxa genes. The aim of this study is to examine these two genes in our collection of 22 clinical specimen of Acinetobacter spp. The presence of these two genes is hypothesized on both regular and real-time PCR platforms. The ompA gene was present in 9 of the 22 samples (~41%), and the bla_oxa gene gave positive results for 15 of the 22 samples (~68%). On the real-time PCR platform with ompA gene 20 of the 22 (~91%) samples were positive. Our study shows that the most accurate and time effective technique to identify Acinetobacter spp. would be real-time PCR for the ompA gene,
because regular PCR tests had many inconsistencies and lacked sensitivity. This method would be ideal in a hospital setting or an outbreak situation. In future we will be examining the $\text{bla}_{\text{muc}}$ gene on the real-time PCR platform and compare it to the $\text{ompA}$ gene results.

*Strain Specific Generation Time for Escherichia coli O157:H7 and its Ramifications on Rapid Detection Targeting the $\text{stx-2}$ Gene in Inoculated Food Samples Using Real-time PCR*

Kimmy Nguyen  
**Mentor(s):** Aparna Tatavarthy  
**Program:** Microbiology

*Escherichia coli* O157:H7 associated with food may lead to life threatening hemolytic uremic syndrome. Rapid methods to screen for this pathogen are of utmost importance. Efforts to expedite the isolation and detection are often limited. The aim of this study was to determine the strain specific generation time of *E. coli* O157:H7 and to find the detection limit for real-time PCR (ABI 7500) targeting the shigatoxin gene ($\text{stx-2}$). The results of this study will help determine the optimal pre-enrichment times in artificially inoculated high background foods for detection. For generation time, inoculated buffered peptone water was serially diluted for absorbance and viable plate counts. The sensitivity of the real-time PCR was examined by boiling the $10^{-4}$ to $10^{-11}$ dilutions for DNA preparation and viable counts. The generation time was determined to be 20.5 min and the detection limit for $\text{stx-2}$ was 7.9 CFU/2 ml of PCR reaction. Theoretically, there should be $104.8$ CFU/2 ml at 6h, and $7.2 \times 10^{12}$ CFU/2 ml at 18h of pre-enrichment. Both the enrichments should lead to strong cycle threshold values ($C_T$). In inoculated bean sprout samples, however, 6h of enrichment resulted in only 41% detection in samples (7 of 17), most of which had weak $C_T$ values. The 18h enrichment was successful in 100% detection of the target organism, with moderate $C_T$ values. Factors that may be responsible for low empirical PCR detection may be background flora in the food acting as inhibiting factors on O157:H7 growth or factors within the food acting as PCR inhibitors.

**CREATTE Project**

*Compare Public Health in 1922 to 2012: Conducting Qualitative Research Using an Actual 1922 Diary*

Amelia Phillips, Sarah Michaels, Chantell Robinson, Thanisha Benoit, Candice Schottenloher  
**Mentor(s):** Kay Perrin  
**Program:** Public Health

Public Health is the science of protecting and improving the health of families and communities through education, promotion of healthy lifestyles, research for disease and injury prevention, and detection and control of infectious diseases. The US Centers for Disease Control and Prevention (CDC) states that since creating the Ten Great Public Health Achievements in the 20th Century, public health has dramatically improved since the early 1900’s (CDC, 2013). The purpose of this research is to compare public health in the 1920’s to public health today. Members of this group transcribed the diary of an American woman, Clara B. Schattinger, who traveled the world in the 1920’s. Once the diary was transcribed, the project was broken up into three sections. The first section mapped out the route of Clara’s journey across the world. This includes a map with dates and locations of all of her travels. The second section of this project determined reoccurring themes related to public health throughout the diary including cultures, entertainment,
healthcare, lifestyle behaviors, hygiene, etc. The last section of this project looks at more quantitative aspects mentioned in the diary, which include the number of times Clara wrote, books that she read, and a cost comparison of the 1922 US dollar with the 2012 US dollar. It has been concluded from the research that public health has dramatically improved since the 1920’s, thus further supporting the information provided by the CDC. This research also provides a first-hand description of world travel in 1922.

**CREATTE Project**
*Toxicology Education K-12 Outreach: Clean Water*
Omar Razack
Mentor(s): Marie Bourgeois
Program: Biomedical Sciences
Ensuring access to safe drinking water, adequate sanitation and promotion of good hygiene practice will improve the quality of life for millions of people worldwide. The goal of this CREATTE course project was to educate 4th grade students at Mabry Elementary School in Tampa about the importance of universal access to clean drinking water and its impact on public health. The project was initiated on November 15, 2012 during the Great American Teach In. During the classroom visit, students were led in discussions about the role of safe drinking water in their lives and led through a water filter construction activity modified from the Environmental Protection Agency educational outreach page. The results show that this activity was well received based upon complete class participation and interest. The students created a water filter from provided materials under the instruction of the presenter. Based on these activities the students gained knowledge on the public health advantages from clean water and learned key steps involved in the water filtration process common at many municipal water facilities. This study indicates that the GATI can be used to induce change and also that young students can learn the importance of clean water from an engaging hands on activity. In the future, studies should be completed to evaluate the effectiveness of long-term K12 outreach benefits developed by an undergraduate researcher.

**CREATTE Project**
*Is USF a Healthy Campus?*
Melina Santos, Maryouri Avendano, Victoria Bryant, Gladys Munoz, Ashlee Demiduk, Amber Boose, Allyson Sison, Kim Cure, Leah Kingbury, Tamara Prevatt, Noemi Rodriguez
Mentor(s): Alison Oberne
Program: Public Health
To achieve healthy communities on college campuses, it is critical to assess and understand the status of student wellness and their access to available resources. Researchers have identified that not all students who need wellness services are even aware these services exist (Yorgason, 2008). This research aims to investigate the health status of undergraduate students attending the University of South Florida (USF) by analyzing mental health, nutrition, sexually transmitted infections and impediments to academic success. We created a comprehensive, anonymous Internet-based survey to obtain qualitative and quantitative data to analyze multiple aspects of health critical to college students. The survey will address questions corresponding with Healthy Campus 2020 goals, which were created to assess the physical and mental health concerns of
college students and their access to health-related campus resources. This study will assess four of the objectives listed within the goals. The registrar’s office will distribute the survey to a demographically stratified sample of 560 undergraduate USF students at the Tampa campus with questions based on these four objectives. Three emails will be sent over the course of one month to perspective participants. Research results will be disseminated to campus agencies to improve the health status of USF students and raise awareness about campus health-related programs. Data will shed light on USF’s progress toward Healthy Campus goals as well as identify the effectiveness of various campus services. This innovative study can be used as a model for other college campuses in addition to increasing current research literature.

**Role of Phosphatase and Kinase Proteins in Plasmodium Falciparum**

Negin Taghzadehasl  
**Mentor(s):** John Adams, Jennifer Sedillo  
**Program:** Biomedical Sciences

Malaria is a mosquito-borne infectious disease caused by a parasite. People with malaria often experience severe fever and flu-like illnesses. If malaria is left untreated, it may develop severe complications and result in death. More than 300 million people are infected each year, of which 1 million cases have fatal endings and there is no vaccine. Among all malaria parasites, *Plasmodium falciparum* is the most deadly parasite. Drugs have been discovered to treat malaria effectively, but resistance of the parasite to existing drugs is rapidly increasing. The goal of this research project is to study protein-protein interactions within *P. falciparum* by expressing and purifying recombinant kinase and phosphatase proteins to characterize their interactions. Recombinant phosphatase and kinase proteins were tagged with glutathione S-transferase and His<sub>6</sub>, respectively. Recombinant proteins were expressed in *Escherichia coli* and purified using two types of affinity chromatography; glutathione sepharose and Dynabeads His-tag isolation. Functional interactions of these proteins were evaluated in an *in vitro* binding assay. We confirmed the expression and purification of the recombinant proteins using SDS-PAGE gel and western blot, and through a functional assay, we confirmed interaction among the two types of proteins. Kinases and phosphatases regulate many cellular pathways, particularly those involved in signal transduction. In *P. falciparum*, signal transduction has been known to be responsible for the invasion of red blood cells, indicating the importance of understanding the interaction between kinase and phosphatase proteins, as they can be a potential drug discovery target.

**CREATTE Project**

**Great American Teach-In 2012: Planting of Edible Garden at Pierce Middle School**

Michael Targ  
**Mentor(s):** Marie Bourgeois  
**Program:** Environmental Science and Policy - Public Health

In our current age of technology and big business, millions of Americans lack access to locally grown food sources. Although, it is most convenient to purchase produce from the grocery store, this convenience has created a lack of awareness as to where our food in general comes from and how it arrives on our plate. The goal of this CREATTE course project was to educate students at Pierce Middle School in Tampa about the skills required to feed themselves by establishing a small vegetable garden with them. The project was initiated on November 15th, 2012, during the Great
American Teach In. During the first class visit, students were engaged in discussions about ways to grow an edible garden and the connection to access of the public to "green spaces". The second activity was completion of a garden with a dozen vegetable and herb plants. The students were expected to care for the garden indefinitely. A return visit occurred January 17th, 2013. The results show that the vegetables and herbs were being cared for and had grown substantially. The students learned from the discussion how to establish a garden and based on the garden activity, the students gained experience and desire to achieve produce from their work.
Social Sciences

Effects of Intensive Musical Education on Neurocognitive Abilities in School-Age Children
Jessica Allen
Mentor(s): Nathan Maxfield, Jennifer Lister
Program: Communication Science and Disorders
Children involved in musical education programs, which are typically long-term, demonstrate higher scores on tests measuring cognition, social behavior, mathematical skill, and even physical well-being. The purpose of this pilot study was to assess the impact of an innovative, short-term/intensive musical education program on neurocognitive abilities in school-age children. The study included a convenience sample of 16 non-musically trained, typically-developing children, 8 to 12 years old. Participants completed a series of tests to obtain baseline data on working memory, speed of processing, and central executive function. The test battery included the Rey Auditory Verbal Learning Test (AVLT), Adaptive Test of Temporal Resolution (ATTR), Woodcock-Johnson Tests of Cognitive Abilities (WJC-3), and a neurophysiological measure. After participants completed a two-week, intensive, group, piano training program, these same tests were administered again for comparison. Improvements, ranging from marginal to robust, were obtained on central executive functioning and speed of processing measures. Working memory measures did not demonstrate any changes, possibly due to the type of musical education program provided in the study. The results of this study lend support to the hypothesis that musical education has positive effects on cognitive abilities in school-age children. Results motivate the need for additional research in this area, and lay groundwork for investigating music-based cognitive stimulation in children with speech and language disorders. Challenges in conducting research of this nature will also be discussed. This study was a collaborative effort involving the USF Communication Sciences and Disorders program, School of Music, and BCS Undergraduate Research Certificate program.

Changing Student Understanding of Engagement in Undergraduate Research at an R1 University through a Getting Started Workshop
Emily Bauer
Mentor(s): Richard Pollenz
Program: Biomedical Sciences
A strategic focus of many R1 universities is the increased engagement of undergraduates in research. Studies indicate that undergraduate students who engage in research activities show increased retention and better understanding of their discipline. To inspire students across all disciplines to engage in research and understand its importance to their academic progress and careers, the Office for Undergraduate Research (OUR) established the Getting Started in Research workshop. The purpose of this study was to determine if attending the Getting Started workshop would improve a student’s understanding of the process of engaging in undergraduate research. The OUR offered 21 workshops during the Fall 2012 semester that were attended by 313 undergraduate students, 113 of which were first-year. A pre-post five-response Likert survey instrument was utilized to evaluate the agreement with 12 items related to research. The matched pre/post responses for the total population, first year students only, and each individual answer were then entered in an Excel spreadsheet using a 1-5 rating for each answer and compared...
using Student’s T-Tests. The results show a statistically significant change ($p < 0.001$) across the entire population and between the pre and post responses to 10 of the 12 survey items for the first year students and those in years 2-4. The trend of the change indicated a higher level of understanding (more agreement) to the survey item. These results suggest that the workshop effectively meets several of its learning objectives and results in a more informed population that better understands the process and importance of engaging in undergraduate research.

**Language as a Tool for Overcoming Intergenerational Conflict among Chinese-American Young Adults**

Adam Becker  
**Mentor(s):** Heide Castaneda  
**Program:** Anthropology  

Previous anthropological and psychological research has demonstrated a trend of larger intergenerational conflict between Chinese migrants to the United States and their U.S.-born children than in white American families or families having migrated from other Asian nations. This conflict sees the children, “Americanized” in their expectations of parents, express a perceived lack of warmth from parents; the parents, meanwhile, complain that children do not respect them or show no interest in their Chinese heritage. In conducting this study, I set out to test whether the ability to speak a Chinese language of any variety was an indicator of the presence or severity of this conflict. Using interviews, observations made as a student of Chinese alongside several Chinese-American classmates, and 50 surveys distributed to Chinese-American students on the University of South Florida campus, I gathered data on informants’ reported levels of perceived and expected parental warmth following the method used by Wu and Chao (2005), but also collected data on the informants’ level of competency in any Chinese language. Analyzing this data, it is clear that informants who report higher levels of language competency also report parental warmth closer to their expectations. Behaviors observed by Chinese-American classmates in and outside of class demonstrate a desire to impress their parents and overcome intergenerational conflict by studying Mandarin. This could lead to important future research, particularly in the emerging field of heritage language pedagogy.

**You're Not Like the Rest: Precarious Manhood's Effect on Gender Dichotomization and Gender Atypicals**

Caitlin Bronson  
**Mentor(s):** Kenneth Michniewicz, Jennifer Bosson  
**Program:** Psychology  

Whereas womanhood is generally considered a developmental certainty, manhood status requires social achievements and is not guaranteed once earned. Manhood’s precarious state motivates men to psychologically distance their gender in-group from the out-group. Consequently, men gender dichotomize, or view gender-consistent (i.e., masculine) traits as highly central and gender inconsistent (i.e., feminine) traits as highly non-central to their gender in-group. This is further exaggerated when a man’s individual gender status is threatened. In the current study, I examined men’s greater tendency to punish gender atypical individuals: Specifically, I examined punishment of a gender atypical person following a gender threat and how much of this punishment could be explained by men’s heightened gender dichotomization. Male (N=91) and female (N=108)
participants either read gender precarious priming proverbs or neutral proverbs. To measure gender dichotomization, all participants then categorized androgynous, computer-generated faces in terms of in-group status. Finally to measure punishment, participants suggested a bail amount for a same-gender, homosexual individual after reading an ostensible police report detailing the crime. Results showed that men primed with precarious gender proverbs did not set a higher bail for the offender than non-primed men and all women. Men did, however, engage in gender dichotomization more than women, by categorizing less androgynous faces as belonging to their gender in-group and taking more time to make these decisions. These results can inform existing and future research on gender dichotomization.

**CREATTE Project**

*Analyzing Primary Sources: How Florida Weather Affects the Community*

Amy Brown

Mentor(s): Ilene Berson

Program: Early Childhood Education

As a teacher researcher, I learned to use various search strategies to locate primary sources from the Library of Congress that may promote elementary grade students' multiple literacies through the developmentally appropriate use of artifacts and historical images. I completed modules from the Library of Congress to learn how to search the online depository, analyze photographs and prints to determine their appropriateness for instruction in an elementary classroom, and select primary sources from the vast digital collections to integrate into teaching. I connected the primary sources with students' prior experiences and children's informational text to make content meaningful and relevant. I designed and implemented the resulting lesson in a classroom with children in grade one. I collected data, including children's work samples from pre- and post-assessments, other evidence of students' outcomes, and reflections on how teaching strategies affected those outcomes. In my presentation I will share findings about the effectiveness of instruction and how much the students learned. In particular, my research explored images of various people doing a variety of activities here in Florida. One of the main goals was to introduce primary sources and how weather can affect how people live. I discovered that the students did a phenomenal job analyzing primary sources and were eager to do more. However, they had difficulty when trying to make an inference. Overall, having students working with primary sources is a great experience that makes learning more hands on and interactive.

**CREATTE Project**

*The Minority Female Aging Experience*

Lindsey Cox

Mentor(s): Brianne Stanback

Program: Sociology

This project was supported as part of the CREATTE initiative. With a growing minority population in the United States, it is important to examine issues associated with aging. Minority women, in particular, face multiple disadvantages as they move through the life course, such as the accessibility to quality health services and financial security in late life. The research question that was examined was: “What disadvantages do minority women face as they move through the life course and how can we help to alleviate these issues?” To address this question, the Otis R.
Anthony Oral History project through USF Special and Digital Collections was used to contextualize the life experience of participants. From this library, three women were chosen at random and their oral histories were examined to extract relevant information on disadvantage and challenges they faced in life. From the review of these histories, it was determined that minority women faced compounded disadvantage, such as racism and sexism, as they moved through the life course and these disadvantages translated into a poor aging experience. In order to alleviate this discrepancy, it is necessary that educational programs are established, accessibility of care is improved, certain programs are defaulted, and that the familism present in minority families is utilized in policy making and marketing of services.

Language, Attitudes, and Identity at an American Flea Market
Robert Creighton
Mentor(s): Angela Stuesse
Program: Anthropology
This research aims to illuminate how flea market vendors compose their identities and to reveal the language and communication strategies employed during vendor/customer and vendor/vendor interactions. The research is based on two vendor types: one that creates his or her own merchandise, and one who does not. Performing the study between two such sites will allow for the contrast and comparison of business practices and language strategies between vendors that sell self-made merchandise and those who do not. It may also reflect the variation in the vendors’ attitudes towards their products. The methods used in gathering data are in situ observation and one on one interviews. In conjunction with the vendors’ relationship with and attitudes towards their merchandise as made apparent from the interviews, different language strategies employed by the vendors will be noted; especially during attempts to make a sale and in the case of bargaining or haggling. This research attempts to resolve how flea market vendors identify themselves in a business/marketplace context and as members of a unique enclave of business people. It also seeks to create a more general applicable understanding of how any vendor that creates his or her own products relate to said products and how attitudes and language strategies may differ from or relate to vendors who do not.

**CREATTE Project**
Female Adolescents’ Views on Teen Pregnancy and Anti/Prosocial Behavior
Haley DeLeon
Mentor(s): Tiina Ojanen
Program: Psychology
The project described in this presentation was researched and developed during the Child and Adolescent Social Development CREATTE course and takes the form of a rigorous research proposal. This presentation will highlight the research that was required to develop the proposal and the components of the planned research project and its impact. Extensive research has been conducted on the health and socioeconomic risk factors for teen pregnancy. However, the literature lacks research on teen pregnancy in a psychological context. In addition, many studies have struggled with an emerging distinction between teens that have negative feelings toward pregnancy and females that possess positive or ambivalent feelings toward becoming pregnant. The presently proposed study seeks to examine prosocial and antisocial behavior in adolescents in
respect to their views on teenage pregnancy. Many studies report that adolescents at risk for pregnancy (early sexual behavior, low contraception use) may be at risk due to their antisocial or deviant behaviors. This study will examine the association between anti/prosocial behaviors and attitudes toward teen pregnancy. Participants will be recruited from local high schools (females; 14-17 years; target N = 500). Research design is correlational and cross-sectional. Behaviors, G.P.A., and demographic information will be assessed with surveys. Participant and parental consents will be obtained. Due to the high teen pregnancy rates in the nation, this topic has scientific and practical significance. Information on associated risk factors can help us to develop prevention and intervention programs that are informed about social psychological risk factors associated with teen pregnancy. The development of this project has made me realize the need to integrate research across psychology and health sciences, while also considering societal factors, in this context. The process of developing this proposal will be described.

Environmental Change and Diet of the Longshan at Liangchengzhen
Raymond Figueroa
Mentor(s): Robert Tykot
Program: Anthropology
This research project focuses on analyzing how environmental change had affected the diet of the Longshan culture at Liangchengzhen through lipid analysis of potsherds. The Longshan culture is a Late Neolithic Chinese culture with the city of Liangchengzhen being located in present day Shandong, China. Ten pottery samples were selected from the Late Longshan era and lipid analysis has been performed on these samples in order to extract fat cells that have been cooked or stored in the vessels, which allowed me to ascertain diet as well as ritual food consumption. This information will be compiled with bone/ dental isotope, lipid, macrobotanical, microbotanical, and zoological data from various Chinese sites in and around Shandong province as well as different time periods to create a fuller picture of the Chinese Neolithic diet. Assessment of environmental change on the Longshan and its effect on diet and subsistence requires information from multiple sources in different disciplines. Background on where the Longshan lived is important, however background on different time frames as well as different areas is also necessary to understand the cause and effects of environmental change. Studies pertaining to environmental makeup, subsistence patterns of the Neolithic Chinese, cultural complexity, zoological and macrobotanical remains in different time frames were also analyzed, which helped fill in the details of change over time. By using both qualitative and quantitative methods the environments affect on the Longshan has become clearer.

Religiosity and Racial Identity associated with Psychological Well-Being among Black College Students
Gregory Fortune
Mentor(s): Erica Coates, Vicky Phares
Program: Psychology
College is a stressful time for many students that is related to various negative outcomes including poor psychological health (Pedersen, 2012). Black students attending predominantly White institutions (PWIs) experience unique stressors such as hostile campus climates, subtle and overt racism, and social isolation (Harwood et al., 2012; Strayhorn, 2009). These stressors contribute to
increased psychological distress among this population (Neville et al., 2004). There is some empirical evidence to support factors associated with better psychological health among Black students attending PWIs including racial identity (Pillay, 2005), religiosity (Holmes & Hardin, 2009), and parent-child relationships (Love, 2008); however, the unique contribution of these factors have never been examined in one study. This study examined whether father closeness, mother closeness, religiosity, and racial identity were uniquely associated with psychological well-being in Black students (N = 121) attending a PWI. Participants completed the following questionnaires online via Qualtrics: Children’s Report on Parental Behavior Inventory – Revised (Schludermann & Schludermann, 1970), Spiritual Well-Being Scale (Paloutzian & Ellison, 1982), Multidimensional Racial Identification Scale – Revised (Sanders-Thompson, 1995), and the General Health Questionnaire – 12 (Goldberg & Williams, 1988). A simultaneous multiple regression revealed that religiosity and racial identity were uniquely associated with psychological well-being among our sample. Analyzed together, students’ relationships with either of their parents were less salient than students’ perceptions of their religious faiths or Black Americans’ contributions to society. Given the unique stressors encountered by Black students attending PWIs (Harwood et al., 2012), these findings suggest key target areas for improved psychological well-being.

**Electrification and Youth Labor**

**Toni Jung**

**Mentor(s):** Joshua Wilde

**Program:** Economics

Diffusion of electricity in developing countries is believed to have significant impacts on the labor market and is generally seen as an important contributor for further economic development. My contribution is significant due to the policy implications regarding economic development and youth labor in Sub-Saharan Africa and the push for an increase in the proliferation of electricity. Benefits from electrification include freeing up time previously allocated to household tasks and reducing poverty. Previous research has argued that electrification improves labor market outcomes, especially for females. My research questions is whether or not electrification will have a significant effect on youth labor market outcomes – such as employment rate, industry of employment, years of schooling, and weekly hours worked amongst other variables in Cameroon. Specifically, I will evaluate the change in youth labor market outcomes before and after the construction of two dams off of the Sanaga River in southwest Cameroon. To address this question I will use census data on labor outcomes. My empirical identification strategy will involve using the land gradient and distance as instrumental variables for electrification, and then, employ a difference-in-differences regression to isolate the effect of electrification on youth labor market outcomes. At the present time, I anticipate a demand side effect: electrification will generate a more suitable business environment which may cause firms to enter into the market, increasing the demand for labor, and hence improving labor market outcomes.
**CREATTE Project**

*Adolescent Adjustment in Step-families: The Role of Sibling Relationships*

Jena Keenan  
Mentor(s): Tiina Ojanen  
Program: Psychology/ Sociology

The project described in this presentation is currently being researched and developed during the Child and Adolescent Social Development CREATTE course and takes the form of a rigorous research proposal. This presentation will highlight the research that was required to develop the proposal and the components of the planned research project and its impact. Prior research has established that children raised within step-families have more negative outcomes when compared to other family structures (Evenhouse & Reilly 2004). Families with step-siblings are more likely to experience low levels of family belonging and higher levels of perceived stress, aggression, and provocation than families with biological siblings alone (Leake, 2007; Lutz, 1983; Hetherington, 1989). However, previous research has not examined the influence of biological, step-, and half-siblings on the adjustment of adolescents during the transition period (first year) into a step-family. The current study proposes a correlational, cross-sectional examination of the relationship between stress and negativity in sibling relationships, as well as how this association may differ according to gender. Participants will be recruited from high schools within Hillsborough County (target N = 300; ages 14-18). Measures will include the General Information Questionnaire, portions of the Adolescent Stress Questionnaire (Byrne et. al., 2007), and the Sibling Relationship Inventory (Stocker & McHale, 1992). The expected findings from this study are: 1) negativity in sibling relationships will be positively correlated with stress, 2) the relationship will be stronger in biological and half-siblings than step-siblings and stronger among female than male siblings. The findings of this study are expected to have meaningful theoretical and practical implications for sibling relationships in step-families. Thus far, the development of this proposal has taught me how to generate theoretically and practically significant research questions and produce scientific text.

*Effects of Redundant Feedback on the Response Related ERN*

Loni Lebanoff  
Mentor(s): Siri- Maria Kamp  
Program: Biology/Psychology

Incorrect responses in speeded reaction time tasks are associated with the elicitation of two brainwaves (ERP components), the Error Related Negativity (ERN) and the P300. The P300 is known to be elicited during the process of decision making. When the accuracy of the performance cannot be evaluated without an external feedback, the ERN is known to be elicited by the informing feedback. The purpose of the presented experiment was to elucidate the extent to which redundant feedback (feedback which is not necessary for task performance) affects the attributes of the error related ERP components. Nine participants completed a Flanker task, in which a participant is shown 5 letters and presses with the right or left hand button in response to the middle letter, in two sessions which differed in the extent to which performance feedback followed the participant’s responses. In one session, no feedback was provided, while in the other session, each response was followed by performance feedback. Participants were instructed to perform as quickly and as accurately as they can. The results of the study indicated that the
amplitude of the response ERN was larger when no feedback was provided, while the P300 amplitude remained constant. These results suggest that the presence of feedback, regardless of its usefulness for task performance affects performance monitoring. Our data suggest that when feedback is provided, participants tend to rely on it to some degree, or in other words, to shift some of the monitoring “responsibility” to the external source.

**CREATTE Project**

*Domain-Specific Self-Esteem: Is Competence Really the Cause of Increase in Self-Esteem among Children?*

Salwa Mansour  
**Mentor(s):** Tiina Ojanen  
**Program:** Psychology

The project described in this presentation is currently being researched and developed during the Child and Adolescent Social Development CREATTE course and takes the form of a rigorous research proposal. This presentation will highlight the research that was required to develop the proposal and the components of the planned research project and its impact. 

Harter (1993) describes self-esteem in children as the combination of James’ formulations that self-esteem reflects competence in areas where success is deemed important (James, 1893), and Cooley’s theory, which states that self-esteem is constructed through social interactions (Cooley, 1902). While Harter acknowledges that children’s selection of domains aspired to be competent in depends on what domain peers deem valuable, there has been little exploration of what such implications might entail. Because children assign value to domains based on what peers consider as valuable, this study seeks to explore whether increases in self-esteem are due to feelings of competence or to receiving positive feedback from peers. Participants will be recruited from three local elementary schools (Target N = 120; three groups: “Positive, Negative and No Feedback”; Two levels of Competence: “won” and “lost”). A game will be administered to all groups simultaneously. In each group, participants will be randomly assigned to either a “lost” or “won” condition. Feedback, which will be given by the experimenter after the disclosure of participants’ performance, will be composed of comments supposedly made by peers on performance. State self-esteem will be measured prior and following the game using the Rosenberg Self-Esteem Scale (Rosenberg, 1965). Participants receiving positive feedback are expected to experience higher increase in self-esteem regardless of their performance. The main and interactive effects of feedback style and competence level will be examined using ANOVA. Findings are expected to increase understanding of the causes of self-esteem in children, with potential practical applications for increasing self-esteem.

*The Changing Face of Argentine Immigration: The "Ley de Residencia" and the Impact of Darwinism in 19th Century Argentina*

Stephen Naylor  
**Mentor(s):** Adriana Novoa  
**Program:** History

This essay will examine the relationship between the Ley de Residencia (1902) and the reception of Darwinian ideas in Argentina. The research shows how new scientific ideas transformed elite views towards immigration and how this change is reflected in the writing and sanctioning of this
law. Existing historiography has traditionally represented the *Ley de Residencia* as an emergency political measure intended to combat the threat posed by anarchist activists, while paying scant attention to the influence of scientific discourse on the implementation of the law. Via recourse to recent historiography on the reception of scientific ideas in Argentina and through an examination of primary documents relating to the *Ley de Residencia*, this essay will attempt to demonstrate the significant impact of Darwinism on the traditional ideas and beliefs of those invested in nation building. It will focus on how the reception of Darwinian concepts helped transform an initial optimism towards the benefits of European immigration to an increasing pessimism in subsequent generations, shaping the mindset of elites and convincing them of the need to control the country’s population, particularly the assimilation of immigrants. Based on this analysis, I will argue that whilst the law can be understood from the viewpoint of political exigency, it should also be seen as entirely consistent with the altered perception of immigration which new ideas of evolution and inheritance provoked in the political discourse of late 19th century Argentina.

**CREATTE Project**

*Cultural Frameworks: Indian and Panamanian Ideals and Values in Cross-cultural Perspective*

Pratik Patel  
*Mentor(s):* Karla Davis-Salazar  
*Program:* Chemistry

Cultural diversity remains a research specialty in the fields of global economics, world religion, and international communication, to name a few disciplinary areas. Ethnographic research and cross-cultural curriculum assist in facilitating security and cooperation for cross disciplinary understanding among, for example, modern medicine, environmental engineering, and global politics. This presentation uncovers unique cultural frameworks of Indian and Panamanian cultures through a cross cultural comparison focused on kinship and marriage. Specifically, using key informant interviews and textual anthropological and sociological research this study explored similarities and differences in dating, weddings, and major holidays celebrations in order to uncover underlying religious values, proper gender roles, and appropriate dialogue in conversation. As found in both cultural frameworks, Indian and Panamanian cultures attribute common value to kinship, marriage, and large collective consciousness. Similarities were found predominantly in the spheres of religion and social life; some of which included the necessity of marriage as a rite of passage and a traditional patriarchal social order. These consistencies in cultural values could increase global and sociopolitical interest in trade, global investments, and encourage cross-cultural communication for both cultures.

**CREATTE Project**

*Gender Roles: Moderators For The Effect Of Violent Video Game Play On Aggression?*

Yara Perez Del Castillo  
*Mentor(s):* Tiina Ojanen  
*Program:* Psychology

The project described in this presentation is currently being developed during the Child and Adolescent Social Development CREATTE course and takes the form of a rigorous research proposal. This presentation will highlight the research that was required to develop the proposal
and the components of the planned research project and its impact. Both long- and short-term studies have indicated that playing violent video games activate aggression, increase physiological arousal, and encourage imitation. However, more studies are needed to better understand the association between violent video game playing and aggression. To my knowledge, there is no research on gender roles and how they may affect this association. Studies show that males who play violent video games display more aggression than females playing the same amount. This study will examine whether gender roles moderate the association between violent video game playing and aggression, while controlling for sex. Participants will be recruited from a high school in the Tampa Bay area (Target, N=300 ages 15 to 18). Participants will be given a survey upon entering the study that assesses aggression and gender roles (including male norms). Subsequently, participants in the control group will play a non-violent video game, whereas participants in the experimental group play a violent video game. Afterwards, all participants will take the survey again, which assesses their subsequent levels of aggression (to avoid priming effects pre-game playing). It is expected that those scoring high in male gender norms will subsequently display more aggression in the violent game condition than those exhibiting less of these norms, while controlling for biological sex. The findings from this study are expected to increase understanding of the association between violent game playing and aggression.

**CREATTE Project**

*Dying Is A Part Of Living: Death Anxiety In Minorities*

RubyLee Redbrook-Robinson

Mentor(s): Amanda Holup, Winny Shen

Program: Psychology

The universality of death makes it necessary to address the anxiety that is often associated with it. However, little information exists regarding the extent to which cultural diversity mitigates death anxiety among racially diverse young adults. Therefore, this study explores the association between death anxiety and culture in a sample of culturally diverse young adults. Primary survey data were collected from a sample (n=90) of young adults in 2013. Death anxiety was measured using a self-report Likert scale which was composed of 25 data elements questioning topics ranging from the fear of death to general anxiety and personality characteristics. Demographics of the sample were also assessed. Results suggest that there is a correlation between death anxiety and demographics that has generalizability to the population with the exception of the geriatric population. This correlation suggests that demographics and culture influence how anxious a young adult may be about death or death related topics. Although this study begins to address the gap in the current research and brings light to the issues of death anxiety, future research should research further established correlations between age, race, religiosity and death anxiety. Additionally, empirical research is necessary to establish a cause for death anxiety in the general and geriatric populations.

*Usability of Social Sharing*

Tonya Thacker

Mentor(s): Joe Elliott

Program: Psychology

This study examines the social sharing application’s interface on a personal computer and an iOS operating system mobile device. It is unknown how a person constructs a mental model of the site
when using the same application on different devices. Therefore, we wanted to gain a better understanding of when, why, what, and how often a particular user would share information on a social sharing application. We examined participant’s behavior on both of the interfaces by watching the participants navigate the site and iOS application while completing several tasks we had chosen. After consent and a demographic questionnaire are completed, the participant first uses an Apple iPod and the second part is on a desktop computer they complete the task we provided. The participants speak their navigation into the voice recorder. Following each test they fill out a satisfaction questionnaire. Between tasks they are given a math quiz to clear their short term memory. Participants are then debriefed and leave the study. The preliminary results show that the participants were able to navigate through both versions of the interface equally well. However, the users did have difficulty in determining how to search and add people to “share with” on both versions of the site interface.

**CREATTE Project**

*Bear Bile: An Unnecessary Cruelty*

Allyssa Webb  
Mentor(s): Philip Bishop  
Program: Biomedical Sciences  
Endangered Asiatic black bears in China are farmed and kept in tiny cages for the sole purpose of providing bile to be used as a part of Chinese herbal medicine. Because the farms and bears are not clean, there are a lot of dangers involved with using bear bile from farmed bears. Articles from various scientific journals were examined for the medicinal effects of bear bile to decide if using bear bile and further endangering these animals is necessary for medicinal purposes. Results showed that although the main component in bear bile, Ursodeoxycholic acid has many beneficial effects on the body, such as treating primary biliary cirrhosis or cholestatic liver disease, it can also be easily replaced with a synthetic alternative, sold as Ursodiol in the West. Teaching the Chinese about the effects of using the natural ursodeoxycholic acid from the farmed bears and incorporating the synthetic version into Chinese medicine can greatly increase the number of Asiatic black bears in the forests of China.

**CREATTE Project**

*China’s Olympic History to Gold*

Danielle Williams  
Mentor(s): Philip Bishop  
Program: Exercise Science  
China’s commanding presence in Olympic games not only represent the amazing talents that Chinese athletes obtain, but it also represents the country in which China hope’s to convey to the rest of the world. The rich history leading to China’s participation in the Olympic Games depict China’s progress as a country. This research investigates the history of China’s interaction with the Olympic Games focusing on the 2008 Beijing Olympic Games. The intended goal is to create a better understanding of China’s success in the games in the recent years as well as investigating the underlying meaning of the games hosted in 2008. The investigation of this research shall be conducted based on texts relating to China’s history as well as personal testimonies from Chinese citizens exposed to the Beijing Games directly. After the conduction of research, it was concluded
that China’s struggle to find their own voice within the world was greatly attributed to their success in the Olympic Games. It also became evident that China created a false image of their country at their own Olympic games in 2008. The hits taken on humanity rights along with molding false images were detrimental to China’s image after the conduction of the Beijing games. This research will change the perception of Chinese government due to attention brought to the greatly misleading aspects that attributed to the perception of overwhelming success at the Beijing games.

**CREATTE Project**

*Adolescent GAD Influences of Perception in Relational Victimization*

Jessica Winder

Mentor(s): Tiina Ojanen

Program: Psychology

The project described in this presentation is currently being researched and developed during the Child and Adolescent Social Development CREATTE course and takes the form of a rigorous research proposal. This presentation will highlight the research that was required to develop the proposal and the components of the planned research project and its impact. Individuals with a social anxiety disorder have negative perceptions of themselves and the social environment (Blote, Kint, & Westenberg, 2007). Existing research suggests that there is a link between peer victimization during adolescence and development of anxiety into adulthood (McCabe, et al., 2003). However, research on social anxiety during adolescence, in the context of perceived peer victimization, is missing from the literature. The current study seeks to examine 1) whether adolescents with generalized anxiety are more likely to perceive themselves as targets of relational victimization (whether victimization actually occurs or not), 2) whether friendship quality moderates the relationship between anxiety and perceived victimization, and 3) whether these associations differ by gender. Survey data including the Friendship Quality Questionnaire, the Multidimensional Anxiety Scale for Children, as well as peer-reports of victimization will be collected in high school students. I will expect that youth who score high in social anxiety display a tendency to perceive relational victimization (even when peers do not report it). Also, the role of friendship quality in buffering against such biased perception will be examined. The findings are expected to have theoretical and practical implications for the study of adolescent anxiety disorders and peer relationships. Thus far, the development of this proposal has taught me about the rigorous method of designing research in psychology. The process of constructing this proposal will be described in the presentation.
The Arts

*Beauty: An Artist’s Introspective*
Angela Azmitia  
**Mentor(s):** Julie Weitz  
**Program:** Art Studio/Drawing

Drawing connections to societal standards of beauty, my work of art incorporates research on mass media’s effect on women. My goal is for the work to function as a reminder that while we are all individuals, there are cultural standards that shape and influence the way we perceive others and ourselves. My aim is to incorporate excessive control and restraint in the drawing by showing elaborate styles that may take hours to create and are taxing and foreign. I achieve this through the reproduction of familiar images one might find in the media into hyper-portrayals of the original. My presentation will include my most current drawing and a brief discussion on my mark making and concept. The materials used in creating the piece are graphite and paper; the image relies heavily on line quality and movement throughout the work. While the initial gesture of the drawing is loose and fast, the details of the completed image are tight and controlled, suggesting a more painful and tedious process involved in creating such a style. I address in my work the effects of media, symbolically represented through hair as style. This presentation will offer the audience an impactful drawing that references a major constraint that women endure. My main question is, “Does the media’s portrayal of femininity have an effect on women today?”

*Do You Hear What I Hear?: Musical Nuance Perception in Musicians and Non-Musicians*
Danielle Batcheller  
**Mentor(s):** Jennifer Bugos, Jack Heller  
**Program:** Music Education

Previous research suggests that musical training can enhance performance on the *Heller Musical Nuance Task* in elementary students (Heller, Campbell, Gibson, 1987). Little is known about the effects of extensive musical experience on musical nuance perception. The purpose of the study is to examine the perception of musical nuance in musicians compared to non-musicians. Our underlying hypothesis is that music majors will demonstrate enhanced performance on the Musical Nuance Task compared to those not engaged in music activities. Participants (musicians and non-musicians) listened to three short musical phrases, some that are recognizable tunes such as “My County Tis Of Thee” and others specifically composed for this research. Participants determined which one of the three phrases is not like the other two in inflection, dynamics, and/or expression. The *Musical Nuance Task* consists of 15 examples performed on a single instrument and 15 examples with mixed instrumentation among clarinet, cello, and piano. Data collection is currently underway and will be complete by time of presentation. The development of aural skills, essential to musical training and aural working memory processes, can impact learning and memory performance in many fields. This research has implications for music education, communication sciences, and educational psychology.
Experience-Related Perception of Musical Nuance  
Danielle Batcheller  
Mentor(s): Jennifer Bugos, Jack Heller  
Program: Music Education  
Previous research suggests that experienced musicians have better speech-in-noise perception. This suggests that musicians are able to perceive nuances in speech more easily than non-musicians (Parbery-Clark, 2012). The purpose of the study is to examine the perception of musical nuance in college music majors compared to music educators. Our underlying hypothesis is that music educators will demonstrate higher performance on the Musical Nuance Task compared to those who are currently majoring in music. Participants (college music majors and music educators) listened to three short musical phrases, some that are recognizable tunes such as “My County Tis Of Thee” and others specifically composed for this research. Participants determined which one of the three phrases is not like the other two in inflection, dynamics, and/or expression. The Musical Nuance Task consists of 15 examples performed on a single instrument and 15 examples with mixed instrumentation among clarinet, cello, and piano. Data collection is currently underway and will be complete by time of presentation. The development of aural skills, essential to musical training and aural working memory processes, can impact learning and memory performance in many fields. This research has implications for music education, communication sciences, and educational psychology.

Johnny No Good  
Julia Fowler  
Mentor(s): Anat Pollack  
Program: Fine Arts  
Using video and photography, I attempt to comprehend the philosophy of the mind and women’s roles/issues throughout history into today’s society. My work studies the psyche of women and the tension that is created at the meeting point of their conscious and unconscious mind. Through the use of sensory data and abstract language, I explore this part of the mind and the temporal space of this juncture in the mind. All moments revealed in the work are from direct experience and interpretation or that of others. I aim to capture certain happenings from this state of mind through the use of film and photography in a cinematic manner.

Experimental Collagraph  
Emily Gerrity  
Mentor(s): Bradlee Shanks  
Program: Studio Art  
In my work, I am dealing with subverting photographic images that are taken with a camera phone. They deal with memory and the way that technology has drastically changed the way that we process and store moments that we deem important. These works are experimental collagraphs. A collagraph is a printmaking plate made by adhering textured materials to a board and sealing them to achieve an effect that mimics the material in a voluptuous manner. The plate is then inked and wiped in a manner that can be related to intaglio printing. My collagraphs are experimental in that I am sculpting fabric to achieve various effects, and combining it with dry point and monotype. By experimenting with sculpted fabric collagraph, and combining it with the
flatter aesthetic of dry point, I achieved a textural dichotomy that is interesting in its opposition. The incongruous textures create a memory like feeling from the unnatural memory represented by the photograph the image is derived from. In this manner the work is representative of a desire to find sublime moments in the mundane activities of everyday life.

_Safeguarded_

Gary Jennings  
**Mentor(s):** Bradlee Shanks  
**Program:** Studio Art

My work as an artist engages questions of media and its saturation, perception and influences. Safeguarded deals specifically with the ever-growing camera systems being implemented daily in public spaces. Safeguarded is inspired by Cubist paintings, which depict an object from multiple perspectives similar to the way in which camera systems capture everyday life from multiple angles. With the projected growth rates for this technology in the near future, we have the potential to be viewed from multiple angles every time we step out of our home. This is becoming a reality, especially in the United Kingdom, where they are leading the world with an average of 19 privately owned CCTV cameras per square mile. By using the cubist style of multiple angles I am representing the way in which our lives are constantly being documented by an outside source. If this trend continues and these numbers begin to correspond with the United States; this issue will raise serious constitutional questions about the sovereignty of our nations’ people. In the center of Safeguarded there is a ghosted image of a figure, which is collaged together in a cubist form and represents the individual in our society. The ghosted image also embodies the social and cultural experiences in our daily life that will lead to the constant development of our individual identity. The mass media is a combination of a simple reportage of social and cultural concerns that question the consequences of a disjunctive and over-engineered world. The overlapping between these areas of study is a rich source of inspiration for my work. It is in this realm, within the unique interplay between the physical and the digital, that my work engages and explores new territory.

_Researching Vibrator: In the Next Room by Sarah Ruhl_

Brette Morningstar, Selena Frey  
**Mentor(s):** Fanni Green, Dora Arreola  
**Program:** Theatre Performance

In this project, Brette Morningstar and Selena Frey present research and dramaturgy for the School of Theatre and Dance’s spring production of In the Next Room, directed by Professor Fanni Green. Its purpose is to provide historical context for the world of the play for the director and actors. Morningstar will present research on the origins of hysteria, its early treatment of vulva massages, to the invention of the vibrator. The play which deals with female hysteria in the Victorian age inspired her to research modern sex toys, sexual disorders and forms of treatment. Morningstar’s research addresses certain taboos like orgasms, masturbation and the psychology of it all. Its aim is to educate what is still a very naïve society in terms of sexuality and to bring forth hysteria and the role it played in history. Frey’s research focuses on the late 19th century America and the matter in which both fictional and real life characters of the time discovered new advances in technology and electricity. Frey seeks to further explore the playwright and director’s assertion of the true link between physical and emotional intimacy, how that is seen within the context of
the play, and how it is enacted in present day American society. The impact of this research will connect relevancy to audience through a lobby display depicting the difference between what was once a medical issue to our modern knowledge of sexual disorders and the technology of the vibrator.

*I Hate Clothing*

**Tyler Odom**

**Mentor(s):** Gregory Green  
**Program:** Fine Arts

With this project I am exploring where and if the world of “Contemporary Fine Arts” and the world of popular business arts or “Low Art” can meet. I hope to answer this question of merging these two distant ideas using my own personal vision of traditional fashion- my company, “I Hate Clothing.” Over the last 50 years printmaking has often been the answer to combining fine art with popular culture and functionality, allowing the artist to mass produce work for sale. I hope to take this a step further, as “I Hate Clothing” is an ongoing project that combines the ideology of the fine art world with the functionality and relevance of commercial business, while also exploring and exploiting the Internet as a new forum for exhibition and commerce of contemporary art. Essentially, “I Hate Clothing” effectively combines contemporary artwork with the commercial world through the internet, selling each shirt as a hand-made work of art complete with the signature of the artist on the inner label. Customers are meant to be the force that redefines the term “art”, as they are welcome to browse the gallery-formatted website [www.ihateclothing.com](http://www.ihateclothing.com), in which each shirt design is displayed in the same manner that any other fine artist would present one of their pieces. All articles for sale are created using screen-printing, a technique that has long been used for mass-produced articles for sale in common culture, but also recognized as an established medium for the contemporary fine arts since the Renaissance. While generally most articles of clothing available to the public are screen-printed in a traditional manufactured environment, the shirts distributed through “I Hate Clothing” are individually printed by hand, each screen is designed, created, burned, and personally printed by the artist/business owner. Years of research in art history and contemporary practices in fine art and business models are culminated in “I Hate Clothing”; the structure of the commercial supply side of the store is based on the standard model of clothing companies and what sells in popular culture, while the structure of the theoretical side of “I Hate Clothing” is based on conceptual art, gallery, and curatorial practices that have been explored since the 70’s. The store functions as a gallery, dispensing unique pieces of artwork, rather than simple articles of mass-produced clothing.

*Frame of Mind*

**Rebecca Philpot**

**Mentor(s):** McArthur Freeman  
**Program:** Studio Art

Matte painting and camera projection are both digital techniques that are used in movies and in television to create seamless false realities and constructed scenery. For my project I am going to use these methods along with rotoscoping, the transfer of an image from live action film into another film sequence. Using these techniques, I feel that the viewer will be able to relate more to the piece that, although being stylized by the artist, will show hints of life and movement. Using
the techniques I will convey a personal message relating to nostalgia and wishing to be back in a period in time where everything seemed to be going right. The stylized appearance of the landscape in the piece, which will be digitally painted, will convey a sense of illusion and show how unrealistic the situation is. However, the figure, rotoscoped from live footage, will be living in the scene completely oblivious to what is real. The fact that the figure will be encased within a screen or frame will give a sense of being entrapped in this false reality. I believe that the integration of live footage mixed with digital painting will better convey my theme of nostalgia and the idea of being in discord with a cohesive time and space. By contrasting these methods in my work I will take a new look at these techniques to offer new ways for creative expression.

Adult Self-Efficacy and Perceptions Resulting from An Intergenerational Music Program
Courtney Randol
Mentor(s): Jennifer Bugos
Program: Psychology

The purpose of this project was to evaluate general and musical self-efficacy in adults who participate in an intergenerational music program. Twenty-four children and their caregivers enrolled a six-week summer intergenerational music program that contained music listening, music activities, music theory, and weekly homework assignments. Nine children and caregivers completed this research. Attrition was due to custody issues, illness, and travel. Participants were recruited from local early childhood centers such as Bright Horizons, Primrose of Land O Lakes and USF Preschool Creative Learning Center. Standard measures of musical and general self-efficacy were administered pre and post musical training. Results of a paired samples t-test shows significantly higher (p < .05) musical self-efficacy scores post-testing, (t) = -2.7, p = .03. This indicates an increase in musical self-efficacy in the adults after participating in the program. Results of a survey regarding programmatic perceptions show that fifty percent indicated class material as a strength, and sixty-three percent indicated instruction as a strength of the program. These results suggest that class material and instruction are key indicators for the development of successful intergenerational programs.

Marimba Ensemble and Journaling Classes on Self-Efficacy and Quality of Life in Older Adults
Shahnaz Rashid
Mentor(s): Jennifer Bugos
Program: Biomedical Sciences

The purpose of this research study was to examine the effects of mood and self-efficacy resulting from an eight-week cognitive intervention in older adults from [65-85]. According to sociocognitive theory, successful aging is associated with maintenance of cognitive abilities (Bandura, 2001). Enhanced self-efficacy is associated with decreased cognitive deficits (Hertzog et al., 2009). Twenty-six participants were recruited for the study. Criteria for research participation included: less than five-years of musical training; native English speakers; no prior history of neurological impairment; no difficulty with hand movements; and not currently engaged in music training. Participants were assigned to an eight-week cognitive intervention, either marimba ensemble or a structured autobiographical recall class. Each class lasted two hours and included a domain-specific lesson, social activities, and intensive homework assignments. We administered a standard battery of measures to examine mood and self-efficacy during the pre-testing session including the Geriatric...
Depression Scale (GDS); General Measure of Self-Efficacy (Sherer); World Health Organization Quality of Life (WHOQOL). Preliminary data has shown that self-efficacy increases with musical training (Bugos, 2012). These programs will have implications for medical practitioners, gerontologists, and music educators on how to structure programs to enhance the quality of life for older adults.

**CREATTE Project**

*The Remade Renaissance Woman*
Natalya Swanson
Mentor(s): Helena Szepe
Program: Art History

*La Sultana Rossa* is a 16th century painting owned by the Ringling museum in Sarasota, Florida. Its artist is claimed to be Titian, one of the most renowned painters of the Venetian school because of his illumination of subject matter through meticulous finish and use of bright colors. Titian’s role as a respected artist along with the developing relationship he had with his main patron, Prince Philip of Spain, unraveled an understanding of Titian’s freedom to create art on his own terms. Through close visual analysis and research via secondary sources, it was revealed that Titian represented alluring women as an embodiment for the allegory of painting, and an idealized and eroticized image of an objectified woman whose beauty and materiality are essential for portraying social and martial positions. This particular painting has not been researched by many historians, but through my research I have concurred that Titian’s painting is a stylized portrait that embraces female virtues, while simultaneously depicting a Renaissance woman remade as an imperfect version of ideal attributes of the patron. His portrayal of Roxelana not only acts as an image of the Ottoman Empire, an exotic world of forbidden sexuality, but also a recalling of earlier masterpieces from the 15th century that implied a correlation from the patron to the subject matter, bringing attention to the fame of Roxelana as a public figure, Prince Phillip as a leader, and Titian himself as an artist.

**CREATTE Project**

*Mixing Wine and Gender: Cross-Dressing in Ancient Greece*
Phillip Townsend, Mona de Torres, Jeffrey Hansen, Jessica Barron
Mentor(s): Mary Fournier
Program: Art History; Fine Arts

The Zewadski Stamnos from the Greek and Roman Antiquities Collection at the Tampa Museum of Art raises issues of gender construction during the 5th century B.C.E. Scholars have been puzzled by its unusual imagery of a bearded man wearing women’s clothing (sakkos, chiton, and himation) and have suggested that this attire is the result of cross-cultural exchange with Lydians (non-Greek Anatolians). This poster explores why a male figure wearing women’s clothing appears on this particular vessel. Through archaeological and anthropological evidence and analysis, we explore how the Zewadski Stamnos functioned in Dionysiac rituals, which encouraged a dynamic breach of gender boundaries complimented by wine and costume. We find that during Dionysiac rituals revelers mix and store wine in the stamnos, and then serve the drink to the Greek males wearing feminine attire.
**A World of My Own**  
Lasceeka Willis  
**Mentor(s):** Elisabeth Condon  
**Program:** Studio Art  

My drawings examine the impact of industrialism and urban development on the earth’s natural landscape. They do this by suspending portions of natural landscapes in blank, white space, presenting nature as a specimen under our control. Landscape becomes an object of longing, rather than the space that surrounds us. My drawings point out this discrepancy. My research methods incorporate the study of natural disasters such as hurricanes, sinkholes, earthquakes and tornadoes in addition to works by artists interested in landscape ranging from Charles Sheeler to Robyn O’Neil or Julie Mehretu. The disasters provide a compositional structure for my drawings, a container that holds the suspended portions of landscape within. At first I gather images and videos of disasters for an archive I use as inspiration for sketches and studies. Then I apply soft graphite sticks to cover large, dark areas, a fine .3 mm mechanical pencil for fine detail, gouache, and Prismacolor pencils to add chroma. On smooth Bristol paper, I combine geometric forms amidst whirling patterns, from which tiny, wild hairs grow. Geometry embraces the human need for structure while the hairs reveal the vulnerability and organic nature that teems beneath the surface of man-made constructions. Once a composition is established the painstaking process of graphite drawing deepens my awareness of human intervention within the natural environment. The slow evolution of drawing evolves a utopian landscape that negotiates a relationship between the mind and hand, in the attempt to balance the conflicts between man-made structures and natural environments.

**Following Fairytale Fragments**  
Kristina Wilson, Ryan Bernier, Warren Buchholz, Jared Debusk, John Lawsen, Hannah Prince, Jose Rodriguez-Rivera, Tyler Sloan  
**Mentor(s):** Chris McRae  
**Program:** Communication; Theatre Performance  

This performance considers the relationship between fairytales and personal narratives as aesthetic communicative phenomenon. By following the form and function of the fairytale genre, these personal narrative fragments and performances explore the transformative possibilities of fairytales. In this performance, the fairytale becomes a map to follow in making sense of lived experiences. The goal of this creative research project is to develop and stage a performance that explores and demonstrates the implications and possibilities of the fairytale genre for the development and presentation of personal narratives. This project uses a variety of collaborative performance methods to research and develop a performance about the fairytale genre including devising and scriptwriting techniques that follow experimental theatre and performance art traditions. This performance offers insights about the ways fairytales work to produce and maintain various cultural relationships, expectations, and practices. This performance contributes to the communication discipline, specifically within the area of performance studies by adding to ongoing research and conversations about aesthetic communication and traditional literary genres by blending fairytales and personal narratives.
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The CREATTE Scholars Program (Creating Research Experiences and Activities Through Teaching Enhancement) was established in Fall 2012 to build additional undergraduate research capacity by providing seed funding to faculty for the development of sustainable opportunities for students to engage in research and creative activities within lower or upper level undergraduate courses. During the 12/13 academic year 21 faculty were recognized as CREATTE Scholars and provided UR opportunities to over 725 students. This year, 88 CREATTE Student Researchers and 15 Faculty Scholars are presenting their research at the Colloquium.

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<tr>
<td>Gregory Herbert</td>
<td>Geology</td>
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<td>Philip Bishop</td>
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<tr>
<td>Cynthia Patterson</td>
<td>English</td>
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<tr>
<td>Mary Gould</td>
<td>English</td>
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<tr>
<td>Amy Clanton</td>
<td>English</td>
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OUR Scholarships and Awards 2012 - 2013

The OUR supports various funding initiatives to enhance student participation and productivity in mentored research and creative activities projects. Detailed information about each initiative can be found on the OUR website: http://lib.usf.edu/undergraduate-research/travel-funding/

Research in Arts Scholarship

The Research in Arts Scholarship was established in 2012 and provides $750 to students who are accepted to participate in the School of Art and Art History’s Summer Paris Program. Scholarship recipients create research-based art projects, which are displayed in the OUR office suite for one academic year.

2012-2013 Awardees
Kristin Beauvois
Jessica Brantley
Steve Jean-Louis
Jordyn Newsome
Sabrina Pingel
Tyler Staggs

Interdisciplinary Research Scholarship

The Interdisciplinary Research Scholarship was established by the OUR in 2012 to promote student engagement in interdisciplinary research at USF. Undergraduate students in all disciplines are eligible to apply for the $750 Interdisciplinary Research Scholarship. *2013 Colloquium Presenters

2012-2013 Awardees
Anita Behari
Hannah Feig*
Megan Howard*
Nicole Le*
Courtney Randol*
Funding to Conduct Undergraduate Research Travel Grant

The Undergraduate Research Travel Grant provides up to $750 to support students who need to travel for the purposes of conducting research related to an ongoing research or creative activities project. *2013 Colloquium Presenters

2012-2013 Awardees
Ryan Bernier*
Warren Buchholz*
Jared Debusk*
John Lawson*
Hannah Prince*
Jose Rodriguez-Rivera*
Tyler Sloan*
Kristina Wilson*

Funding to Present at the National Conference on Undergraduate Research (NCUR)

The OUR supported seven students to present their research at the annual NCUR conference. Support is awarded after review of the research abstract and priority is given to students who have not previously presented at NCUR and have not presented the research at any other national meeting within the past 12 months. The 2013 NCUR meeting was held April 11-13 at the University of Wisconsin-Lacrosse. *2013 Colloquium Presenters

2012-2013 Awardees
Toni Jung*
Ryan Kaufman
Oscar Merino
Alicia Nassar*
Kevin Potter
Dana Putney*
Sandra Zivkovic*
Community Scholars Fellowship Program

The OUR partners with the Office of Community Engagement to support the Community Scholars Fellowship program. This fellowship supports undergraduate students conducting research that benefits, and is carried out in partnership with community organizations, nonprofits, or local government agencies. The program provides a stipend of $1,000 for a student who will carry out at least 150 hours of research over the course of a semester or a summer. The program also provides up to $250 for research related expenses, and a $250 stipend for the community partner, and if applicable, $250 for a faculty “mentor”. *2013 Colloquium Presenters

2012-2013 Awardees
Alicia DeVita*
Brittany King
Alyssa Hughley*
Sarah Preston
Undergraduate Research at USF

Undergraduates have participated in research activities at USF since the inception of the first doctoral programs in the early 1970's. Undergraduate Studies established the first Office of Undergraduate Research in 1999 under the direction of Dr. Stuart Silverman, current Dean of USF's Honors College. Shortly after its creation, the Office of Undergraduate Research became a unit of the Honors College and Professor Emeritus Michael Angrosino was named its first Director. The first research competition was held in 2000 under the leadership of Dr. Angrosino. By 2003, under the direction of the second director of the office, Dr. Georg Kleine, current Assistant Dean of the Honors College, the competition became known as the Undergraduate Research Symposium and Celebration. Beginning in 2004, undergraduate research became a key component of the SACS Quality Enhancement Plan and this resulted in increased funding and the formalization of the office within the Honors College. Dr. Naomi Yavneh served as Director of the Office of Undergraduate Research from fall 2004 to fall 2011.

In August 2011, oversight of undergraduate research was moved to Undergraduate Studies and the office was renamed the Office for Undergraduate Research (OUR). With funding from the Office of the Provost, the OUR was relocated to the second floor of the Tampa Campus Library. The new office suite provides more visibility and greater accessibility for students, faculty and staff and features a computer lab and classroom to accommodate expanded services and new OUR initiatives. In addition, the OUR is now part of the library's “Learning Commons,” which includes the Writing Center, Tutoring and Learning Services, and the library IT help desk. On April 18, 2012, under the direction of the OUR's new director, Dr. Richard S. Pollenz, and continuing the rich tradition established by previous directors, the OUR hosted Inquiry and Discovery: Undergraduate Research and Arts Colloquium. The highly successful event featured more than 175 diverse and engaging presentations from undergraduate researchers across all disciplines.
The OUR would like to thank today’s facilitators for graciously volunteering their time and expertise to help make this event a success.

Michael Ayres, Advancement/Marketing - Sarasota
Maura Barrios, Arts & Sciences
Ella R. Bieze, English
Prof. Patrick Bradshaw, CMMB
Lynne Carlson, Student Academic Services
Matthew Chrzanowski, Chemistry
Courtney Coon, Integrative Biology
Michael Cross, Physics
Carolyn Day, Communication
Prof. James D’Emilio, Humanities & Cultural Studies
Angela Eward-Mangione, English
Kurt Fawver, English
Erin Feichtinger, Public Health
Carrie Gentner, Adult, Career & Higher Education
Vanessa Hettinger, Psychology
Selma Hokenek, Chemical & Biomedical Engineering
Amanda Holup, School of Aging Studies
Prof. Piyush Koria, Chemical & Biomedical Engineering
Morgan Lee, Psychology
Emily Mandeville, Childhood Education
Christine McNiff, Geology
Shabnam Mehra, Office of Decision Support
Prof. Janet Moore, Undergraduate Studies
Prof. Jennifer O’Brien, Psychology
Abidemi Ologunde, Electrical Engineering
Prof. Luther Palmer, Computer Science & Engineering
Scott Murphy, Anthropology
Lindsay Persohn, Childhood Education
Sandy Pettit, Chemical & Biomedical Engineering
Prof. Chris M. Ponticelli, Sociology
Audrey Powers, USF Library
Prof. Andrew Raji, Electrical Engineering
Prof. Jackie Reck, Finance
Jessica Russo, Rehabilitation Counseling
Andrea Sanchez, Adult, Career & Higher Education
Camara Silver, Humanities & Cultural Studies
Anastasia Smith, Economics
Kristin Steffen, Office of VP for Health Sciences
Victoria Stuart, College of The Arts
Siqi Sun, Chemistry
Aparna Tatavarthy, Center for Biological Defense
Britany Telford, Psychology
Lauren Townsend, Honors College
Dan Utic, Chemistry
Matthew Venesky, Integrative Biology
James Walker, Political Science
Lindsey Williams, Student Academic Services
MISSION STATEMENT:
The Office for Undergraduate Research (OUR) promotes mentored research across all disciplines by partnering with faculty and staff in all academic programs, administrative units and within the community. The office assists students, faculty, staff, administrators and community leaders in establishing research experiences that are designed to enhance a student’s academic progression and foster deeper immersion in the field. The office elevates the research experience by providing all participants professional development and mentoring workshops, research training, publication and funding opportunities.

To learn more about the Office for Undergraduate Research:

http://lib.usf.edu/undergraduate-research/
Office Location - LIB 210
Phone - 813-974-6824

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www.facebook.com/urusf

*Please note that student names, project titles, advisor names and abstracts were submitted by colloquium participants. Therefore, this document may contain errors and some information may have been unintentionally omitted.