Paaras Agrawal, Engineering - Chemical and Biological Engineering
Faculty Mentor: Jason Bara, Engineering - Chemical and Biological Engineering

Development of Structured Distillation Packing through Additive Manufacturing
The purpose of this research is to examine the role of additive manufacturing in terms of designing and producing structured packing to improve the efficiency in a distillation setup. Structured packing forces fluids to take complicated paths throughout its environment thereby increasing both the efficiency and the capacity of the process by increasing the liquid/vapor contact areas. This study focuses on the design of the packing created through the propagation of a unit cell to create interesting structures with large surface area to volume ratios via CAD software. By manipulating the unit cell propagated as well as certain parameters including the distances between the unit cells several different designs can be created and tested in an experimental setup. A series of unique distillation packing will be produced through additive manufacturing techniques and then tested in an experimental distillation setup to compare packing types in order to determine parameters which lead to more efficient results.
Amy Akel, Nursing - Capstone College of Nursing  
Faculty Mentor: Michele Montgomery, Nursing - Capstone College of Nursing

Community Health Assessment (Trussville, AL)  
It's important to assess a community before providing essential help. This helps you target the areas that need help and the areas in which the members of the community are willing to accept help. This presentation is a community health assessment of Trussville, AL in Jefferson County. The presentation will display significant demographics. These include population, median age and age ranges, race, number of households, median income, employment rates, employers, number of residents living below poverty level, and the average housing cost and appeal. The community has been evaluated via an interview of a successful resident. This will be included in the presentation. Other things discussed in this presentation will include growth and development, education availability, safety and transportation, politics, school systems, healthcare services, economic vitality, and disaster resources. As well as all these factual statements, several research articles have been evaluated in their effectiveness of interventions. Obesity is a major health issue in this community and these articles have provided possible options to implement into this community and reduce the issue at hand.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Husam Ali, Engineering - Chemical and Biological Engineering
Faculty Mentor: Yuping Bao, Engineering - Chemical and Biological Engineering

MRI: T1 or T2
The Gadolinium complex is a compound that is used in Magnetic Resonance Imaging (MRI) as a contrast agent. However, gadolinium complexes can be toxic to the body and cause many adverse health side effects. This project focuses on finding a viable alternative contrast agent by using iron oxide nanoparticles. Specifically, ultra-thin iron oxide nanowires will be created, which has been demonstrated to be great T1 MRI contrast agent. Right after synthesis, these nanowires are coated with a layer of hydrocarbon ligands (e.g. oleic acid). Subsequently, ligand exchanges will be performed to replace the oleic acid with tannic acid, a biocompatible hydrophilic molecule. These water soluble nanowires are characterized with Dynamic Line Scattering and a Relaxometer.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
AHMED ALI, HES - General Studies in HES  
Faculty Mentor: Bernard Burroughs, Education - Kinesiology

Athletics Trainer Abstract
Ahmed Ali, Health Science Department Faculty Mentor: Bernard Burroughs, Sports Medicine Athletic trainer Athletic trainer The University of Alabama is well known for its prestigious academic and well for its high achievement in athletic. Athletics trainer’s serve a big role to that high achievement, they are the first Health care every athlete refers to. They provide prevention service, emergency care, clinical diagnosis and rehabilitation of injuries and medical conditions. As for my duties during my community's hours. I have been thought many things while assisting I have earned how to maintain a daily treatment log, provide 1st aid and injury assessment, and learned how to equip each team with appropriate medical equipment. Also for Straight 3 weeks I have been providing my fellow teammates with flyers to inform and educate them on what's they might be dealing with personally. I have provided handout containing information such as. Wellness matter for college students, Discrimination and stress, and dealing with test anxiety
Ahmed Ali, HES - Health Science
Faculty Mentor: Lori Turner, HES - Health Science
Bernard Burroughs, Education - Kinesiology

Athletic trainer abstract
Ahmed Ali Abstract
March 1, 2016 Ahmed Ali, Health Science Department Faculty Mentor: Bernard Burroughs, Sports Medicine Athletic trainer Athletic trainer The University of Alabama is well known for its prestigious academic and well for its high achievement in athletic. Athletics trainer's serve a big role to that high achievement, they are the first Health care every athlete refers to. They provide prevention service, emergency care, clinical diagnosis and rehabilitation of injuries and medical conditions. As for my duties during my community’s hours, I have been thought many things while assisting I have earned how to maintain a daily treatment log, provide 1st aid and injury assessment, and learned how to equip each team with appropriate medical equipment. Also for Straight 3 weeks I have been providing my fellow teammates with flyers to inform and educate them on what’s they might be dealing with personally. I have provided handout containing information such as. Wellness matter for college students, Discrimination and stress, and dealing with test anxiety.
Maya Allen, A&S - Biological Sciences
Faculty Mentor: Juan Lopez-Bautista, A&S - Biological Sciences

The Biodiversity of Ulva (Ulvophyceae, Chlorophyta) from the Western Atlantic and Chile
This project focuses on the molecular systematics and identification of the green algal genus Ulva from the Western Atlantic and Chile. Ulva (Ulvophyceae, Chlorophyta) also known as the "sea lettuce" is a genus of green macroalgae that exhibits a vast array of morphologies and different environmental preferences. Ulva species are notoriously difficult to identify due to a conserved morphology but significant cryptic diversity. In order to understand the true biodiversity of these areas and correctly identify these species using molecular techniques the rbcL (chloroplast), tufA (chloroplast), and ITS1-5.8-ITS2 (nuclear) molecular markers for ~250 samples from Western Atlantic, USA and ~50 samples from Chile including the Juan Fernandez Islands and Easter Island were sequenced and analyzed. Subsequently, our data has shown that the diversity of Ulva from these areas is very different than morphological studies have previously suggested. Thus far, we have been able to identify four new species reports in the Gulf of Mexico including the harmful algal bloom causing species Ulva ohnoi, which has likely been introduced to this area. This is especially important because HABs can cause drastic changes to the environment, which in turn results in severe ecological and economic consequences. Additionally, we have identified 8 species that have DNA sequences that are unique in comparison to sequences available from previous research, and thus, likely represent new species.
Elie Allen, School of Social Work
Miranda Casey, School of Social Work
Madison Darling, School of Social Work
Molly Darling, School of Social Work
Rachel Hartley, School of Social Work
Molly Moran, School of Social Work
Bailey Reese, School of Social Work
Shelby Smithson, School of Social Work
Rachel Thompson,
Cho Rong won, School of Social Work
Faculty Mentor: Kevin Corcoran, School of Social Work

**USDA Nutrition Guidelines: Do they make a difference?**

Every 5 years the USDA and DHHS distributes nutrition guidelines, which are designed to be the standard for the country. Our research question was “do the guidelines make a difference on health, obesity, diabetes, or hunger?” Using longitudinal data we compared the dependent variables 3 years before and 5 years after they were distributed, from 2008 to 2015. Using nonparametric statistics the answer was a resounding “NO” on all dependent variables; that is, the nutritional guidelines do not appear to make any difference, and yet a considerable amount of money is spend on them.
Elie Allen, School of Social Work  
Molly Moran, School of Social Work  
Bailey Reese, School of Social Work  
Shelby Reese, School of Social Work  
Rachel Thompson, School of Social Work  
Faculty Mentor: kevin Corcoran, School of Social Work

"Living Memories": An app for family matters
"Living memories" We have developed an app that in faces with family and family history, including medical history. It is entitled "Living Memories" and is an online interactive family tree and living will, last will and testament, a time capsule database of family histories including medical history, legacies, and farewells. We have planned an evaluation of Living Memories using a randomized controlled design. It is hypothesized that Living Memories will enhance family bonding compared to the control group.
Matthew Amick, School of Social Work  
Colin Thomas, A&S - Psychology  
Race Belk, A&S - Psychology  
Belk,  
Faculty Mentor: Tricia Witte, HES - Human Development and Family Studies

Identity Development of Addiction Recovery  
Research suggests that there are various stages of identity development that can be distinguished and observed for various identities (e.g., LGBTQ+ identity, feminist identity). This project discusses the development and application of a stage-model for identity development related to addiction recovery. Using a survey method, this project will query individuals about their substance use history and their path to recovery in order to test a new recovery identity development framework.
Identifying Impurities in TBAF

Tetrabutylammonium fluoride (TBAF) is a commonly used fluoride source. However, in high concentrations commercial TBAF often possesses a visible, pale yellow impurity. While the yellow color is acknowledged by commercial suppliers, the effect of the impurity in UV/vis and fluorescence spectroscopy has not been documented. Through this research, the effect of this impurity on the UV/vis and fluorescence spectrums of several TBAF samples was studied. The identification and removal of the impurity was an additional focus of the research.
Hydrolysis Reactions of Actinide Oxide Nitrates

Hydrolysis reactions of actinides oxides play an important role in the initial steps of the conversion of actinides oxides to compounds containing OH groups. Such reactions play an important role in the design of new nuclear fuels as well as in environmental cleanup. We are calculating the structures of the reactants and products and the energetics for the reactions of AnO(NO3)3- with H2O and HNO2. These specific reactions are being studied in the gas phase at Lawrence Berkeley National Laboratory. Although the experimental work determines reaction products, it does not determine their structures or the overall energetics. These reactions provide unique insights into the chemistry of the +IV and +III oxidation states of the actinides, especially the transuranics about which little is known because of their radioactivity and the cost to synthesize these atoms in cyclotrons. Density functional theory with carefully selected basis sets/effective core potentials and exchange-correlation functionals (B3LYP, BP86, PW91 and ωB97x) was used for these calculations.
**From beer to cancer: How yeast help in the development of anticancer therapies**

The maintenance of internal cellular functions is mediated by a variety of biomolecules. This project focuses on a class of lipids called phospholipids, which play an essential role in mediating homeostatic mechanisms, particularly those involving cell membranes through many signaling pathways. Phosphatidylethanolamine (PE) is one phospholipid that is involved in a wide range of processes including endocytosis and cell-cell signaling, and has been shown to be essential for the cytoprotective responses of S. pombe to the anticancer compound Avicin G. Understanding phospholipid synthesis and the roles of phospholipids in the maintenance of cell structures is critical to cancer research and the development of novel chemotherapeutic agents. One method by which S. pombe synthesizes PE is by the decarboxylation of phosphatidylserine (PS) using the Psd (PS decarboxylase) enzymes. Cells made deficient in these enzymes exhibit an aberrant phenotype of small, round, bottle-shaped, and slow growing cells. These phenotypes are suppressed by addition of ethanolamine (EA), which can be used in an alternate PE synthesis pathway. Also, supplementing wild type cells with EA renders resistance to Avicin G, although independently of the Kennedy Pathway. This work not only demonstrates the role of PE in the cellular response to Avicin G, but also implicates a novel role for EA in the cell. Here I propose to use S. pombe to study the role of PE and EA in the cytoprotective responses to Avicin G.
Samantha Baldwin, Nursing - Capstone College of Nursing
Faculty Mentor: Cassandra Ford, Nursing - Capstone College of Nursing

Cardiovascular Disease: The Silent Killer of Tuscaloosa County
Abstract Cardiovascular disease has become the major causes of morbidity and mortality in adults of Tuscaloosa County. Smoking, diabetes, hypertension, high cholesterol, obesity, physical inactivity, and poor diet are all factors that lead to the development of cardiovascular disease. In 2015, 22% of the population report smoking while 33% report being obese. Cardiovascular disease is a preventable disease. Through primary prevention, all factors associated with cardiovascular disease could be prevented; thus, preventing cardiovascular disease completely. Through community outreach programs, the number one cause of mortality in Tuscaloosa County can be significantly reduced. Community programs focusing on primary prevention and health screenings have been shown to reduce the incidence of cardiovascular disease. This presentation will offer evidence-based interventions that have been shown to reduce cardiovascular disease as well as reduce deaths due to cardiovascular disease. The purpose of this presentation is to educate and prevent cardiovascular disease in Tuscaloosa County and eventually the entire country.
Jordana Baraad, A&S - Psychology  
Faculty Mentor: Matthew Jarrett, A&S - Psychology  
Dane Hilton, A&S - Psychology

Attention-Deficit/Hyperactivity Disorder (ADHD) and Mindfulness
Attention-deficit/hyperactivity disorder (ADHD) is a developmental disorder that commonly persists into adulthood. New research is investigating another domain of symptoms reflecting drowsiness, decreased alertness, and decreased activity (termed sluggish cognitive tempo or SCT) that commonly co-occurs with ADHD. To date, only one study has examined treatment response for SCT symptoms. One promising treatment for SCT may be mindfulness meditation. Over the past few years, there has been increasing interest in studying mindfulness for adult ADHD, although no study to date has examined effects on SCT. The current study aimed to assess the efficacy of mindfulness meditation for ADHD and SCT symptoms in an adult ADHD sample. Approximately 800 undergraduate students were prescreened for ADHD. Those who reported significant ADHD symptoms were invited to participate in the study. Participants completed a pre-treatment diagnostic assessment to confirm ADHD diagnosis. After a 4-week waiting period, participants meeting inclusion criteria were treated with an 8-week, group-based mindfulness program for adults with ADHD. Self-reported ADHD and SCT symptoms were collected weekly. Using Simulation Modeling Analysis, results supported declining linear trends for all 3 participants with particularly strong effects for inattention and SCT. The current study provides the first evidence for the potential efficacy of mindfulness in treating SCT symptoms.
Shea Barger, A&S - Biological Sciences  
Clint Hydrick, A&S - Biological Sciences  
Faculty Mentor: Stephen Secor, A&S - Biological Sciences  

Not-so-picky eaters; The Cost of Choosing for the Kingsnake  
Kingsnakes feed on a variety of prey, including other reptiles, birds, and mammals. Notable is their capacity to eat other snakes of near equal size. A snake meal undoubtedly presents several challenges that would result in more time and effort needed for digestion. We addressed the hypothesis that snake meals are relatively costly by comparing the duration of breakdown and the cost of digestion and assimilation between rodent and snake meals for the kingsnake, Lampropeltis getula. Prior to feeding, we measured the fasting standard metabolic rates (SMR) of kingsnakes using closed-system respirometry. Snakes were then fed either a rodent meal (3 mice) or a snake meal (a corn snake) equaling in mass to 25% of snake body mass. Following feeding, metabolic rates were measured and x-rays taken daily for up to 2 weeks. Both meals generated a rapid increase in metabolic rate, peaking at 7 and 6.5 times SMR for the mice and snake meals, respectively. Kingsnakes however took more time to digest the snake meals as gastric breakdown was completed in 8.5 days for the corn snakes meals compared to 6.5 days for the mice meals. This added time and effort resulted in a greater overall cost in the digestion and assimilation (specific dynamic action of the meal) of the corn snake meal compared to the mouse meal. While the data supported our hypothesis, a corn snake is still a profitable meal for kingsnakes, delivering a net 65-70% of corn snake energy to the snake.
Rob Barlow, A&S - Anthropology  
Faculty Mentor: Virgil Beasley, A&S - Anthropology

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Oral & Poster Presentation Abstracts

Grace Beasley, A&S - Biological Sciences
Faculty Mentor: Elizabeth Hibberd, HES - Health Science

RELATIONSHIP BETWEEN THROWING VELOCITY AND PHYSICAL CHARACTERISTICS IN ADOLESCENT BASEBALL PLAYERS
Shoulder and elbow overuse injuries are most common in baseball pitchers. Previous research has identified physical characteristics that predispose adolescent baseball pitchers to these injuries. To date, there is limited research evaluating how the physical characteristics affect pitching velocity in adolescent pitchers. The purpose of this study was to evaluate the relationship between glenohumeral muscle strength (STR), rotational range of motion (ROM), and throwing velocity. 57 youth baseball players were recruited and demographics, internal rotation (IR) and external rotation (ER) ROM, and glenohumeral internal rotation (IR), external rotation (ER), retraction (RET), and abduction (ABD) muscle STR, and pitching velocity were measured. Pearson coefficients were calculated to find the relationship between physical characteristics and pitching velocity. There was a weak correlation between throwing velocity and ER ROM. IR STR, ER STR, and RET STR correlate the strongest with throwing velocity. These findings suggest that strengthening of the muscles that produce these movements may also increase throwing velocity. Further, previous literature has suggested that strengthening of these muscles may decrease the risk of shoulder and elbow injury. Strengthening of muscles that contribute to glenohumeral IR, ER, and RET STR may improve performance while also decreasing injury risk.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Briana Bettison, C&IS - Advertising and Public Relations
Faculty Mentor: Caryl Cooper, C&IS - Advertising and Public Relations

This study focuses on the career of Caroline R. Jones, an African American advertising copywriter, from 1973 through 1983. Focusing on this time period provides an opportunity to examine the challenges and opportunities African American women faced when the Civil Rights Movement and the Feminist Movement pressured advertising management to consider the profitability of hiring women and minorities as copywriters and creative directors. This study uses the historiographical method to analyze newspaper articles about Jones and minority marketing found in the ProQuest Historical Newspapers Database, advertising trade journals such as Advertising Age, government documents and interviews. Jones’ career and contributions to the advertising industry have not escaped the interest of media and marketing historians. One scholar described her as an “advertising pioneer and trailblazer.” Although Jones passed away in 2001, her career and accomplishments are relevant today because barriers to hiring and success in the advertising industry still exist. This study is significant because it contributes to the limited body of knowledge that scholars have about Caroline R. Jones and the careers of African American women in the advertising industry.
The role of habitat age in structuring multi-trophic species diversity in a successional pond metacommunity

Metacommunity theory invokes both local and regional processes to explain community assembly, but the role of succession in influencing metacommunity dynamics has been ignored to date. To address the importance of succession in structuring multi-trophic species diversity at local and regional spatial scales, we evaluated the influence of habitat age, local environment, and spatial distance on species diversity across three taxonomic groups: crayfish, fish, and zooplankton. The communities are located in beaver-formed forest ponds connected by stream flow in the Talladega National Forest, Oakmulgee District. Analyses testing for effects of pond age on the beta diversity of each taxonomic group suggest that age influences the diversity of fish, but not crayfish or zooplankton. Additionally, fish community structure is limited by hydrology. Crayfish communities are spatially structured according to analyses of beta diversity and variation partitioning by Euclidean distance. Crayfish communities in young ponds significantly differed in composition relative to the crayfish communities in mid-aged or older ponds. Taken together, the results suggest the relative importance of habitat age and regional processes on community structure differ by taxonomic group. These patterns may be due to the relative limitation of dispersal for each taxonomic group.
Caroline Bloodworth, Engineering - Chemical and Biological Engineering
Faculty Mentor: David Dixon, A&S - Chemistry
Monica Vasiliu, A&S - Chemistry

Computational Studies of Trans-Actinide Hydrolysis
We are developing a fundamental and predictive understanding of actinide aggregation in aqueous solution under conditions relevant to nuclear-waste storage and reprocessing of spent fuel. Intractable, small aggregates in nuclear-waste streams can impair clean-up, forcing a low-level waste stream to be treated as high-level waste, thereby increasing treatment costs. Metal oligomers, aggregates, clusters, nanophases and colloids are ubiquitous in aqueous chemistry. Proton transfer reactions play an important role in colloidal particle formation, especially the initial steps. Electronic structure calculations were used to predict the properties of single metal +4 cations embedded in water as well as the structures generated by loss of protons. We are predicting the thermodynamic properties of Pa(IV), Am(III) and Am(IV) water/hydroxide clusters and comparing them to aqueous Th(IV) and Pu(IV) cations which have been already studied. The calculations were done by using density functional theory including relativistic effects with effective core potentials. The behavior of these monomers in aqueous solution is studied using COSMO as a solvation method and pKa’s are calculated.
**Allison Bouslog**, A&S - Psychology  
Faculty Mentor: Philip Gable, A&S - Psychology

*Influence of direct current neural stimulation on motivation and cognition*

Decades of research found that emotional state impacts cognitive scope, specifically associating approach-positive states with local attentional scope and avoidance-negative states with global attentional scope. Additionally, the prefrontal cortex is asymmetrically related to the processing of approach related positive stimuli and avoidance related negative stimuli. However, most of this previous research has confounded motivational direction and affective valence in that positive stimuli presented during these studies were almost always approach motivating and negative stimuli presented were almost always avoidance motivating. More recent research suggests that change in cognitive scope is due to motivational direction and not affective valence. The current experiment sought to examine how cathodal transcranial direct current stimulation (tDCS; a method for temporarily altering brain activity) impacts cognitive scope in response to both positively and negatively valenced approach-motivating states. We hypothesized that dampening the neural activity of the right prefrontal cortex would narrow attentional scope indicating an increase in approach motivation. We also hypothesized that dampening the neural activity of the left prefrontal cortex would broaden attentional scope indicating a decrease in approach motivation. However, the stimulation did not affect attentional scope or motivation, indicating that the stimulation may have been ineffectual due to placement.
Brittany Bradley, HES - Human Nutrition and Hospitality Management
Hannah Claire Robillard, HES - Human Nutrition and Hospitality Management
Virginia Brasher, HES - Human Nutrition and Hospitality Management
Brasher,
Faculty Mentor: Lori Greene, HES - Human Nutrition and Hospitality Management
Meghan Chambers, HES - Human Nutrition and Hospitality Management

Parental Feeding Practices and the Association of Overweight and Obesity in Children Using the Child Eating Behavior Questionnaire: A Review

Childhood is a critical period during which autonomous feeding practices are acquired. Development of feeding practices in early childhood sets the stage for lifelong feeding practices that could result in being overweight or obese. This review aimed to determine which parental feeding practices were associated with appetitive traits predictive of overweight or obesity. A review of literature from the last 10 years was conducted to examine the relationship between parental feeding practices and weight outcomes of children. All articles use the Child Eating Behavior Questionnaire as a survey tool. PubMed, EBSCO, and ScienceDirect were reviewed. Research suggests that parental perceptions of child's appetite and weight status are predictive of both pressure to eat and restrictive feeding practices. Factors such as emotions, awareness, and enjoyment play a role in a child's eating practices and responsiveness to food. Additionally, a parent's involvement in mealtime affects a child's enjoyment of the meal. However, too much control can create negative feelings about mealtime and create a picky eater. The literature also shows that authoritarian feeding styles are associated with higher food and satiety responses. Parental feeding practices play an integral role in determining the outcomes of their children's relationship to food. Our findings suggest the importance clinicians play in educating parents on children's feeding patterns, appropriate intake, and appropriate weight.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Anna Bragg, HES - Human Nutrition and Hospitality Management
Faculty Mentor: Kristi Crowe-White, HES - Human Nutrition and Hospitality Management

Relationship between Cardiometabolic Disease Staging and Inflammation in Obese Older Adults

Background: The Cardiometabolic Disease Staging System (CMDS) is an algorithm validated to assess risk level for diabetes and cardiovascular disease (CVD) mortality in adults. Based on parameters of waist circumference, blood pressure, plasma glucose, and serum lipids, risk is categorized into numerical stages ranging from 0 (metabolically healthy) to 4 (highest risk). Although inflammation occurs alongside cardiometabolic dysfunction, CMDS risk factor assessment does not include inflammatory measures in CMDS staging. Objective: To assess the relationship between CMDS risk staging and inflammation among a cohort of obese older adults. Methods: CMDS scoring and inflammatory biomarkers were evaluated in 121 adults > 65 years with stage I or II obesity. Relationships were examined by regression modeling and proportion of variation in dependent variables (inflammation) explained by CMDS after adjusting for age, sex and ethnicity. Results: Inflammatory biomarkers did not differ significantly by CMDS stages (p>0.05). C-reactive protein (CRP) and interleukin-6 (IL-6) progressively declined in stages 2-4 with tumor necrosis factor-α (TNF-α) peaking at CMDS stage 2. Significance: Contrary to the hypothesis, inflammatory status does not add predictive value to the assessment of diabetes and CVD mortality risk using CMDS staging. Additional research is needed to investigate the potential decline in inflammation observed with accumulating risk factors.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Hannah Browdy, Nursing - Capstone College of Nursing  
Faculty Mentor: Michele Montgomery, Nursing - Capstone College of Nursing

_Smoking in Public Places in Tuscaloosa, AL_  
Smoking in public places is a continuing issue that Tuscaloosa, AL has struggled with. In 2007, smoking was banned in public places in Tuscaloosa exempting bars that do not serve food and allowing bars that do serve food to allow smoking after 10 pm. In 2015, smoking was prohibited at all times and all locations on the University of Alabama's campus, including University-owned and leased facilities, properties, and grounds (including DCH Regional Hospital). As of January 1st, 2016 all city of Tuscaloosa facilities, grounds, and vehicles were to become smoke-free but this regulation has not been successful. After doing much investigation, there are several public places and campus properties that do not prohibit smoking and there are no consequences to those who do smoke on campus or inside restaurants/bars in Tuscaloosa. This presentation will assess the current problem at hand, the strengths of Tuscaloosa as a community, planning tactics used in order to establish evidence-based interventions to help reduce smoking in public places and then the evaluation of these interventions in order to better the health of the community of Tuscaloosa, AL.
Nelson Brown, Engineering - Chemical and Biological Engineering
Faculty Mentor: Laura Reed, A&S - Biological Sciences

Testing the Effects of High Intensity Artificial Sweeteners on Drosophila melanogaster
In recent decades, diabetes and obesity have grown at astronomical rates in the United States, contributing to more than 20% of American adult deaths. One tactic to combat obesity is the use of non-nutritive artificial sweeteners in place of sugar and other high calorie sweeteners such as high fructose corn syrup. However, some studies suggest that regular consumption of artificial sweeteners leads to weight gain rather than weight loss. Drosophila melanogaster serves as a good model organism to study the effects of regular consumption of artificial sweeteners due to the multitude of genes that are homologous to humans. Additionally, a large sample size can be generated relatively easily with Drosophila compared to humans. My study tests the various effects that artificial sweeteners have on Drosophila melanogaster and whether genotype-by-diet interactions have a significant influence on various phenotypic outcomes, particularly body weight. My initial study looked at the effects of four different non-nutritive sweeteners (Aspartame, Sucralose, Saccharin, and Stevia) on one genetic line of Drosophila melanogaster. The results from this study indicate that different artificial sweeteners at varying concentrations can significantly affect the body weight of a fruit fly. These results suggest that artificial sweeteners may also affect humans in a similar manner and the mechanisms for these effects should be explored to improve public health.
Ashley Brown, C&BA - Culverhouse School of Accountancy
Faculty Mentor: Lisa McKinney, C&BA - Culverhouse School of Accountancy

Business Education to Assist Economic Restoration in Haiti
Abject living conditions remain in Haiti despite the fact that several institutions have spent time and money rebuilding the country's infrastructure and attempting to mend the fiscal state. Haitian Entrepreneur Research and Development (HERD) travels to Haiti twice a year to try and approach this problem from the source by providing general business and computer classes to Haitian citizens. Two trips of faculty members and students have been made to Haiti so far: a team of 11 in May 2015 and a team of 24 in December 2015. The program began with a focus on the creation of small businesses in Haiti. In May 2015 the classes taught were on subjects including entrepreneurship and computers and were offered in lecture format. A business plan competition resulted in the selection of 3 Haitians to receive funding in order to start their small business. Lack of communication or progress from these Haitians resulted in a shift of program focus to purely providing business related education to members of the Haiti community. In December 2015 the classes were taught on subjects including marketing, financial literacy, economics, and other fundamentals of business. A shift from lecture based classes to activity based classes proved useful in keeping the students engaged during the eight-hour class days. HERD is now reevaluating their target market so that in the future local Haitian businesses will send their employees to us so that our classes may increase the value of their employment.
The Effects of Clinical Journaling in Mental Health Practice
The purpose of this study is to explore the influence of clinical journaling in mental health nursing on the attitudes and learning of undergraduate nursing students. Methods used in this study include the review of various research articles of how nursing, and other disciplines, uses journaling in the education process as well as the outcomes experienced. Our review of literature shows that the addition of journaling to undergraduate course work fosters healthier attitudes toward the mentally ill. It has also been shown that post-clinical reflection strengthens understanding and empathy of mental illnesses. Research targeting the level of empathy in undergraduate nursing students shows a positive, linear increase of empathy throughout a mental clinical rotation. Further research is needed related to journaling in other aspects of patient care, such as levels of retention of learning, understanding, and cultural as well as community awareness. This research will continue to foster the development of outstanding nursing students and will ensure their success in the professional world upon graduation.
Connor Buckley, A&S - Biological Sciences
Faculty Mentor: Ryan Earley, A&S - Biological Sciences

The effect of endocrine disrupting compounds on the behavior of juvenile mangrove rivulus fish

Endocrine-disrupting compounds (EDCs) are a class of chemicals that interfere with the production or reception of certain hormones and can lead to many developmental and reproductive disorders. Many of these compounds can be found in the outflow of wastewater treatment plants, where EDCs such as ethinyl estradiol (EE2) and nonylphenol (NP) concentrate and permeate the surrounding environment. Organisms respond to toxins either monotonically, with the response increasing with dosage, or non-monotonically, where the response is variable as dosage increases. Mangrove ecosystems and their inhabitants are becoming increasingly threatened by effluent from wastewater treatment facilities that contains EDCs. For our study, we dosed juvenile mangrove rivulus fish (Kryptolebias marmoratus) along a concentration gradient of EE2 and NP. We hypothesized that the behavior of individuals dosed with EE2 or NP would significantly differ from the controls. We also hypothesized that individuals dosed with EE2 or NP would exhibit a non-monotonic dose response. Individuals were dosed with one of 12 treatments for 40 days, including a control, ethanol control, and 4, 20, 40, 80, or 120 ng/L of EE2 or NP. Individuals were subsequently tested in arenas designed to quantify fear, aggression, and exploration. The results did not support our hypothesis that EDC exposure would cause changes in behavior. These data suggest that juveniles are resilient to behavioral changes elicited by EDC exposure.
Bryneth Buckner, C&IS - Communication Studies
Faculty Mentor: Meredith Bagley, C&IS - Communication Studies

Exploring the Visual Rhetoric of a Non-Profit Organization
The research distinguishes how the visual rhetoric of the United Way of West Alabama's website identifies with college students and makes them want to volunteer. Non-profits, such as the United Way, are prominent across college campuses because they give students a way to be active in the community, form connections, and gain real-world experience. Through the use of visual media, non-profits can appeal to a variety of audiences, age groups, and ethnicities. Visual rhetorical criticism was used to analyze the website including the function and evaluation. The function is what the organization is communicating, and the evaluation establishes if the function is successfully communicated and accomplished. The social capital, visual argument, and identification theories were utilized to pinpoint key areas that could be improved upon. The findings concluded that the visual rhetoric being presented is not consistent throughout the website, and fixing these inconsistencies is crucial if the United Way of West Alabama wants to obtain volunteers. This non-profit could benefit from setting a clear strategy for their website and keeping everything, visually and verbally, constant from page to page instead of so dispersed. The United Way of West Alabama's website has a strong start and a powerful message, but they need to make a few adjustments to better identify with college students through their website.
Taylor Burns, HES - Human Nutrition and Hospitality Management
Faculty Mentor: Amy Ellis, HES - Human Nutrition and Hospitality Management

The relationship between visceral fat, CRP, and indexes of insulin resistance among obese older adults
Background: Excessive visceral fat is a known risk factor for type 2 diabetes. This is explained by the portal theory, which states that visceral fat releases free fatty acids and pro-inflammatory factors such as C-reactive protein (CRP). These then enter the hepatic portal vein and cause hepatic insulin resistance. HOMA-IR and QUICKI are indexes used to estimate insulin resistance based on fasting blood glucose and insulin. High HOMA-IR and a low QUICKI scores signify insulin resistance. Methods: One hundred twenty obese men and women, ages 65-84, had their visceral fat predicted by dual energy X-ray absorptiometry (DXA) and waist circumference (WC). A fasted blood sample was taken to measure CRP, glucose, and insulin. HOMA-IR and QUICKI were calculated as [(Insulin * Glucose) / 405] and [1 / (log10Insulin + log10glucose)], respectively. Relationships between visceral fat, inflammation, and insulin resistance were examined by Pearson correlations. Results: CRP was correlated with HOMA-IR ($r=0.258$, $p=0.005$) and QUICKI ($r=-0.262$, $p=0.004$). Trunk fat was correlated with HOMA-IR ($r=0.361$, $p<0.001$) and QUICKI ($r=-0.368$, $p<0.001$). WC was correlated with HOMA-IR ($r=0.260$, $p=0.004$) and QUICKI ($r=-0.268$, $p=0.003$). Conclusion: In these obese older adults, inflammation and visceral fat correlated positively with HOMA-IR and inversely with QUICKI, suggesting that excessive visceral fat may produce pro-inflammatory cytokines (e.g., CRP) that contribute to insulin resistance.
Maranda Burns, HES - Health Science
Faculty Mentor: Lori Turner, HES - Health Science

**National AHEC Organization HPV Immunization Project**
The National AHEC Organization HPV Immunization Project is an initiative funded by the Centers for Diseases Control and Prevention. The goal of the project is to better educate health professionals about the Human Papillomavirus (HPV) vaccine. Participating states created needs assessments and inventory books to better serve their communities. They also increased the awareness of the HPV vaccine information, resources, and tools among health providers. Ultimately, the increased knowledge should result in a decrease in missed opportunities of vaccination among parents who report their child's provider did not recommend HPV vaccination. Correspondingly, HPV vaccination rates should increase, and prevalence of new HPV cases should decrease. Some of the objectives of this program are achieved through Continuing Education (CE) credits for clinicians in the form of round table discussions, webinars, dissemination of “You are the Key” self-study materials, and other educational presentations at local, regional, and state health profession conferences.
Laura Canaday, A&S - Biological Sciences
Faculty Mentor: John Yoder, A&S - Biological Sciences

**Transcriptional Regulation of the Hox gene Abdominal-B**

From worms to birds and mice to men, there are physical and behavioral differences between males and females of the same species called sexual dimorphic traits. The deeply conserved DMRT family of transcription factors has been found to regulate sexually dimorphic traits. In Drosophila melanogaster, one sexually dimorphic trait is the failure of the terminal abdominal segments to develop in male flies. This inhibition has been linked to a feedback regulation system controlled by the sex-determining cascade of the gene doublesex (dsx). Male and female flies have their respective isoforms of dsx, DsxM and DsxF. These proteins have been shown to regulate male and female specific characteristics. We have found the homeotic protein Abdominal-B transcriptionally activates dsx in the developing abdomen in a sex-specific manner. Further, we more recently showed that the Dsx proteins feedback to dimorphically regulate Abd-B protein levels. The goal of this project is to determine whether Abd-B expression is transcriptionally regulated by the Dsx proteins. This study holds promise for placing Homeotic proteins as more proximal regulators of critical developmental processes and may have important implications for investigations into mechanisms of evolutionary change as well as a disease etiology. Because similar observations have been reported for the Hox gene Sexcombs reduced, it is further hypothesized that this modulation is a widespread phenomenon during Drosophila development.
Derek Carter, A&S - Economics, Finance and Legal Studies
Faculty Mentor: Stephanie Brewer, Student Affairs

Economic Freedom and Corruption
Many economists have analyzed the relationship between economic freedom and corruption using various methods. The aim of this study is to confirm that there is indeed a link between economic freedom and corruption, and to determine causation from the link by breaking economic freedom into its component parts. This study shows achieves these goals through statistical analysis and regression methods.
Oral & Poster Presentation Abstracts

Khadijah Carter, HES - Health Science
Faculty Mentor: Lori Turner, HES - Health Science

Common Health Related Issues For Student Athletes
Khadijah Carter, Health Science Department Lori Turner, Health Science Department Common Health Related Issues For Student Athletes I passed out flyers to the team over different types of health problems. Such as Good Sleep Hygiene and also STD's. First I choose Good Sleep because this is something that the team has struggles with. I addressed to them that without good sleep it can affect your body it can cause problems with eating, exercising, and so much more. Did you know it's better to get up from your bed at the same time each day, keeping your feet warm, wearing socks in the bed.. What most people fail to realize is that you are not suppose to read or watch tv in bed, do not go to bed too hungry, do not exercise just before going to bed. Also I stressed to them about STD's how to help protect yourself and all the different types. As the week goes by I plan on talking to them more about calcium, managing your stress, and eating the right things while being a student athlete competing. These are all somethings that we need to know and learn that can really impact our lives.
Miranda Casey, School of Social Work  
Madison Darling,  
Molly Fitch,  
Rachael Fitch,  
Claudia Won,  
Faculty Mentor: kevin corcoran, School of Social Work

HealthU: An app for collegiate health promotion  
HealthU Abstract HealthU is a mobile application designed to educate students about healthy lifestyle choices, such as diet and exercise. It also includes general information about SNAP benefits and helps students become more health-conscious while learning to become cost effective. In looking at social work practice, HealthU has implications in education, advocacy, and prevention. We have developed a randomized control trial to test the impact of HealthU on health and other relevant dependent variables.
Trever Chidester, A&S - History  
Faculty Mentor: Erik Peterson, A&S - History

Changing the Direction of Evolution: From Buffon's Species Degeneration to Lamarck's Organic Progress

For years, Lamarck's theories has been understood as a continuation of Buffon's work in 19th century France. A closer look at the works of both Frenchmen suggests that - while Buffon and Lamarck shared similar opinions concerning their direct opposition of preformation and morphology - the differences arise in their explanations of phenomena in the natural world. While both target the popular notion of preformation, the theories of each natural philosopher pose significantly different ideologies and functions. Their combined effort against the preformationists, while conflicting, was essential to establishing a new, Newtonian study of living organisms - so foundational for Darwin and the future of evolutionary studies. Most of Lamarck's career was spent addressing the very same questions that Buffon had tackled half a century earlier, but this does not mean that Lamarck was continuing Buffon's work. Instead, Lamarck's work should be seen as a revision or reevaluation of the problems in eighteenth-century natural philosophy. One topic of extreme importance to Buffon, however, seems to have been left out of Lamarck's rewrite. With Buffon contributing to some of the first concrete racial categorizations with his theory of degeneration, Lamarck's contradicting theory of organic progress suggest something very intriguing about how Lamarck's ideas organic change may have activated Buffon's constructions of the human races to initiate the racial practices of the 19th century.
Facilitation of Infection Transmission: The Shortage of Hand Hygiene Stations on a Progressive Care Unit

Research has proven that hand hygiene is the most effective way to prevent hospital-acquired infections. Therefore, easily accessible hand hygiene stations are essential to reducing infection in healthcare clients and employees. The progressive care unit under review is not in accordance with the hospital's hand hygiene policy due to an insufficiency of accessible sinks and hand sanitizer dispensers. According to the Department of Health, adequate sinks, soap, paper towels, and/or hand disinfectant should be available in all areas of patient care. Also, hand-wash basins should be designated solely for hand washing and have elbow-operated or no-touch taps to further prevent the spread of infection and decrease cross-contamination. This unit does not conform to healthcare standards because sinks are often behind closed doors, used to discard waste, and are not hand-free. In addition, the aggregate of hand sanitizer dispensers and alcohol-based hand rub on this unit are only a fraction of what is allowed by Joint Commission, which presents the hospital with room for growth. To coincide with its hand hygiene policy, this hospital must increase the frequency and convenience of hand sanitizer stations, while also installing at least one accessible sink that satisfies the Department of Health's guidelines. By taking these measures, the hospital will empower its clients, nurses, and other employees to improve upon their hand hygiene practices, thus reducing the spread of infection.
Mitch Clayton, Engineering - Chemical and Biological Engineering  
Faculty Mentor: David Nikles, A&S - Chemistry

Synthesis of 10-(4-vinylbenzyl)phenothiazine  
The objective of our research was to synthesize polymers that have a large change in complex refractive index when nitro-aromatic molecules are absorbed from the gas phase into the polymer film. The polymer film would be the basis for an optical waveguide sensor used to detect TNT-based explosives. We have found that 1,3-dinitrobenzene, one of the volatile components of TNT, interacts with a 10-methylphenothiazine to give a dark red charge transfer complex, with a large change in refractive index. This has led us to synthesize a monomer, 10-(4-vinylbenzyl)phenothiazine (VBPT). Phenothiazine was reacted with potassium t-butoxide in dry THF to give the phenothiazine anion. Reaction of this anion with 4-chloromethylstyrene then yields the VBPT product. The product was recrystallized from ethanol. Atom transfer radical polymerization will be used to prepare copolymers of VBPT and either styrene or acrylates.
Oral & Poster Presentation Abstracts

Emma Clements, Engineering - Civil, Construction and Environmental Engineering
Faculty Mentor: David Dixon, A&S - Chemistry
Monica Vasiliu, A&S - Chemistry

The Properties of Actinides in High Oxidation States: The Fluorides
The Properties of Actinides in High Oxidation States: The Fluorides Emma Clements, Monica Vasiliu, David A. Dixon Computational chemistry electronic structure approaches are being used to predict the structures and the vibrational frequencies of the neutral and anionic actinide fluorides AnFx where An = Th, Pa, U, Np, Pu and Am. These fluoro-actinides, which have electrons in the 5f orbitals, are being studied to provide deeper insights into the Periodic Table and to provide insights into the design of new separation systems for next generation nuclear fuels. The different oxidation states of actinides and different spin states of each complex were studied using density functional theory. The geometries were optimized using density functional theory with B3LYP exchange-correlation functional, the TZVP basis set on F and the Stuttgart basis set and effective core potentials for the An = Np, Pu and Am and cc-pvdz-pp basis sets were used for An = Th, Pa and U. The spin densities, fluoride affinities, electron affinities, An-F bond dissociation energies, and natural atomic charges were calculated to determine what high oxidation states might be synthesized.
**Calculation of the Magnetic Anisotropy of the Nitroso (-N=O) Group in Nitrosobenzenes**

The nitroso group (-N=O) causes dramatic magnetic field changes at neighboring protons when it is attached to a benzene ring (nitrosobenzene) and placed in a strong external magnetic field. These dramatic magnetic effects can be observed using 1H NMR (Nuclear Magnetic Resonance) spectroscopy. I have used quantum mechanical calculations to model theoretically these magnetic effects and predict the resulting NMR chemical shift positions of H's syn and anti to the nitroso group in nitrosobenzenes. 1H-NMR signal positions have been calculated using Density Functional Theory (DFT) B3LYP 6-31G* for a series of compounds: nitrosobenzene, 2-nitrosocumene, 2-nitrosobazonitrile. Another student has prepared these compounds, measured the NMR chemical shifts of the H's for comparison to the theoretical chemical shifts I have calculated. The agreement between calculated and observed 1H-NMR shifts is quite good and the calculational results allow us to gain a better understanding of the origin of the special magnetic anisotropy (highly directional) of the nitroso group.
Oral & Poster Presentation Abstracts

**Spencer Cornelius**, C&IS - Communication Studies  
Faculty Mentor: Ashley Mcwaters, A&S - English

*Chimera City*
Chimera City Spencer Cornelius University of Alabama Chimera City is a illustrated cityscape poem exploring the intersections of art, architecture, and culture., Chimera City was designed as a culturally distinct architectural language that consciously blends elements from locales as diverse as New Orleans, Oxford, and the Forbidden City. I initially began work on this project as part of my final project in the Creative Writing graphic novel class, EN 408. The text embedded in the images is a collage poem cut and edited from multiple authors writing about their experiences in urban spaces and the thoughts, feelings, and descriptions they associate with the space. I will create this collaborative text by soliciting writings from friends and classmates with the prompt: Recall any city-space, real or imagined. What did you experience there? How did it make you feel? You can respond in any written form, and responses can be any length. In addition to this method of assembly, I've incorporated texts from ancient works describing cities like Alexandria and Tenochtitlan and famous fictional cities such as Carcosa, the Emerald City, and Qarth. I've also incorporated my own travel writings into the text. Like chimeras, cities are wonderful and monstrous. Never a singular beast, but rather a result of endless recombinations that adhere to each other in a unique blend. No two cities are ever exactly alike and each is an exercise in flux. This piece is intended to evoke n
Molly Cory, A&S - Psychology  
Faculty Mentor: Beverly Roskos, A&S - Psychology

Technology Use and Driver Mental Resources
Research has shown that hands-free cell phone use has a detrimental effect on driver attention, and it has been suggested that global positioning system (GPS) devices may have a similar effect, but no studies have directly compared the two. To fill the gap in the literature, this study sought to determine the relative effects of hands-free cell phones and GPS devices on driver mental resources. Undergraduate students (N = 42) learned a route and made turn decisions throughout a simulated driving task in one of three conditions: GPS device, hands-free cell phone, or driving only. Following the task, they were asked to recall items from the environment and complete the Multiple Resources Questionnaire. It was predicted that the cell phone condition would require more mental resources, leading to impaired turn decision-making, reaction time, and item recall compared to the other conditions. Consistent with predictions, the cell phone group proved to be the most mentally demanding and showed significantly less accuracy in following the intended route, in addition to significant differences in item recall. The results of this study provide supporting evidence of the risks associated with driving while using a cell phone, and establish a base for further research addressing the growing presence of technologies in vehicles.
**Megan Craig**, A&S - Political Science
Faculty Mentor: Nichole Bauer, A&S - Political Science

**Combined Effects of Candidate Race and Class on Voter Opinion**

It is well-established that voters use heuristics when evaluating candidates. Some commonly used heuristics in these evaluations are race and social class. Previous studies on the impact of race on voter opinion show voters as perceiving African American candidates as more hardworking and trustworthy than their white counterparts (Weaver 2010). Experiments on the impact of candidate class on voter opinion uncover that voters view working-class candidates as having less political sophistication than their upper-class counterparts (Carnes 2015; Sadin 2013). This leads voters to believe that candidates will be liberal on economic issues, and craft liberal economic policies. Voters assume the candidates that support these policies understand their needs; thus vote for these working-class candidates (Carnes and Sadin 2014; Sadin 2013). This research on how a voter's perception of a candidate is affected by that candidate's class ignores how a candidate's race could change what inferences a voter makes based on a candidate's class. If the assumptions made by voters under each condition are aggregated, it would seem as though working-class, black candidates would be viewed as hardworking, but lacking experience, knowledge, and sophistication. However, it is possible that voters rely on negative racial stereotypes and assume that lower class African American candidates accepted handouts and did not earn their status. A candidate-choice experiment will investigate which is the case.
**Breakfast in the Classroom Program Effectiveness**

In the following study, Breakfast in the Classroom Effectiveness, we look to answer the question of whether or not breakfast in the classroom programs affect student performance. Previous studies regarding food security and breakfast programs in the school system have shown positive effects on students. Our study is unique because it serves breakfast during class time to all students, whereas most other studies that have been done are based on giving breakfast before school and to students from families below a certain income level. We hypothesize that the breakfast in the classroom program will better students’ performance as well as their well being. We are evaluating the breakfast in the classroom program at ten schools across Alabama; six in Tuscaloosa, three in Birmingham, and one in Montgomery. By analyzing the test scores of individual students before and after the implementation of the program, we will be able to draw conclusions about how the breakfast in the classroom program affects students.
Financial Planning and Health Care Decisions for People with Alzheimer's Disease Diagnosis

Advance financial planning and health care can help people diagnosed with Alzheimer's disease (AD) and their families confront tough questions. Currently in the United States, more than five million people live with the Alzheimer's disease. This study is focused on (1) investigating how AD diagnosis affects financial planning and (2) investigating how AD diagnosis affects health care decisions. This research used the 2012 wave of the Health and Retirement Study (HRS), a representative national sample of the US residents over the age of 50 years and their spouse of any age. For this study we analyzed 1,687 households. This study found that people tends to discuss more their health and medical plans with loved ones compared to financial plans. In addition, only 5.1% respondents among married couples answered that they would not teach their spouse how to manage their finances, while 15.7% among unmarried couples said they would not. Interestingly, the person most knowledgeable about their family assets, debts and retirement planning was spouse/partner (32.8%), while the person who deals most with day-to-day finances, like paying the bills was self (59.9%). To promote the awareness surrounding the need for sound financial planning and health care decisions ahead of AD diagnosis in the US, this study will provide a useful insight on financial planning and health care decisions for older adults, caregivers, and communities.
"They blasted my name on the internet": Being "Friends" with the Enemy on Social Media
Social media is a popular form of communication amongst college students and is a way for high school friends to stay connected. Adolescents spend a considerable amount of time online, sometimes checking social media over 100 times per day for reasons such as "to see if anyone says something mean about them" (Underwood, 2016). Voyeuristic action, often referred to as "lurking" or "stalking," is one of the most popular Facebook activities among college students (Antheunis et al., 2010). We were interested in whether friends who later became antipathies would remain "friends" on social media. This study examined the process of transformation from friend to antipathy in an ethnically diverse (82.7% Caucasian, 9.5% Black or African American, 2.9% Latina/o, and 2.4% Asian, 4.8% other) sample of undergraduates (N = 410, 85% female, modal age = 19 years). College students (80%) reported being "friends" on social media with a friend who became an antipathy, whether they reconciled during high school (42%) or not (58%). Moreover, males (33%) and females (29%) reported that they are currently friends on social media with their former friend who is now someone they dislike, strongly dislike, or hate! Because there is no prior research on this topic, we can only speculate as to the reason for being "friends" with an enemy on social media. Perhaps the prevalence of cyber aggression has created a new dimension to the old adage "Keep your friends close but keep your enemies closer."
Sam Czarnota, HES - Human Nutrition and Hospitality Management
Charli Gaston, HES - Human Nutrition and Hospitality Management
Katie Parrott, HES - Human Nutrition and Hospitality Management
Crystal Parrott, HES - Human Nutrition and Hospitality Management
Faculty Mentor: Lori Greene, HES - Human Nutrition and Hospitality Management

The Impact of Food Insecurity on Diabetes Management: A Literature Review
Title: The Impact of Food Insecurity on Diabetes Management: A Literature Review. General Topic: Food insecurity, lacking the ability to obtain adequate healthful food, is associated with inferior diabetes management when compared to food secure individuals. Specific Question: Food insecurity is strongly correlated with poor glycemic control because of limited funds to procure healthier food, less self-efficacy, inadequate education, and emotional distress. Method: In this literature review we summarized the findings of 13 relative research articles published in the past 5 years that studied the relationship between food insecurity and diabetes management in the United States using at least one of the following: hemoglobin A1C, self-efficacy, knowledge assessments, and dietary recalls. Results: Food insecure individuals shared common attributes such as limited access to healthy foods, a limited understanding of glycemic control, higher hemoglobin A1C levels, and more emotional distress related to diabetes. The short-term consequences of healthful eating did not outweigh the long-term benefits in more food insecure diabetics when compared to food secure participants. Conclusion: There is a disparity between food insecure and food secure adults in managing their diabetes. More diabetes interventions, such as increased diabetes education and time with health professionals are needed for food insecure individuals to comply with the recommendations for diabetes management.
Ashley Daugherty, A&S - Anthropology
Nick Roy, A&S - Psychology
Caitlyn Walker, A&S - Anthropology
Walker,  
Faculty Mentor: Christopher Lynn, A&S - Anthropology

Operation Sappho
Studies show male same-sex relations are evolutionarily adaptive on group level selection (Vasey and VanderLaan, 2009), as well as links between same-sex sexual behavior and benefits for groups as a whole in primates (Cronin, 2012). We hypothesize that when sexual fluidity is prevalent within a group, it will be positively correlated with prosocial behavior within that group. "Sexual fluidity" is the frequency of same-sex sexual behaviors within a given group, and "prosocial behavior" is behaviors that benefit others in the group or group welfare without necessarily being altruistic. We are collecting data from young adults aged 19-30 of all genders, with purposive sampling for women, who are an understudied demographic in this regard. This sample is being surveyed with regard to the Big Five personality traits, sexual fluidity, and prosociality. Preliminary regression analysis indicates a significant positive association between sexual fluidity and prosociality when controlling for openness to experience ($r^2 = 0.292, p = .031$). Findings from this study will shed light on the evolutionary implications of human sociosexuality.
Nicholas Davies, Engineering - Mechanical Engineering  
Faculty Mentor: Wei Song, Engineering - Civil, Construction and Environmental Engineering

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
If it Isn’t Labeled, it Didn’t Happen
Labeling and documentation of peripheral venous catheter insertions is critical in providing adequate IV care. Unlabeled or incorrectly labeled IV dressings can cause issues in a time of need or in an emergency situation. Additionally, not having the date of insertion labeled on an IV dressing can lead to IV complications and can cause unnecessary stress to the patient. According to hospital policy, labels should include the date and time of insertion, length, and gauge of vascular access devices and the nurse’s initials. However, when asked about their practices, the nurses interviewed had differing preferences for labeling and inserting new IVs. Some RNs claimed that they never labeled their IVs, while others said that they labeled them every time they inserted one. According to hospital and CDC policy, IVs must be changed at least every 7 days and no more frequently than every 96 hours. The CDC recommends for health care facilities to periodically assess knowledge of and adherence to guidelines for all personnel involved in the insertion and maintenance of intravascular catheters. Continuing education for the nursing staff as well as consequences for those who repeatedly ignore the protocols could improve nurses’ adherence. The standardization of insertion and labeling of IVs should be a priority and the disconnect between the hospital protocol and the nurses’ practice needs to be addressed for the health and safety of the patients.
Trial by Fire: A Performance Comparison of Several Option Valuation Models Using Historical Asset Price Data

The dominance of the Black-Scholes-Merton option valuation model in derivatives markets over the past forty years has led to hardened assumptions about the fundamental nature of stock price distributions over time. Namely, it is assumed stocks follow geometric Brownian motion. We compare the predictive performance of the Black-Scholes-Merton option valuation model to an alternative model that assumes stocks follow arithmetic Brownian motion. We used historical S&P 500 option and underlying price data from September 2014 to September 2015 for our comparisons. Preliminary results show that the arithmetic Brownian motion model consistently achieves less root mean squared prediction error than the Black-Scholes-Merton model.
Lauren Deutsch, C&BA - Information Systems, Statistics and Management Science  
Faculty Mentor: James Mixson, A&S - History

Travels in Late Medieval Religion- Case Studies from Visitation and Crusade

Introduction: Monks, nuns, friars, and canons were relentlessly in motion throughout the Middle Ages, yet their travel is a theme that is at best underdeveloped. Concretely, as best we can tell, exactly how did these travelers get from one place to another, and what did their experiences entail? Methods: Given source materials, context, and itineraries, Esri's ArcGIS Online platform was used to map the travels of John of Capistrano and Martin of Leibitz. When mapping likely routes, geographical features were taken into consideration. Hypothesized routes were then measured and recorded. Results: The results are centered on just how much more detailed and precise GIS mapping allows one to be, as opposed to the traditional print versions. Yet, the GIS maps only leave more questions regarding the thematic nature of medieval travel unanswered, and point to further research that is needed in this area. Further case studies must be mapped in order to produce sufficient data that can provide preliminary answers to questions regarding travel's aims, obstacles, agendas, conditions, etc. during the time period. Conclusion: Though further research is required, there were quite a few figures throughout the Middle Ages similar to John of Capistrano and Martin of Leibitz who would make excellent candidates for route mapping. GIS is a powerful tool for mapping all sorts of movements of people and objects, so the possibilities of expanding this research project in the future abound.
**Oral & Poster Presentation Abstracts**

**Alex Drozd**, A&S - Physics and Astronomy  
Faculty Mentor: Preethi Nair, A&S - Physics and Astronomy

*Size-luminosity relationship of Elliptical galaxies in the Hubble Space Telescope Frontier Fields Cluster Program*

Current models of galaxy formation predict that galaxies grow through a hierarchical process where smaller galaxies merge to form larger galaxies. These mergers can lead to a change in a galaxy's structure, specifically to an elliptical galaxy. Models used to predict the size and luminosity of elliptical galaxies provide a range in slopes with a large scatter which is dependent on the galaxy's environment (isolated vs clusters). Contrary to predictions, elliptical galaxies in the local Universe exhibit a tight linear relationship between their sizes and luminosities, independent of environment. This poses a significant challenge given that elliptical galaxies in the early Universe (6 billion years ago) do not exhibit a tight size-luminosity relation suggesting that over time galaxies grow in size differentially. Specifically, more compact galaxies must grow in size by a factor of 5 while the least compact galaxies must increase in size by only 20% over 6 billion years. Theoretically, this remains an unsolved issue. A key problem with the results from the early Universe has been the small samples of galaxies used. This lack of data has recently been rectified by the Hubble Space Telescope imaging program called Frontier Fields which is taking images of multiple galaxy clusters. With these data we can better constrain the slope and scatter in the size-luminosity relationship and its evolution with time thereby providing better constraints on models of galaxy formation.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
UA Beautiful Health Program
Beautiful health is a health education after school program for seventh and eighth grades girls at David Emerson Middle School in Cottondale, Alabama. The University of Alabama has partnered up with David Emerson Middle School to allow a safe and productive way to spend their time while their parents are still at work. Each mentor leads at least one lesson a week and meet with other mentors to help plan future lessons. The health program focuses on four areas of health: physical, mental, social and spiritual. Core topics discussed include self-esteem, physical activity, mental health, nutrition, family life, relationships, and confidence. According to the Center of Disease Control, research has shown that school health programs can reduce the prevalence of health risk behaviors among young people and have a positive effect on academic performance. It is important for the mentors to set good examples for the young girls in the program. The beautiful health program wishes to help the students become comfortable in their own skin and want to live a happy healthy lifestyle. This program wants to impact young ladies in hopes that they will pass on some healthy habits to friends and family. The beautiful health program provides hands on mentoring providing skills and knowledge to set goals, overcome obstacles, and improve life performance.
Multi-sensory campfire experiences influence lower electrodermal response

The mastery of fire has exerted underexplored evolutionary influences on human physiology. While the purpose and necessity of fire has changed throughout human history, humans still display natural curiosity or attraction to fire, which could be explained by the physiological benefits of controlled fire. The purpose of fire varies throughout the day, serving as a more functional unit during daylight hours, providing relaxation, and calming influences at night. Our previous research using a simulated fire paradigm indicates that multisensory campfires influence human physiological responses by lowering blood pressure. Our current study includes two phases—another simulated fire experiment to further isolate sensory aspects with regard to blood pressure and electrodermal response and a field test of physiological responses to real fires in day and nighttime settings. Based on preliminary analyses, we find statistically significant decreases in blood pressure in fire as a multisensory experience and in the multimedia condition. Further, we predict a larger effect with regard to real fire at night but not during the day. There are numerous implications of this research. The relationship among human physiology, fire, and multimedia are important for understanding contemporary interest in and sometimes addiction to television, videogames, and smartphone use. This study may also explain the utility of fire as a vehicle for relaxation and meditation throughout evolutionary history.
Oral & Poster Presentation Abstracts

Michael Dunn, Engineering - Civil, Construction and Environmental Engineering
Faculty Mentor: Alex Hainen, Engineering - Civil, Construction and Environmental Engineering

Comparative Traffic Analysis of Proposed Flyover at US-11 and AL-69 Using Microsimulation
This project involved the use of traffic simulation software to model the intersection of US-11 (Skyland Boulevard) and AL-69 in Tuscaloosa, AL. The intersection was first modeled in its current configuration as a baseline scenario and then reconfigured to incorporate a proposed flyover in the north/south direction on AL-69. Both of these models were then simulated during peak traffic conditions to determine before and after change in operational performance. Field data was provided by ALDOT detailing signal controller timings and turning-movement volumes for the intersection in its current configuration. The Transportation Research Board Highway Capacity Manual Software was used by a consultant to determine optimum signal timings for the proposed configuration which was then simulated in this project. Adjacent intersections were also examined for changes in delay and travel time along the AL-69 corridor after implementation of the flyover. The results of this study will help to assess the potential improvements and operational changes associated with the alternative intersection configuration.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Kevin Duque, A&S - Biological Sciences  
Faculty Mentor: Ryan Earley, A&S - Biological Sciences

**Hormonal Responses to Non-Contact Aggression in Convict Cichlid Fish**

Aggressive contests can impact an individual's ability to acquire fitness-related resources. Aggression often is studied by exposing animals to artificial stimuli such as mirror images and it has been shown that animals fail to mount a hormonal response to such stimuli despite exhibiting intense aggression. This could be because the stimulus is unnatural or because contests cannot resolve. We aimed to determine, using convict cichlid fish, whether endocrine status remains unchanged even when animals engage in unresolved contests against live opponents. Concentrations of circulating androgens are often elevated following intense aggressive behavior. We hypothesized that pre-fight 11-ketotestosterone (KT) and testosterone (T) concentrations would correlate positively with aggressive behavior exhibited toward a challenger. We also hypothesized that individual variation in aggressive behavior during conflict would correlate with variation in post-fight hormone concentrations. Results indicated that individuals with higher pre-fight T and KT release rates took longer to initiate conflict. Cortisol decreased from pre-fight to post-fight only in the experimental condition (unresolved fight), KT decreased significantly from pre-fight to post-fight in both experimental and control (no fight) conditions. We demonstrated that animals that engage in conflict with live opponents still do not mount a significant hormonal response when clear dominance relationships are not established.
Preparation of Nursing Graduates for End-of-Life Communication

The American population is aging and living longer with chronic illness. According to the 2010 United States Census, by the year 2029 approximately 20% of the American population will be 65 years and older. Often, the nursing shortage is a topic of discussion and many are working to address this concern. A consideration that may not often occur when caring for this aging population is the discussion regarding end-of-life care. How can we prepare our new nursing graduates to offer patients a death with dignity? Current research identifies the existence of gaps in educating undergraduate nurses in palliative and end-of-life care. A literature review will highlight common gaps and current educational themes to address these gaps. Identification of the most successful implementation method in the undergraduate nursing program will be identified and presented.
Cassidy Elliott, A&S - Biological Sciences
Faculty Mentor: Julie Olson, A&S - Biological Sciences

Genomic Similarities Between Four Strains of Streptomyces
Streptomyces, a common genus of soil bacteria, are well known for their ability to produce metabolites that are not essential for life, but confer an advantage to the producing organism. To identify the biosynthetic pathway for the formation of a neurodegenerative metabolite produced by some species of Streptomyces, the genomes of four strains were sequenced using Illumina technologies. Two of the four strains are known producers of the neurodegenerative metabolite; the other two strains did not exhibit this capacity in Caenorhabditis elegans exposure studies. Assembling the genomes of the strains can be challenging, as Streptomyces possess linear, as opposed to circular, genomes with highly variable regions at both ends and a conserved core. CLC Genomics Workbench 8 software was used to assemble the paired-end reads into contiguous sequence data for each species. These large contigs were then aligned to one another using MUMmer to identify regions of similarity and differences, with the ultimate goal of identifying the biosynthetic pathway for the production of the neurodegenerative metabolite. Finally, antiSMASH, an online program, was utilized to identify putative secondary metabolite biosynthesis gene clusters within each strain.
Incidence of Vocal Pathology in Healthy College Students

Many careers require the chronic use of an individual's voice. Teachers, vocal musicians, theater performers, and lawyers are professional populations that are known to have an increase risk of voice disorders. Students preparing to enter these careers may also be at an increased risk for developing voice disorders during their undergraduate training. Many voice disorders can be prevented with good vocal hygiene practices. However, most undergraduate students do not have knowledge of the importance of vocal hygiene. This retrospective project evaluated the vocal health of undergraduate students who volunteered for voice assessment at The University of Alabama's Speech and Hearing Center over the past 18 months. This study documented the prevalence of vocal pathologies and describes the overall vocal health of a convenience sample of undergraduate students. The results indicate that there is a significant proportion of undergraduate students with poor vocal hygiene and underlying vocal pathology. A significant number of undergraduate volunteers had vocal pathology that they were not aware of prior to volunteering for assessment. The results from this study indicate the need to implement an educational program about vocal health for student populations at risk for developing vocal pathology and/or trauma during their undergraduate coursework.
Alison Farrar, A&S - Mathematics
Faculty Mentor: Claudia Mewes, A&S - Physics and Astronomy

Theoretical Investigation of Damping in Exchange Bias Systems
Data storage devices like hard disk drives and STT-MRAM (spin transfer torque magnetic random access memory) use a combination of stacked thin magnetic films to store information. As information is written on the storage device, the magnetization of the corresponding bit rotates and relaxes into a new direction. The relaxation of the magnetization into this new equilibrium state is done by the damping mechanism, which couples the magnetic structure to the crystal structure of the material. Therefore, the improvement of current devices and the development of new spintronic devices requires an accurate model of the magnetization dynamics and, in particular, the damping mechanism. The Landau-Lifshitz-Gilbert equation, which is the basis for current micromagnetic models, describes this damping mechanism with a scalar damping constant. Studies in magnetic bulk materials show that the damping mechanism could be better described by a magnetic damping tensor reflecting the symmetry of the crystal structure. However, new experimental data suggests that even greater specificity is needed to model the magnetization dynamics in an exchange bias system, an asymmetric structure used in many existing and new spintronic memory devices. In this presentation we discuss our new model, its implementation within the micromagnetic code M3, and the first results of those simulations.
Annakate Faulk, A&S - Anthropology  
Faculty Mentor: John Blitz, A&S - Anthropology

*What Can Vessel Forms Tell Us About Archaeological Sites?*
This study seeks an answer to the question: What can pottery vessel shapes tell us about the function of archaeological sites? An archaeologist can use the remains of various pottery vessels to piece together ideas about the daily activities of people living at archaeological sites. Pottery vessels with different shapes served different purposes in the prehistoric world in the same way that they do in today's modern cultures worldwide. For my research project I compared samples of pottery vessel shapes from two prehistoric (A.D. 1200-1500) Native American archaeological sites: Shell Bank (1Ba81), a small shell midden on Mobile Bay, and Bottle Creek (1Ba2) a much larger ceremonial mound center in the Mobile-Tensas River delta. People at the two sites had the same pottery tradition, but because the two sites are very different, I expected there would different food related activities, and therefore, different frequencies of vessel shapes. Food remains from the Bottle Creek mounds (and other mound sites) suggest that the mounds were the scene of ceremonial activities and feasts for large groups of people (Blitz, 2006). Vessel shapes from Bottle Creek's mound A had been recorded previously by Hunter Johnson (Brown, 2003, 158-59), but there has been no comparison of vessel shapes with other types of site, such as Shell Bank. Studies at other Mississippian sites have shown that plates and bowls were used for serving purposes and jars were used for cooking and storage (Blitz, 1993)

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Anthony Fiacco, A&S - Biological Sciences
Faculty Mentor: Janis O'Donnell, A&S - Biological Sciences

"Oh the Irony: Investigating the effect of Iron (III) Chloride in Drosophila melanogaster"
In recent years there have been great gains in the applications of nanotechnology in medicine and other fields. One area of interest for medicine and industry is the use of polymer-linked iron oxide nanoparticles (IONP). The potential for nanomaterials to become ubiquitous calls for further analysis of the effects of these particles in living organisms. Prior studies have shown harmful effects of low concentrations of polyacrylic acid (PAA) coated IONPs on the reproductive success of female Drosophila melanogaster. The focus of this work is to determine to what degree the iron component of PAA-coated IONPs contributes to the reduction in reproductive success. Larvae were fed iron (III) chloride (FeCl₃) in the 2nd instar stage and allowed to mature to eclosion. Virgin FeCl₃ dosed flies were crossed with controls and assayed for fecundity and fertility. This work will contribute to determining the mechanism by which PAA-IONPs disrupt development.
Rebecca Fischer, A&S - Psychology  
Faculty Mentor: James Hamilton, A&S - Psychology

**Factitious Cyberbullying**
Cyberbullying refers to the use of electronically mediated communication to aggress against an individual or group of individuals. Public awareness of this problem has grown steadily in recent years, and high profile cases of young people who committed suicide as a result of being tormented by cyberbullying have heightened sympathy and concerns for victims of cyberbullying. Various forms of victimization are known to be exploited by people who falsely claim the victim role to garner the various psychological and material benefits that attach to the victim role. Recent media stories and one small survey study has revealed that people have made false claims about being the victim of cyberbullying (factitious cyberbullying; FC). The one study on this phenomenon has found that as many as 15% of 18 year old college students admit to falsely claiming to have been cyberbullied. In the current study, a sample of UA students and a national convenience sample of adults were asked to report on their use of alternate electronic media accounts or identities to create the appearance of being cyberbullied. In addition to replicating the previously reported prevalence rate, the study addresses both the means through which FC is enacted, the specific forms FC takes, and the reasons offered for engaging in it. The results of the study can inform parents, teachers and school counselors about strategies for the prevention and early detection of FC.
Anna Forrister, A&S - Anthropology
Faculty Mentor: Philo Hutcheson, Education - Educational Leadership, Policy and Technology Studies

Resegregation in Macon County Public Schools
This project examines how Lee v. Macon County Board of Education has effected the racial diversity of Macon County's public schools over time, both before and after unitary status was granted. For much of the 1960's, Macon County, Alabama was involved in a years-long legal battle to desegregate its public schools. In 1967, Macon County public schools were ordered to desegregate by a federal district court. Because of this court order, the county's desegregation efforts remained under federal supervision for decades. Macon County was released from court-ordered desegregation in 2006 and was granted unitary status. A declaration of unitary status came with an end to federal oversight of desegregation efforts in Macon County. This research examines the effects of court-ordered desegregation on Macon County's public schools, specifically its effects on racial diversity at a school-wide and system-wide level, before and after the district was granted unitary status in 2006.
William Freeman, Engineering - Chemical and Biological Engineering  
Faculty Mentor: Laura Reed, A&S - Biological Sciences  
Vishal Oza, A&S - Biological Sciences

Creating a Drosophila Metabolomics Database
In recent years, researchers have focused their efforts on identifying the causation of metabolic syndrome, a disorder linked to cardiovascular disease, diabetes, and obesity. Metabolic syndrome arises due to both genetics and behavioral trends such as diet and exercise. Since metabolic syndrome becomes increasingly manifest over long periods of time, flies are used as a human analog due to their high throughput and genetic similarity to humans. The field of metabolomics is fast developing with one goal of identifying and quantifying the complete suite of metabolites found in an organism, and is an especially appropriate tool for the study of Metabolic Syndrome. The purpose of this project is to facilitate metabolomics fly research by compiling a database, named FlyMetLib, to link fly metabolites to known identifiers, metabolic reactions, studies, and species. Key identifiers for FlyMetLib include those from IUPAC, PubChem, ChemSpider, CAS, DrugBank, SMILES, and HMDB as well as several common synonyms. These identifiers will be linked to a new unique hexadecimal identifier. This new identifier will be expanded on in more complex tables in order to link to reaction, citation, and species data, as well as to link unidentified compounds across studies. When completed, the FlyMetLib database will be integrated into broader model organism databases, such as Flybase.
The Effect of Lighting Cues on Patients' Reported Hunger Levels

The body's biological systems are heavily influenced by what is known as the Circadian Rhythm, or "internal clock." This internal clock is set largely by lighting cues received by the retina and sent to the suprachiasmatic nucleus, or SCN. The SCN then communicates with other areas of the brain, including the paraventricular nuclei (PVN) which assists in regulating glucose levels and hunger cues. In prior studies, it has been indicated that the onset of a light phase causes widespread activation in the brain, including in the SCN and PVN, which signals a need for digestion and hunger cues. This study aims to understand the effects of lighting cues on the hunger levels of patients who are unable to eat due to surgery through surveying patients whose overhead lights were out (DD), whose overhead lights were on (LL), and whose overhead lights had been turned on at some point but were out at the time of surveying (LD). By examining differences in the responses of patients in each lighting environment, it may be possible to gain a better understanding of the effects of lighting on level of hunger, ultimately allowing healthcare professionals to manipulate lighting in hospital rooms to lower patients' levels of hunger and agitation while they wait for procedures.
Jordan Fuhrman, A&S - Physics and Astronomy
Faculty Mentor: Ion Stancu, A&S - Physics and Astronomy

Enhanced Signal-to-Background Discrimination in the LZ Dark Matter Project

According to current observations of the universe, approximately 85% of all matter in the universe is classified as dark matter. Dark matter has never been directly observed, and one popular theory is that dark matter is actually weakly interacting particles that are currently flowing through every part of the universe. Because the particles interact so rarely, it requires a very particular detector in order to observe dark matter. The LZ project is a new detector that will be built one mile underground in a former gold mine in South Dakota. It involves a cylindrical tank that holds 7 metric tons of liquid xenon with two arrays of photomultiplier tube detectors located at the top and bottom of the tank. When dark matter interacts with the liquid xenon, it produces 2 flashes of light separated by some amount of time: scintillation light and ionization light. These two flashes can tell us a great deal about the interaction, namely whether it is caused by dark matter or by background radiation. In order to correctly characterize these events, the photomultiplier tubes must be calibrated to measure time and charge very precisely. This project focuses on simulating events in order to show that the photomultiplier tubes' timing can be correctly calibrated. Additionally, this project will combine the scintillation and ionization light to study the signal vs. background rejection.
Rachel Fuller, Nursing - Capstone College of Nursing  
Emily Valdez, Nursing - Capstone College of Nursing  
Faculty Mentor: Michelle Cheshire, Nursing - Capstone College of Nursing

Emotional Intelligence in Nursing Students

Emotional Intelligence (EI) in the nursing field is defined as how nurses understand the emotions of patients and colleagues while managing one's own emotional response to the work environment (Shanta & Garguilo, 2014). EI is critical to nurses when establishing working relationships with patients and problem solving. An ongoing longitudinal research study is being conducted to determine EI scores of nursing students enrolled in the baccalaureate program of a university in the southeastern United States. The purpose of this study is to determine the relationship between BSN students' EI scores and traditional evaluation criteria. Furthermore, the study aims to determine if EI scores are a predictor of success in the BSN program, and evaluate if EI should be considered in the admission criteria formula. A literature review was conducted to support the research. The studies reviewed supported the need for further research on how EI should be utilized in nursing education. The longitudinal data collected shows there is a statistically significant decrease in the overall EI scores of nursing students. The literature review supports these findings. The research indicated that to improve EI in BSN students, nurse educators should consider incorporating EI content in the curriculum so that students can grow in their ability to care for others and themselves. This is the expected course this college will take.
**Spatial and Seasonal Diversity of Chytrids in Two Temporary Forest Ponds**

Temporary ponds, also known as vernal pools, are depressions that annually flood and dry. These ponds are integral parts of the overall forest ecosystem functioning as frog and salamander (amphibian) breeding sites. Microbial communities in these ponds are relatively understudied, and in other aquatic habitats it has been shown that chytrids potentially provide important links in the microbial food web. Little is known about the chytrids present in temporary forest ponds or their spatial and temporal patterns. To explore the spatial and seasonal dynamics of chytrid diversity, I collected soil and water samples from two temporary ponds located in the Oakmulgee District of the Talladega National Forest. I baited the samples, recorded the chytrids present, and converted the presence/absence to frequency data. I used mixed effect ANOVAs in the statistical software R to test the hypotheses that location and month of sampling would explain a chytrid taxon's frequency. Location of sampling significantly predicted the frequency of one chytrid. Month of sampling significantly explained the frequency of eight chytrids. My results suggest that chytrid taxa respond differentially to the same changes in the environment. My work lays the ground work for studies elucidating the environmental factors that cause the observed fluctuations in frequency.
Allexa Gardner, C&BA - Economics, Finance and Legal Studies  
Faculty Mentor: Paan Jindapon, C&BA - Economics, Finance and Legal Studies

Analysis of the Cost-Effectiveness of Cancer Spending on Survival Gains  
The cost associated with cancer and its treatment accounts for a huge portion of the global spending on healthcare. The United States in particular has spent almost 300 billion on cancer research between the years of 1988 and 2000. Various economists and policymakers have posed the question whether this total expenditure is worth it in terms of the benefit to society. An analysis of cancer treatments and survival rates for different cancers show that there are greater economic benefits for some cancers than others. Breast and prostate cancer are found to have the highest economic return in terms of money spent on treatment versus increase in life expectancy. These cancers are often affected by genetic factors and have a network that relates to the development of other cancers and diseases. However, lung and bladder cancer have mortality rates such that increased screening and research holds no economic return and very little impact on life expectancy rates. In comparison with the U.S., Europe spends significantly less on cancer research, the impact of which is shown in the country’s survival gains. The United States’ economic investment in cancer treatment is worth the billions in spending based on net survival gain and additional social value.
Callie Garrison, HES - Health Science  
Faculty Mentor: Lori Turner, HES - Health Science

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Rachel Gentry, Engineering - Electrical and Computer Engineering
Faculty Mentor: Jaber Abu Qahouq, Engineering - Electrical and Computer Engineering
Zhiyong Xia, Engineering - Electrical and Computer Engineering

State-Of-Health Estimation of Batteries using Offline and Online AC Impedance Measurements
Batteries with high energy and power density, such as the Lithium-ion (Li-ion) battery, are increasingly being desired in many applications such as Electric and Hybrid Electric Vehicles and consumer electronics. Because of this, there is continuous research and development efforts to increase the energy and power density of batteries; therefore, the health, safety, reliability, and life span of these batteries becomes increasingly of concern. Ac electrochemical impedance together with other battery parameters have the potential for use in predicting the State-Of-Health (SOH) of batteries, providing a way for early fault detection and better estimation of battery expected life/performance. One of the tasks related to this research is to perform offline and online ac impedance measurements while aging several battery cells and as battery capacity fades. A newly developed online/real-time ac impedance measurement method which does not require specialized equipment is being used. The ac impedance is being measured at different frequencies and State-Of-Charge (SOC) conditions as batteries are aged. Data collected will be used to study the SOH trend as a function of the online ac impedance measurement and will be used in the future to develop SOH estimation algorithms.
Rainey Gerald, HES - Human Nutrition and Hospitality Management
Faculty Mentor: Amy Ellis, HES - Human Nutrition and Hospitality Management
Kristi Crowe-White, HES - Human Nutrition and Hospitality Management

The accuracy of 24-hour recalls and food frequency questionnaires in determining nutrient intake

Background: Researchers commonly use diet recalls and food frequency questionnaires (FFQ) to quantifi y dietary intake. The accuracy of 24-hour recall and FFQ have been questioned due to the reliance on memory of the participant. This reliance on memory is an even greater concern for the older study participants, who are prone to memory impairment. The primary aim of this cross-sectional study is to determine how well reported intake of lycopene through 24 hour-recalls and FFQ correlates with serum lycopene, a reliable biomarker of actual intake. Methods: Participants are 24 women age 60 and older. They will complete a validated FFQ and three 24-hour recalls, one in person and two over the phone. The FFQ and diet recalls will be analyzed for dietary intake of lycopene. A blood sample will be drawn to determine their serum lycopene. The reported lycopene intake will be compared to serum lycopene by simple Pearson correlations, partial correlations, and paired t-tests. Results/Conclusions: This IRB-approved study is in the data collection phase and will be completed May 2016. This analysis is important in determining the accuracy of 24-hour recalls and food frequency questionnaires in reporting nutrient and food intake, particularly among older adults.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Role of neutral cholesterol ester hydrolase gene in lifespan and neuroprotection in a C. elegans model of Parkinson’s Disease

Parkinson’s disease (PD) is the second most common neurodegenerative disease. The loss of dopaminergic neurons leads primarily to muscle tremors. Aging is one of the contributing factors for PD, with age correlated with an increase in PD occurrence. PD is characterized by the accumulation of the α-synuclein (α-syn) protein as aggregates in and around the neurons. We have developed an experimental model of PD in the roundworm Caenorhabditis elegans by expressing human α-syn in the dopaminergic neurons, which then causes these cells to degenerate. We are using this model to identify genetic components that act together with aging to contribute to PD. One such gene is daf-2, which, when mutated in C. elegans, extends lifespan and protects dopamine neurons from α-syn. A screen for genes involved with daf-2 identified nceh-1. Loss of nceh-1 enhanced neurodegeneration, while overexpression was neuroprotective. NCEH-1 is a conserved enzyme that converts esterified cholesterol to free cholesterol. Lower cholesterol levels in the C. elegans growth media was also neuroprotective. Since this gene was identified by its relationship to the longevity gene daf-2, we are determining if nceh-1 also alters the lifespan of C. elegans and if cholesterol modulates this effect.
Allison Gordon, HES - Human Nutrition and Hospitality Management
Savannah Thompson, HES - Human Nutrition and Hospitality Management
Allison Woods, HES - Human Nutrition and Hospitality Management
Karlie Woods, HES - Human Nutrition and Hospitality Management
Ashton Baughman, HES - Human Nutrition and Hospitality Management
Kacie Hattaway, HES - Human Nutrition and Hospitality Management
Faculty Mentor: Lori Greene, HES - Human Nutrition and Hospitality Management

Risk for Type 2 Diabetes Among Low Income, Food Insecure Children

Introduction: The purpose of this review is to determine whether or not there is a higher risk for type 2 diabetes among low-income, food insecure children. Methods: A search of the literature was conducted using multiple electronic, evidence based databases such as Scout and PubMed to locate studies and systematic reviews. The criteria for this literature review included a publication date of 2010 or later. A total of 7 articles were included, consisting of varied study design. Results: There are several factors that put these children at risk for developing type 2 diabetes. These risk factors include but are not limited to family history, hypertension, overweight/obesity, elevated casual blood glucose, and racial/ethnic background. Many of the studies identified that the children who were found to have 3 or more of these risk factors had a greater chance of developing type 2 diabetes. Many of these children lack the knowledge, education, and resources that allow them to make healthier lifestyle decisions in order to reduce their risk. Children in lower-income areas who are provided with nutrition education and intervention and/or have been told they are at increased risk for type 2 diabetes by a medical professional are more likely to make positive choices in order to help reduce their risk. Conclusion: It is important to create and implement nutrition education programs in low-income, food insecure areas. These programs should focus on reducing the controllable risk factor.
Christina Green, A&S - Psychology  
Faculty Mentor: Forrest Scogin, A&S - Psychology

**Addressing Memory Concerns: A Community Cognitive Screening Event**  
Addressing Memory Concerns: A Community Cognitive Screening Event Christina Green, Lisa Mieskowski, MA, & Forrest Scogin, PhD  
Concern about cognitive impairment is not uncommon among older adults (Claudia et al., 2016). To address concerns in the community, a free cognitive screening event was held at the University of Alabama for adults 50 and older. Cognitive status was assessed using either the Saint Louis University Mental Status Exam or the Montreal Cognitive Assessment. In general, scores at or below 26 are indicative of mild cognitive impairment (with lower scores being indicative of dementia). A demographics survey and anxiety and depression screeners were also administered to assess overall well-being. Cognitive screeners from 54 participants (Mage = 68.02, SD = 8.57) were explored for their relation to other demographic and psychosocial factors. Mild cognitive impairment was found in approximately 48% of the participants, while 52% fell into the normal cognitive range. Though there were no significant group differences in age (t(52) = 0.81, p > .05), depression (t(52) = 0.61, p > .05), or anxiety (t(52) = -0.32, p > .05). Older age was associated with lower anxiety (r = -.42, n = 54, p < .01) and depression (r = -.47, n = 54, p < .01). Although none of the adults in the project’s sample fell in the range indicative of dementia, our results show that anxiety and depression decreased with age, which is consistent with theories about increased life satisfaction in late adulthood (APS, 2012).
Braxton Greer, A&S - Biological Sciences  
Faculty Mentor: Stevan Marcus, A&S - Biological Sciences

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Ansley Griffith, A&S - Geological Sciences
Faculty Mentor: Fred Andrus, A&S - Geological Sciences
Christine Bassett, A&S - Geological Sciences

Preliminary Growth Analysis of Alaskan and Canadian Bivalves for Paleoenvironmental Reconstruction

Bivalves, invertebrates with two shells hinged together, secrete calcium carbonate to grow their shells. Determining the growth rates of these shells has the potential to determine changes in seasonality from years past. To study past climate in the North Pacific Ocean, modern samples of Saxidomus gigantean were collected from Alaska and Canada, to compare the length of their growing seasons. To analyze their growth variation, lunar daily growth increments (LDGI) must be counted between winter growth bands identified through oxygen isotope profiles. Different methods of preparation were compared to produce the best results, determined by the clarity of LDGIs in acetate peels. Shells were polished using varying grits of sand paper and slurry to even out the shell and to see the growth bands clearly. After polishing, acetate peels were prepared for each shell by etching them in varying strengths of hydrochloric acid (HCl), rinsing them in acetone and placing them onto an acetate paper. Each peel was imaged under a microscope at 40x magnification. Shells were imaged from the end of the first year to the end of the second year of growth for later growth analysis. LDGI were most clearly visible using the 360 µm plate followed by 15 µm plate on the Buehler Polisher, and etching them in 5% HCl for 45 seconds before preparing the peels.
Sarah Griswold, A&S - Religious Studies
Faculty Mentor: Michael Altman, A&S - Religious Studies

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Jared Halstrom, A&S - Biological Sciences
Faculty Mentor: Glenn Davis, Community Health Sciences

*Paramedic Performance Based Trials - The Effects of Fatigue During Shift Work*
In conjunction with the University of Alabama Institute for Rural Health Research, I am conducting a research study aimed towards learning about the differences in quality of care given to patients by paramedics over the course of a 24-hour shift. In this project, our goal is to both quantitatively and qualitatively measure differences in the performance of paramedics at the beginning and at the end of a 24-hour shift using tests based on common tasks such as laryngoscopy, high quality CPR, and rapid defibrillation. This data will be symbolic of the quality of their performance in the field towards the end of a 24-hour shift. This will ultimately assess their ability to perform under significant fatigue. With this information, we aim towards drawing a conclusion on whether 24-hour shifts are conducive towards giving the best quality of care to patients. If we decide there is a significant decrease in quality of care given over these shifts, the Institute for Rural Health Research and I will make it a goal to educate the region about our study and the possible ramifications of shift work.
Russell Hancock, Engineering - Aerospace Engineering and Mechanics
Faculty Mentor: Paul Hubner, Engineering - Aerospace Engineering and Mechanics

Aerodynamic Force Study on an Airfoil Covered with Shark Skin
The shortfin mako is one of the fastest swimming shark species. Researchers have theorized that the surface microgeometry of their skin assists their speed, and prior water tunnel research has demonstrated that the bristling of surface denticles plays a role in passively delaying boundary layer separation. Denticles are microscopic scales that cover the skin, acting as a protective layer and providing hydrodynamic benefits. They are about 200 micrometers in length, and some can hinge about their bases to angles greater than 50°. Compared to a smooth surface, the denticles create an energized boundary layer and preferred flow direction, enabling the flow to remain further attached in regions of adverse pressure gradients. This study aims to determine if aerodynamic benefits can be observed on an airfoil covered with shark skin. Lift, drag, and pressure distribution data are compared over a range of angles of attack in a low speed wind tunnel for two 3D printed airfoils: a control airfoil and a geometrically similar airfoil covered in mako shark skin. Initial results show consistency among pressure measurements for control and skin-covered tests. Flow over the skin-covered airfoil appears to have resulted in higher lift and drag than the control airfoil. Further testing is to be done to confirm and understand these results.
Oral & Poster Presentation Abstracts

Francie Harris, HES - Health Science
Faculty Mentor: Lori Turner, HES - Health Science

Bariatric Health and Wellness
Francie Harris, Health Science Department Faculty Member: Lori Turner, Health Science Department
Bariatric Health and Wellness Bariatric Health and Wellness is a medically supervised weight loss clinic located in Northport, Alabama. Dr. John Morgan, the supervising physician, has been an OB-GYN for 30+ years and has been a certified bariatric physician for 15 years. He is one of five certified bariatric physicians in the state. According to the State of Obesity, Alabama is ranked fifth in the nation for most overweight adults. The goal of Bariatric Health and Wellness is for patients to be healthy and live well. The diet they advocate is a high protein-low calorie diet fulfilled through various food supplements including nutritionally designed pastas, bars, chips, shakes and many others. Patients receive weight loss guidance, support, accountability and education through the program. While actively on the program, patients are encouraged to weigh in the clinic weekly for accountability. This has proven to be a successful component of weight loss. Once patients have reached their goal weight, they are declared to be on maintenance. With the support, accountability, education, and dieting tools Bariatric Health and Wellness provides, patients are set up on the best road for success in being healthy.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Cameron Harvey, C&BA - Information Systems, Statistics and Management Science
Patrick Mitchell, C&BA - Information Systems, Statistics and Management Science
Faculty Mentor: Burcu Keskin, C&BA - Information Systems, Statistics and Management Science
Mesut Yavuz, C&BA - Information Systems, Statistics and Management Science

Patrol Routing with Alternative Fuel Vehicles
This study investigates patrol routing on state highways with hybrid electric vehicles, which operate in electric mode until battery depletion, at which point, the vehicle switches to the more expensive gasoline mode. We model a cost minimization network flow problem in which the state troopers’ time is most effectively utilized while also reducing the environmental footprint. For this purpose, data related to the time and location of accidents and citations are collected from the Center for Advanced Public Safety. The network flow problem seeks to place the patrol officers at the most advantageous nodes of the system, while keeping their hybrid electric vehicles properly charged. The nodes in this system are the hotspots on highways and street intersections, stretches of roads that are mostly likely for incidents. The cost of this model is negative benefit. A state trooper covering a hotspot will offer an optimal societal benefit. Therefore, hotspot coverage is valued above all other activities. If successful, this study will station state trooper's in the most advantageous positions during a given shift. By sending state troopers to hotspots, accidents can potentially be prevented and responded to more quickly. The use of a fleet of hybrid electric vehicles by the state troopers would bring Alabama to the forefront of the American discussion on environmental sustainability. The model's focus on minimizing negative benefit will ultimately point to maximum societal impact.
Jessica Hauger, A&S - History
Faculty Mentor: Lisa Lindquist-Dorr, A&S - History
Erik Peterson, A&S - History

"The Common Lot": The Philosophical Problem of Labor Pain in the Late Nineteenth Century
This research explores physicians' and laypeople's concepts of childbirth pain in the period following the invention of anesthesia, 1848-1900. It explores the rift between physicians regarding the appropriateness of anesthesia use during labor, and the ways in which women responded to these conversations. Discussion focuses specifically on how religion and science, particularly in the near-simultaneous advent of anesthesia and publish of Darwin's On the Origin of Species, yielded particular conflict over childbirth pain and how best to treat it. This includes an exploration of how childbirth pain became a part of social Darwinism, and how social Darwinism and religion conflicted and allied in discussions on pain in childbirth. Although the research is incomplete, this project seeks to explore how prevailing scientific and religious ideas informed historical understandings of a specific kind of pain.
Oral & Poster Presentation Abstracts

Adrienne Hayes, HES - Human Development and Family Studies
Trinicia Bodden, HES - Human Development and Family Studies
Magdalena Chavez, HES - Human Development and Family Studies
Whitney Chavez, HES - Human Development and Family Studies
Faculty Mentor: Sherwood Burns-Nader, HES - Human Development and Family Studies

Examining Adults' Memories of Pediatric Experience
Children can experience stress during a healthcare visit, and stress can impact the way a person remembers a healthcare visit. Support from parents and the medical team can positively influence healthcare experiences, which can then impact memories. This is important because childhood healthcare experiences can influence adults' use of healthcare. The purpose of this study is to examine adults' memories of childhood healthcare experiences and the influence of supportive parents and medical teams on these memories. Three hundred and forty three university students were surveyed about their memories of healthcare experiences as a child, both at the dentist and doctor. Results found the adults remembered being somewhat anxious about childhood healthcare visits and remembered the medical team and parents as supportive and helpful. Parents' opinion influenced the participants' opinion about healthcare as a child, and having a relationship with the medical team decreased anxiety. Finally, the adults self-reported that childhood healthcare experiences influence their likelihood to use healthcare as an adult. These findings suggest the importance of children receiving support from parents and the medical team during healthcare visits. Also, healthcare memories from childhood were found to influence use of healthcare as an adult, highlighting the need to promote positive experiences in pediatric patients.
Alaska Medicaid’s RCO Rebrand Research

Alabama Medicaid is changing, affecting the healthcare services of 700,000 recipients. Capstone Agency, the student-run, integrated communications firm at UA, is working with Alabama Medicaid to brand Regional Care Organizations throughout the state. At large, Alabama citizens and Medicaid recipients are unaware of the changes and implications RCOs will bring. The objective of this presentation is to demonstrate how the role of research and insights informs public relations strategies and branding. Prior to the campaign, it was important to identify and understand the role of the target publics: Medicaid recipients, healthcare providers, elected officials and the general public. To ensure that the name of the RCOs would be easily recognized and understood by all, the team conducted research to identify the ages, incomes, education levels, literacy rates and political party affiliations of these publics. Secondly, conversations with stakeholders such as healthcare management, hospital communications directors and healthcare providers gave further insight on how to achieve Medicaid’s goals. The team conducted field testing at two local health centers in order to gain feedback from Medicaid recipients on two final name/logo concepts. Finally, the team presented the client with the feedback regarding both concepts, and this helped the client in deciding the final name and logo design.
John Henderson, A&S - Biological Sciences
Faculty Mentor: Laura Reed, A&S - Biological Sciences

Population Variation in Phenotypic Robustness to Dietary Perturbation
The model of canalization proposes that populations attempt to maintain equilibrium in the face of stress by genetically adaptive mechanisms. It has also been shown that populations differ genetically when geographically isolated. This study explores how geographically isolated populations differ in response to the stress of a perturbing diet, and to measure the levels of decanalization due to this stress. We tested ten isofemale lines of Drosophila melanogaster from each of four populations recently gathered from the wild. The populations represent a broad geographic range of D. melanogaster's distribution. To measure decanalization, we analyzed pupal weight variation within and between the populations for flies raised on either a normal or high fat diet. We found substantial variation between populations in their degree of phenotypic robustness to dietary perturbation. We hypothesize that the varied demographic and ecological history of the populations has influenced their ability to buffer the effects of a change in diet.
**Dominic Hephner, A&S - Biological Sciences**  
Faculty Mentor: Julie Olson, A&S - Biological Sciences  
Philip Lee, A&S - Biological Sciences

*Temporal and spatial variability in urease activity in wetland soils*

The Gulf of Mexico coastline, consisting of beaches and wetlands, is considered to be highly vulnerable as a result of societal and environmental factors. For Alabama, this is alarming due to the important economic impact of the coast for the state. Coastal wetlands are likely to experience increased nutrient enrichment from runoff, which includes nitrogen-containing fertilizers. In order to better understand the ability of coastal wetlands to mitigate nitrogen runoff in the form of urea, we measured urease activity in wetland sediments at Weeks Bay National Estuarine Research Reserve located in Fairhope, AL. By dividing our field site into 3 distinct regions characterized by different vegetation and elevation and by taking measurements on multiple dates, we were able to examine both spatial and temporal trends of urease activity over 6 months. Based on these data, the highest urease activity measurements occurred at the two sampling regions with the lowest elevation (ecotone and marsh), with the lowest urease activity associated with the wetland forest region. Lower temperatures resulted in decreased overall urease activity at all three sites. These results provide insight into how Alabama’s coastal wetlands remove urea pollution and highlight the variability in urea degradation at different wetland locations and under different environmental conditions.
Bethany Herndon, A&S - Psychology  
Faculty Mentor: Jennifer Cox, A&S - Psychology

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*

**The Construct and Application of Aversive Racism in the Criminal Justice System**  
The Theory of Aversive Racism has been researched in the parameters of the effects on the African American population in the Criminal Justice System (Gaertner & Dovidio, 2005; Bucolo & Cohn, 2010, Cohn, Bucolo, Pride, & Sommers, 2009). The present study specifically seeks to determine if previous findings involving said research can disseminate to other minority groups in the United States Criminal Justice System. By examining the effect of implicit racism through an Implicit Association Test, researchers were able to examine the moderating relationship between the independent variables of race salience and race of victim and the dependent variables of juror decision and confidence in decision. The Implicit Association Test was designed to assess the level of implicit bias for the majority population and against Hispanics (Nosek et. al. 2007). This bias is hypothesized to have a moderating effect on juror decisions in cases involving varying levels of race salience and victim race. It is also hypothesized that the level of implicit bias will affect the juror decision confidence. We also hypothesize that the moderating effects will be the largest for the "White Victim" conditions.
Kathryn Hiles, Engineering - Civil, Construction and Environmental Engineering  
Scott Andrews, A&S - Geography  
Faculty Mentor: Michael Steinberg, A&S - New College

Trophic Theory Case Study: South Water Caye, Belize  
The goal of our research was to examine the trophic behavior of various coral reef fish species in the reefs near South Water Caye, Belize. We collected our data over a two-week period, wherein we placed various foods within the reef areas. We recorded the different species of fish that appeared at the feeding site, the distance they traveled to interact with the food, and any particular behaviors they exhibited while feeding. From this data, we were able to characterize certain fish species as the most opportunistic and aggressive. We also concluded which fish would travel the furthest to investigate a feeding frenzy, as well as which food types were most preferable to the reef fish in this region.
In Fact: The Story of a Cuban Detainee Uprising in Talladega
In 1991, a group of Cuban detainees seized control of the Talladega Federal Detention Center and took prison guards and immigration workers hostage. In Fact is a research project that investigates the circumstances that led to the uprising such as the mass immigration of Cubans fleeing Castro's regime, and provides a new perspective into the lives of Cuban immigrants in the United States during the 1980s and 1990s. In Fact also gives some insight into the battles the Cuban immigrants faced when caught in the tangles of the legal system. To tell the story of the uprising, a nonfiction podcast is being created. The podcast will contain six episodes, each centered on a different key character or topic. The completion of the first episode is anticipated to be in April, and the podcast will be launched with a live event.
Simulating Complex Genetic Organism Evolution
A fundamental question in biology is whether or not complex genetic organisms will adapt to new conditions faster than simple genetic organisms. The individual-based population genomics simulator HexSim was utilized to track the evolution of two different types of organisms (genetically simple and genetically complex). The simple organisms are constrained to have only additive genetic relationships while the complex organisms can evolve genetic interactions to stabilize the organisms’ phenotypes at an optimum. This approach allows for the organisms to experience the same simulated environment, while also allowing faster experiments with many replications of the experiments. The two organism populations adapt over time to the peak optimal fitness for the original environment and then a small portion of each of those populations is placed in a new environment with a new selective regime. The portions placed in the new environment are then observed, their adaptations noted. We expect to find that the complex genetic organisms will adapt faster and better to the new environment than the simple genetic organisms. These results would then demonstrate that one advantage to a complex genetic architecture could be greater evolvability.
Jeremy Hitt, A&S - Chemistry  
Dusty Trotman, A&S - Chemistry  
Faculty Mentor: Shanlin Pan, A&S - Chemistry

Synthesis of α-FeOOH and CoPi Thin Films for use as Catalysts in Electrochemical Water Oxidation and Efficiency Comparison to Known Effective Catalysts

As the world looks to develop new forms of clean, renewable energy, water oxidation by electrolysis appears very promising since it can be used to produce hydrogen gas from sunlight to be combusted in fuels cells and provide electricity. The most important factor affecting the efficiency of electrolysis cells is the electrodes surface that is in contact with the water. Here we synthesize, test, and compare two newer types of catalysts for water splitting that can perform at near neutral pH. These two catalysts, α-FeOOH and CoPi, are grown on conductive glass surfaces by electrodeposition and compared with two previously known catalysts (IrOx nano-particle thin film and NanoCOT). The samples are used to split water in an electrochemical cell using linear sweep voltammetry, and their efficiencies are calculated and compared graphically to assess their effectiveness for large scale hydrogen production.
**Strive For Five**  
Stephen Hodge, Health Science Department Faculty Mentor: Lori Turner, Health Science Department  
Strive For Five  
Strive for Five is a program created by the University of Alabama to promote better lifestyle choices for students on campus. Poor lifestyle choices and environmental influences affect Americans daily and are popular topics in today's news. Preventable illnesses contribute to 70% of healthcare costs and directly relate to 9 out of 10 causes of death. The program includes free information, activities, incentives, educational sessions, check-ins and the support of health and wellness staff to help participants reach their goals. Individuals or teams of two or more can participate in this wellness program and log their achievements with online tracking. Strive for Five is a five-week, team-based wellness program that uses five simple steps to improve overall health:  
1. Eat five or more servings of fruit and vegetables per day  
2. Drink five more cups of water per day  
3. Think five minutes of mindfulness and positive thinking  
4. Exercise thirty minutes a day, five days a week  
5. Maintain or lose five or more pounds.  
The mission of the Strive for Five program is to create and sustain a culture of health and wellbeing for UA faculty and staff and their families through a quality program of teaching, research and services.
Shaun Hogan, A&S - Physics and Astronomy  
Faculty Mentor: Conor Henderson, A&S - Physics and Astronomy

Study of Triphoton Production at the Large Hadron Collider  
The Compact Muon Solenoid (CMS), is one of four main particle detectors at the Large Hadron Collider (LHC). With these two machines, we collide two protons at speeds approaching the speed of light and observe the particles produced in the collision. A rare process that can occur in these proton-proton collisions is triphoton production. As the name suggests, the final state of triphoton production will contain three individual photons, along with a variable number of jets. Despite the rarity of this process, observing triphoton production and measuring its cross-section will be helpful in testing current physical models. Furthermore, the triphoton production process has the potential to be a useful tool in observing new physical phenomena. In this project, we utilize two different simulation programs - MCFM and SHERPA - to provide theoretical predictions for the cross-section of triphoton production. We generated a variety of cross-section predictions, corresponding to different momenta of the photons produced. Initial comparison of results from MCFM and SHERPA show agreement, suggesting a good starting place upon which future studies can be conducted.
Heavy drinkers’ normative estimates for alcohol-related nonconsensual sex at college
The complex connection between alcohol use and problematic sexual behavior on college campuses has been well documented. Besides the possibility that there may be a direct or causal link in that alcohol may increase the likelihood of sexual activity and promote riskier sexual behaviors, many alternative hypotheses suggest otherwise. In settings such as fraternity houses, perceptions of peer norms may be the strongest predictors of such behaviors. Normative estimates for a variety of problematic college student behaviors have been explored in recent literature, but there is a gap in the literature on normative estimates of alcohol-related sexual assault, particularly held by heavy drinkers at college. The purpose of this study was to examine normative estimates of alcohol-related nonconsensual sex among male heavy drinkers on campus. Results revealed that heavy drinkers were more likely to report engaging in alcohol-related nonconsensual sexual behavior compared to nonheavy drinkers, but they were just as likely as nonheavy drinkers to report higher estimates of alcohol-related nonconsensual sexual behavior among typical students and among friends, compared to the actual norm. Correlation analyses showed stronger relationships between self-reported alcohol-related nonconsensual sex and perceptions of friend norms for heavy drinkers compared to nonheavy drinkers. Findings have implications for sexual assault prevention programs on college campuses.
No Suture Left Behind

On February 4th, 2016, a CCN student was unable to provide a patient with a suture count when requested due to lack of documentation and visibility. There was no policy at the institution regarding the necessity of documenting suture count upon insertion. If left in the tissue, the suture may lead to irritation and infection. The potential benefits of adopting a new plan for suture documentation would include: promoting patient safety by decreasing the risk of nosocomial infections, ensuring all medical facilities are in line with national standards, and reducing costs by avoiding the prolongation of patients’ length of stay.

Preliminary research suggests a correct amount of sutures removed in comparison to the number inserted in the patient's chart will ensure no suture is left in the tissue. This policy change would involve the provider documenting the number of sutures inserted during the procedure. This added documentation would give the nurses who are removing the sutures the knowledge of how many have been placed, thus preventing nosocomial infections and reducing cost. Patients, nurses, and medical staff around the world in every nation will reap the benefits of this world-changing guideline for suture count standard. Gold and silver treasures will never reach the same incredible heights of astounding glory this change will bring. Every eye will be opened, and no suture will be left behind.
Nursing a Disaster
During April of 2011 an influx of tornados left damage throughout the state of Alabama causing a local facility to receive a massive flow of victims through its doors. Nurses must be able to respond effectively and efficiently to aid as many as possible. Are the nurses well prepared to handle the onset of a natural disaster? Are they resilient and able to adapt once a disaster has occurred? The aim of this project was to examine the needs of nurses’ pre- and post- disaster and gain an understanding of how resilience affects a nurses’ involvement during a disaster. Methods used in this study include qualitative interviews of nurses’ personal experiences and feelings toward the 2011 tornado in Tuscaloosa, AL. In addition to the interviews a survey was given to participants to determine their resiliency levels. In this survey 10 nurses were able to describe whether or not they were prepared or unprepared personally and professionally. During the interviews these nurses were able to state what needs they felt were necessary and why they were unprepared in certain aspects of the disaster. The nurses who were interviewed demonstrated a high level of resiliency; however, even they discussed the need for more planning in the event of another disaster.
Laura Holland, HES - Human Nutrition and Hospitality Management
Faculty Mentor: David Dixon, A&S - Chemistry

Gas-Phase Acidities of Phosphorylated Peptides
Phosphorylation, the addition of a phosphate group, is a common post-translational modification in proteins and is involved in cell signaling. The most abundant phosphorylated amino acids are phosphoserine, -threonine, and -tyrosine where phosphorylation occurs at the -OH group. The lowest energy conformers for neutral and deprotonated dipeptides composed of one alanine residue and one phosphorylated amino acid were predicted. The reliable correlated molecular orbital theory G3MP2 method was used to predict the gas-phase acidities. The lowest energy anion results in deportation of the phosphate group. Partial proton transfers are seen between the phosphate and carboxylic acid groups showing the importance of hydrogen bonding in the most stable structures and its effect on acidity.
Maury Holliman, A&S - Psychology  
Faculty Mentor: Ariane Prohaska, A&S - Criminal Justice

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*

Non-Natives as a Vulnerable Population Following a Natural Disaster  
Natural disasters often receive attention from both the media and scholars directly following their impacts. However, many underserved populations are overlooked in the process, often leaving out the most vulnerable during the long-term recovery process. Lack of time spent in a community was conceptualized as a source of vulnerability in the current project under the assumption that those who have spent less time in the community will know less about its resources and, in turn, receive less social support. For this project, nativism is the main independent variable measured by asking length of time the resident had lived in Tuscaloosa prior to the tornado, their age, and if the respondent considered Tuscaloosa to be their home at the time of the storm. It is hypothesized that social support will mediate the relationship between nativism and the dependent variables: self-efficacy, unity, post-traumatic growth, and post-traumatic stress. Approximately 30 participants will be surveyed and interviewed. Respondents will answer survey questions pertaining to their demographics and the scales measuring the independent, mediating, and dependent variables. Participants will also complete a semi-structured interview asking in-depth questions about experiences following the tornado. Suggestions for city and community leaders will be proposed in order to better assist these populations in their long-term recoveries after a disaster.
Oral & Poster Presentation Abstracts

Brandon Hooks, A&S - Political Science
Maunica Malladi, A&S - Political Science
Taylor Carvalho, A&S - Political Science
Joshua Carvalho, A&S - Criminal Justice
Michael Ciulla, C&BA - Culverhouse School of Accountancy
Faculty Mentor: Mary Meares, C&IS - Communication Studies

Serbia Fellowship Experience
The Serbia Fellowship Experience (SFE) takes undergraduate students at Alabama overseas for a two-week cultural immersion program. During their time on the program, students conduct ethnographic research about general life in Serbia. These studies are done through a series of informal conversations and activities, including visits to local primary/secondary schools and presentations of learning within the various universities. Students also stay with host families in two different Serbian cities, allowing them to compare and contrast the varying customs found throughout the country. The program also takes students to the U.S. Embassy where they conduct presentations on their cultural findings and provide insight into the key areas in which the Embassy should work.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Oral & Poster Presentation Abstracts

McKay House, A&S - Theatre and Dance
Erika Davis, A&S - Theatre and Dance
Faculty Mentor: Rebecca Salzer, A&S - Theatre and Dance

Optic Disc: A dance for film
What elements comprise an individual? Is it the way we interpret information or the way we perceive ourselves, our environment, or others around us? Optic Disc: A dance for film was created with these general questions in mind. Through the use of dance as a medium of commonality one can see how different people in different situations react to the same kinesthetic stimulus. The creators derived the choreography by exaggerating personal idiosyncrasies as a way of defining their personality through movement. This movement was recorded and sent to the participants. They were asked to interpret it as it appeared without external influence from the creators, thus introducing their own idiosyncrasies into the movement. Each setting was chosen to invoke a different movement quality in the participants. From night time on a busy street to a sunny day in a park, each location aimed to further influence the choreography and therefore influence their kinesthetic identity. To accompany the footage the creators collected vocalizations of the choreography from the participants as well as personal idiosyncratic sounds from their everyday lives. This dance film aims to find a balance between the internal and external characteristics of personality, specifically how the dynamics of those factors converge to create a single being.
Rachel Hunnicutt, Nursing - Capstone College of Nursing  
Faculty Mentor: Michele Montgomery, Nursing - Capstone College of Nursing

Prenatal Smoking Cessation for Professional Nursing Practice  
Smoking during pregnancy is the most modifiable risk factor for poor gestational outcomes. It is associated with increased risk of spontaneous abortion, placental insufficiency, preterm birth, low birth weight, and Sudden Infant Death Syndrome. The Alabama Department of Public Health reports that 11.1% of pregnant women in Tuscaloosa County smoke during their pregnancy. These women need assistance in quitting and nurses are in a unique position to help them. The purpose of this investigation is to identify successful smoking cessation strategies that have been studied in pregnant women, are supported by clinical evidence, and are appropriate to a nursing role. Emphasis is placed on core nursing strengths such as communication, assessment, outcomes identification, planning, health teaching, and health promotion. Research articles published within the last five years were analyzed with the Health Promotion Model in mind. The evidence-based intervention best suited to the nursing role is the "5 A's" smoking cessation model. This intervention is well-suited for integration into all levels of nursing practice and is compatible with the established nursing process and Standards of Professional Nursing Practice. Nurses should diligently implement the 5 A's into routine prenatal care. Pregnancy is a unique window of opportunity for smoking cessation because women are motivated to make healthy lifestyle changes and are visiting healthcare providers regularly.
Andy Hurst, A&S - Psychology  
Faculty Mentor: Matthew Jarrett, A&S - Psychology

Anxiety and Academic Performance in Children and Adolescents  
Child anxiety has been shown to be negatively related to school performance and standardized tests of academic achievement. At the same time, little is known about variables that explain this relationship. The current study examined parent-reported attention problems and a tasks-based measure of working memory as mediators of the relationship between child anxiety and school performance. The sample consisted of 312 children and adolescents who were consecutively referred to an outpatient clinic in the Southeast United States. Analyses included correlational analyses as well as the SPSS PROCESS add-on tool for mediational analyses. Although child anxiety in our sample was either unrelated or positively related to school functioning (depending on the informant), there was evidence that the relationship between parent-reported anxiety and school functioning is mediated through parent-reported attention problems. The current findings reflect the complex and nuanced relationships among anxiety, cognitive control, and school performance. Future studies should seek to measure state as well as trait anxiety as well as additional indices of anxiety (e.g., physiological activity) when examining how anxiety impacts cognitive control and academic performance.
Katelyn Isbell, Engineering - Electrical and Computer Engineering
Gatlin LaRochelle, Engineering - Electrical and Computer Engineering
Faculty Mentor: Yang-Ki Hong, Engineering - Electrical and Computer Engineering

Reconfigurable Ferrite Antenna for Mobile Devices
Mobile devices and computers continue to decrease in size while becoming more complex according to the demands of today's increasingly networked world. To continue such profile reductions, embedded components within these devices must also decrease in size. Currently, a cell phone can contain up to seven antennas, each consuming valuable space in the device. The goal of this project is to design and construct a miniaturized reconfigurable ferrite antenna for use in mobile devices. A variable capacitance diode and RF switch controlled by an Arduino Uno microcontroller will be used to configure to a wide range of frequencies in the range of 400 MHz to 2.5 GHz by varying the capacitance and electrical length of the radiator, respectively. The antenna circuit will be fabricated based on optimized antenna and circuit designs as determined by antenna performance simulation. The proposed antenna design has an overall size of 40mm x 60mm and utilizes a 40mm x 10mm ferrite substrate. A ferrite substrate with high permeability reduces the effective wavelength, and the antenna size can consequently be significantly miniaturized. Therefore, by implementing a single reconfigurable miniaturized ferrite antenna with a variable capacitance diode and RF switch into a device, multiple bands can be covered while simultaneously minimizing size and complexity. To confirm this behavior, the fabricated antenna will be characterized with a vector network analyzer and anechoic chamber.
William Jackson, A&S - Chemistry
Faculty Mentor: David Dixon, A&S - Chemistry

Gas-Phase Acidities of Acid-Substituted Peptides
In human biochemistry, peptides associated with brain development, cellular energy, and digestion often rely on polar molecules such as asparagine and glutamine residues. The lowest energy conformers for neutral and deprotonated dialanine substituted at each position with glutamine or asparagine were predicted using extensive conformational sampling at the level of density functional theory. The reliable correlated molecular orbital theory G3MP2 method was used to predict the gas phase acidities. The results show the importance of intramolecular hydrogen bonding and its effect on the gas phase acidity. These results provide the basic science for the development of negative ion mass spectrometry for studying proteomics.
**Siera Jann**, A&S - Geological Sciences  
Faculty Mentor: **Yuehan Lu**, A&S - Geological Sciences  
**Takehito Ikejiri**, A&S - Geological Sciences

*Fossil Reptile or Plant Remains? Mysterious Organic Matters from the Jurassic Morrison Formation of Western Colorado - Investigation Under the Microscope.*

In the Upper Jurassic Morrison Formation of the Fruita Paleontological Area in western Colorado there have been findings of skeletal fossils of rare small vertebrates (lizards, amphibians, mammals, etc.), instead of common giant dinosaur bones. However, the depositional environments are still not well understood. Besides sedimentological features, mysterious dark stain-like material from the bone-bearing layers, which likely represents organic remains, may provide information about the depositional environments. The organic remains are potentially composed of plant material and/or small vertebrate bone fossils that were generally formed near lake margins instead of fluvial and/or floodplain deposits. We incorporated microscopic techniques to examine and identify the biological source(s) of the dark organic material. We observed that the material did not have clear cell structure of tissues of leaves, wood, or bone. It can be hypothesized that the organic remains are decayed plant material based on size, shape, and specific characteristics of the microstructure present. However, the source of these organic materials remains unknown, which opens up further questioning of where specifically these remains come from.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Diabetes and Hypertension Clinic

The Diabetes and Hypertension Clinic is a behavior-change based health education program that is offered to visiting patients in the University Medical Center. Based of data collected from the Center for Disease Control and Prevention, 29 million people (9.3%) of people in the United States have diabetes and approximately 70 million American adults (1 of every 3 adults) have high blood pressure. The purpose of this behavior-change program is to increase health literacy within each patient, and introduce methods to implement that will help regulate the disease. The Diabetes and Hypertension Clinic is active on a day-to-day basis, benefiting each patient that needs to be coached on either topic-diabetes or hypertension. During the health education consultation, patients will be assessed on a variety of factors, including: overall understanding of the disease, overall health literacy, and physical ability to complete exercise techniques to aide in lowering risk factors associated with the disease. Each week, the clinic gives each patient a follow-up phone call to assess progress and identify problems before they get out of hand. Implementation of this clinic for patients with diabetes and hypertension is important, especially with the given targeted adult population. If the patient can implement a behavior-change towards the disease, it can prevent further complications, such as amputations from high blood sugar, or a heart attack from high blood pressure.
**Exploring Heritable Resilience to Neurodegeneration in a Parkinson's Disease Model**

Caenorhabditis elegans are especially useful model organisms for studying Parkinson's Disease (PD) due to the ease of manipulating their genetics and their short generation time (which allows for the study of age-dependent conditions and lifespan assays). Using these advantages, we developed a PD-relevant model that overexpresses alpha-synuclein (the protein implicated in PD) in the dopamine neurons, which triggers neurodegeneration. We apply our PD model to the exploration of resilience: an enhanced ability to resist the effects of disease. Resilience results from undefined heritable, but non-genetic alterations in gene expression. We evaluate the loss of dopaminergic neurons by assessing a behavioral read-out termed the Basal Slowing Response (BSR), a dopamine-regulated slowing of crawl speed when wild-type C. elegans encounter food. Although all our alpha-synuclein animals are genetically identical, they exhibit a range of speeds upon encountering food; those which respond to food more like wild-type animals are considered resilient. We are propagating populations of resilient alpha-synuclein animals over multiple generations and will subsequently identify the battery of expression changes in each group using RNA-sequencing. Genes expressed differentially between the resilient and control samples may be implicated in resilience to dopaminergic neurodegeneration, which could illuminate new treatment possibilities for PD patients.
Evidence of a sneaker male mating strategy in an isolated population of convict cichlid fish.

Alternative male strategies evolve when two (or more) distinct mating strategies - for example, parental males and female-mimicking sneaker males - yield equal fitness. Males that take on alternative roles often possess unique adaptations that allow them to forego normal parenting duties while still maintaining a good likelihood of siring offspring. Because sneaker males do not utilize resources for activities like nest guarding and territory management, these males invest their resources in other physiological features such as body size, sperm density, sperm longevity, and testis size. This study focuses on an isolated population of convict cichlid (Amatitlania siquia). In this species, sexual dichromatism has been observed between males and females. Female A. siquia are typically smaller in body size than males and exhibit a bright orange carotenoid ventral coloration that male cichlids lack. However, several specimens with the carotenoid coloration have been captured in Lake Xiloa, Nicaragua and their sexes determined to be male. This gives rise to the question of whether males carrying out alternative mating strategies are present in the population. We will perform gonad histology on these putative sneaker males to determine whether their investment in sperm and testis size matches theoretical predictions and provides evidence of sneaker male physiology.
Earl Johnson, HES - Health Science
Faculty Mentor: Lori Turner, HES - Health Science

Good Samaritan Clinic
Good Samaritan Clinic is a private nonprofit agency funded by the United Way foundation. The mission of this Christian based ministry is to answer God's command to care for the poor. Good Samaritan clinic does this by providing health services to underprivileged communities in Tuscaloosa, Greene, Hale, Bibb, Pickens, Sumter, and Fayette County. Good Samaritan services individuals that are considered to be the working poor. Good Samaritan works to bridge the gap in health disparities between differing social economic statuses. The health care system is filled with these disparities due to economic status, access to care, and health insurance status. Insurance status alone is a key determining factor in cancer screening and disease progression. The services are tailored to serve individuals that are working full time or part time and cannot afford health insurance. Good Samaritan provides free primary health and dental care, medication, health information, and spiritual support. According to med-ed-online.net fifty-seven million individuals live in the 5,864 designated primary care shortage areas in the United States. Good Samaritan serves as the only source of health information for their target population and have the responsibility of providing adequate and up to date information for a wide variety of health issues.
Elevated Gastrointestinal Metabolism Suppresses Hyperglycemia

An additional benefit of human gastric bypass, besides rapid weight loss, is the restoration of glucose homeostasis for diabetic patients. Documented is the reduction and control of blood glucose levels within days after bypass surgery. Demonstrated for mice is an elevation in metabolism of the remnant intestine following surgery. Suggested is that the highly active intestine is burning glucose, thereby eliminating the incidence of hyperglycemia. We explored the potential that elevated metabolism of the digestive system can repress postfeeding increases in blood glucose using the diamondback water snake (Nerodia rhombifer). Water snakes experience a 5-fold increase in metabolic rate with feeding, in part due to the 2-fold increase in the metabolism of their stomach and small intestine. When feeding on a fish meal, water snakes experience no change in blood glucose. However, when give a glucose bolus on an empty stomach, blood glucose rises rapidly by nearly 3-fold before slowly returning after several days to normal levels. During this trial, snakes experienced minor changes in metabolic rate. When snakes were given a glucose load either before or after a catfish meal, blood glucose did not increase. We suspect that the administered glucose in the feeding trials is rapidly metabolized by the active gut tissues and thereby blood glucose levels do not increase.
**Lacey Kennedy**, A&S - Biological Sciences  
Faculty Mentor: Stevan Marcus, A&S - Biological Sciences

*The Role of Stress Responders Pka1 and Pmk1 in Avicin G, a Potent Antitumor Compound*

Avicins are a group of triterpenoid compounds that exhibit inhibitory activity on tumor growth. Our goal is to understand the ways in which avicin G obstructs tumor growth by studying its effects on the model organism, *Schizosaccharomyces pombe*. We have uncovered multiple stress response proteins that are crucial modulators of avicin G sensitivity using high-throughput genetic screening. Of the genes uncovered by the screen, we have found that two stress responders, Pka1 and Pmk1, have differential effects with respect to avicin G sensitivity: cells lacking Pka1 are resistant and cells lacking Pmk1 are sensitive to avicin G. This corresponds to described antagonistic roles for these proteins in normal cell physiology. Using a variety of techniques, we study the effect that different levels of these proteins have on a cell's response to avicin G exposure. With this knowledge in mind, we are attempting to further characterize the role that these signaling proteins have in avicin G resistance and avicin G induced cell death.
Polymerosomes for a Magnetically Triggered Drug Delivery System
Chemotherapy uses a toxic drug to kill cancer cells. However the drug also kills healthy cells, causing debilitating side effects. Our objective is to build a targeted, magnetically triggered drug delivery system based on polymerosomes. Polymerosomes were made from a poly(ethylene glycol-b-caprolactone) diblock copolymer. In aqueous solution, the polymers assembled to make a spherical structure (a polymerosome) with water in the core and a polymer shell entrapping the water. Doxorubicin, a cancer drug, was trapped in the core of the polymerosomes. Magnetite nanoparticles were prepared having polycaprolactone brushes on the polymer surface. The magnetite particles will be trapped in the polymer shell of the polymerosomes. Application of a radio frequency AC magnetic field will heat the particles by magnetic induction, thereby melting the polymer shell, causing it to break open and release the doxorubicin in a burst. Polymerosomes are a key to making chemotherapy more effective, efficient, and safe by delivering the agents directly to cancer sites within the body instead of the medicine attacking healthy areas as well. This delivery will be affected by targeting groups bound to the periphery of the polymerosome. The targeting groups will bind to receptor sites specific to the surface of the cancer cells.
Sarah Kidwell, HES - Consumer Sciences  
Faculty Mentor: Melissa Wilmarth, HES - Consumer Sciences  
Kyoung Kim, HES - Consumer Sciences

Generation Gaps: Generational Differences in Financial Behaviors  
Generational cohorts experience similar historical, social, and cultural events that shape their behaviors. This research investigated possible differences in financial behaviors among generational cohorts. Specifically, do household financial behaviors differ by generation? Using the 2010 and 2013 Survey of Consumer Finances (SCF; N=12,497), nine financial behaviors and five generations were investigated: The Greatest Generation (Born before 1928) (13.7% of sample), The Silent Generation (Born 1928-1945) (28.8% of sample), The Baby Boom Generation (Born 1946-1964) (36.6% of sample), Generation X (Born 1965-1980) (17.6% of sample), and The Millennial Generation (Born 1981-1997) (3.3% of sample). For all generations, about half (50.4%-54.5%) were spending less than their income. Millennials (59.8%) were willing to take on more risk than other generations. More of the Silent Generation (83.0%) and less Millennials (29.2%) own a home. Baby Boomers (15.7%) had the highest rate of small business ownership. Further, Baby Boomers had the highest rate of financial planner use (31.8%) and bankruptcy filings (17.6%). The three youngest generations had the highest rates of debt. Generation X had the highest rate (10.9%) of debt delinquency. Understanding the needs and differences in generational cohorts' financial behaviors will help financial planners better serve clients to achieve financial goals. Being aware of these differences allows for a better connection and trust with clients.
Rachael Kress, A&S - Chemistry  
Faculty Mentor: David Nikles, A&S - Chemistry

Building a Nano-Thermometer for Localized Magnetic Induction Heating  

Magnetic nanoparticles can be heated by an external radio frequency ac magnetic field thereby providing local heating on a nanoscale. For their use in biomedicine to be fully realized, accurate surface temperatures must be obtained. Building a nano-sized thermometer that can be directly attached to the surface of magnetic nanoparticles is one way to obtain an accurate temperature of the particles at their surface during magnetic induction heating. To achieve this goal, rhodamine B, a compound with temperature dependent fluorescence, was attached the surface of the particles. Rhodamine B isothiocyanate (RITC) was reacted with 3-aminopropyltrimethoxysilane (APTMS) to give the corresponding thiourea. The product was then reacted with magnetite nanoparticles, where the trimethoxysilane group formed a covalent bond to the surface of magnetite. A dispersion of the magnetite-APTMS-RITC System (MARS) particles in ethanol was heated in a fluorometer and the fluorescence spectrum was measured at different temperatures. The excitation wavelength was 485 nm and there was a peak in the fluorescence emission at 573 nm. The fluorescence intensity at 573 nm decreased linearly with increasing temperature, thereby giving a calibration curve. From here, the MARS particles will be used to accurately test the efficiency of heating magnetite nanoparticles by magnetic induction.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Alison Kuhlmann, HES - Health Science
Faculty Mentor: Jen Nickelson, HES - Health Science

Building a Healthier Community
The health education honor society at UA is working with partners from the Holt community to put on a health fair at the local high school for community members. The purpose of this health fair is to promote healthy behaviors in the community and increase awareness of preventable diseases through screenings. At the fair stations will be set up for screenings for different health conditions, and information on how to live a healthy lifestyle will be provided. In addition, fun activities will be provided for children to get them engaged. We hope to see a large turn out from members of the community who want to gain knowledge and understanding of health changes they can make to live healthier, longer lives. By providing education on healthy behaviors and ways to integrate them into your daily life, everyone working with the health fair aims to make an impact in the Holt community.
Kanitta Kulprathipanja, C&BA - Economics, Finance and Legal Studies
Faculty Mentor: Robert Reed, C&BA - Economics, Finance and Legal Studies

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Fate of Dietary Copper: Is the Form of Copper Key to Preventing it from Becoming Toxic?

While copper is an essential trace element for humans, copper in the form of copper(II) salts in the diet has been proposed to be associated with the increased rate of Alzheimer's disease, a disease of increasing loss of cognition leading to dementia with age. Most notably, recent studies have linked the use of copper plumbing and free copper levels (copper(II)) in the body with Alzheimer's disease. However, the fate of dietary copper in the gastrointestinal tract is poorly understood. Most foods contain copper in the form of copper(I), as the copper is bound to proteins and other biomolecules; however, in the presence of air and water, copper(I) can rapidly be converted into copper(II). In the presence of the appropriate chemicals to bind the copper, the reverse reaction can also potentially take place. The extent to which this interconversion can take place in the gastrointestinal tract is unknown. Starting with artificial gastric juice and intestinal fluid and building to an artificial meal exposed to the fluids, the fate of copper(I) and copper(II) species in simulated gastric and intestinal environments will be determined using a variety of spectroscopic and magnetic techniques. Establishing conditions that can lead to the generation of copper(II) salts could lead to changes in diet that could minimize risk for the development of Alzheimer's disease and related conditions.
The day that Led to Foreclosure
It almost seems as if one singular day is rather insignificant in value or importance. After all, there are 365 days in only one year. However, within the 24 hours of any particular day there lies the potential for something monumental to occur. This potential is what makes the human experience both exhilarating and daunting as the possibilities lie untapped. While there are innumerable days that provide opportunities for success, love, life and joy, one of these numerous days in 2006 marked the burst of the U.S. housing bubble. Following this financial crisis, millions of Americans found themselves the victims of foreclosure. Several thousand residents of Tuscaloosa, Alabama were not to be excluded from this daunting number. Mirroring the national crisis, roughly 6,000 homeowners of Tuscaloosa County have lost their homes to foreclose since 2006. The purpose of this presentation is to analyze the stories of 10 Tuscaloosa residents who woke up one day to find that ultimately it would be the day that led them to foreclosure.
Ketrick LaCoste, A&S - Biological Sciences  
Brett Tancak, A&S - Physics and Astronomy  
Faculty Mentor: Stephen Secor, A&S - Biological Sciences

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Nicholas Laffey, A&S - Mathematics
Faculty Mentor: Brendan Ames, A&S - Mathematics

Sparse Regression for Predicting Playoff Success in Hockey
Many folkloric claims are often made to distinguish teams in hockey as, or more often, as not championship caliber. For example, teams with strong defenses are often favored ("Defense wins championships") as are those with more experience. Statistical models attempting to predict playoff performances or to find previously unknown relations between certain team metrics and playoff performances are typically plagued by a wide variety of issues. For example, overfitting, multicollinearity, and undersampling cause significant issues in traditional regression techniques. Moreover, models that can predict playoff success with a relatively high amount of success add little explanatory value to what statistics are most responsible for these predictions. To address this issue, we employ sparse regression to create a variety of linear and loglinear Poisson models. Sparse regression places a penalty on the coefficients of the predictors that drives them towards - or in some cases to - zero. This penalty solves many of the aforementioned problems while also creating parsimonious models.
Oral & Poster Presentation Abstracts

Hannah Larson, Engineering - Mechanical Engineering
Faculty Mentor: Paul Puzinauskas, Engineering - Mechanical Engineering

Toward the Automation of Engine Optimization
This study seeks to increase the efficiency of control strategies applied during the process of a diesel engine cycle through real-time analysis. A combustion analyzer uses a piezoelectric transducer to measure pressure pulses that collectively illustrate a performance cycle of the engine of study. It considers both property analysis by crank position and relative time. The data collected from the combustion analyzer will be incorporated into a real-time transient analysis and control optimization program. The effective study of the behavior of the engine cycle will allow for an increased testing, analysis, and control strategy implementation efficiency.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Sierra Lawson, A&S - Anthropology
Faculty Mentor: Ian W. Brown, A&S - Anthropology
Theodore Trost, A&S - Religious Studies

Floral Engravings on Gravestones: Interpreting Cultural Values in Tuscaloosa County Burial Grounds

Floral Engravings on Gravestones: Interpreting Cultural Values in Tuscaloosa County Burial Grounds
By Sierra Lawson
Advisor: Dr. Ian W. Brown

Abstract

Flora and death have a relationship that holds vast historical and cultural significance. The implications of this relationship are not exclusively relevant concerning the past; there is contemporary value for gender dynamics, political capital, and religious principles. Cemeteries are accessible archives in which flowers are a decorative expression of commemoration, respect, and positive transcendence into the afterlife. Whether it is a single flower on a grave or an abundance of flowers, interconnectedness between cemetery decoration and botanical representation is evident. My research proposes the idea that flower engravings occur more or less frequently on individual’s gravestones as due to specific gender, military, religious, and political influences throughout their life. Of the 250 rural and urban burial grounds that lie within Tuscaloosa County I chose to focus on fourteen. They ranged from public cemeteries such as Greenwood, the oldest surviving cemetery in Tuscaloosa, to private burial grounds such as Old Prewitt, now surrounded by a lavish family lakeside residence. Mortal remains of men, women, and children transcending decades of American history through times of war and peace lie within these cemeteries. The floral engravings on gravestones in these cemeteries can be interpreted to reveal an individual’s personal, historical, political and social narrative. These narratives are vital to understanding the past peoples of Tuscaloosa.
William Layfield, A&S - Chemistry
Faculty Mentor: David Dixon, A&S - Chemistry

Computational Studies of the Hydrolysis of Early Actinide(IV) Cations

With today’s increased focus on finding efficient sources of energy that do not contribute to global warming, nuclear energy is one of the important alternatives to combustion of fossil fuels. There is a need to separate actinides from each other and from other fission products for the design of new reactors that can reuse spent fuel. Computational chemistry is being used to understand the behavior of actinide ions in aqueous solution so that accurate predictive thermodynamic models of these solutions including the speciation of the ions can be developed to aid in the design of efficient separation systems. With the goal of determining better methods of cleaning up contaminated environments. We are predicting the thermodynamic properties of aqueous U(IV) and Np(IV) and An(IV)-hydroxide clusters and comparing them to the chemistry of Th(IV) and Pu(IV), which have been previously studied in the Dixon group. The calculations were done by using density functional theory including relativistic effects with effective core potentials. The COSMO self-consistent reaction field intrinsic solvation model is used to predict free energies in aqueous solution including pKa's.
Valerie Levine, Engineering - Chemical and Biological Engineering  
Faculty Mentor: Jason Bara, Engineering - Chemical and Biological Engineering  
John Whitley, Engineering - Chemical and Biological Engineering

Preparation of Polymeric Materials in Coordinated Ionic Liquid Media
Polymers are an important part of everyday life, existing in everyday products such as chairs, medical supplies, packaging materials, and even biomedical structures. Since they are so prevalent, there is always a need for better ways to polymerize monomers, which make up these polymers, as it can make production of polymer products more efficient. In our research, we examined the polymerization kinetics of cross-linkable monomers (for example, dimethacrylates) as well as the material properties of (meth)acrylate polymers containing long side chains. Using real-time Fourier transform infrared spectroscopy (FTIR), we measured monomer conversion over time. With gel permeation chromatography (GPC), we determined polymer molecular weight parameters. In addition to polymerization kinetics, we studied the mechanical properties and swelling behaviors of the crosslinked polymers and the composite materials. In the future, we hope these polymers may be implemented in many ways, including for 3D printing filament for scaffolding and other bioengineering purposes.
Emily Lewis, Education - Curriculum and Instruction
Faculty Mentor: Elizabeth Wilson, Education - Curriculum and Instruction

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Lauren Lewis, HES - Health Science  
Faculty Mentor: Jen Nickelson, HES - Health Science  

West Central Alabama Area Health Education Center  
West Central Alabama Area Health Education Center (WCAAHEC) improves access to health care, promotes preventative care, and supplies professionals in undeserved communities throughout West Alabama. WCAAHEC is located in Greensboro, AL and strives to reduce health disparities by improving the quantity, diversity, distribution, and quality of Alabama's healthcare workforce in 13 counties in West Alabama. A variety of programs are offered to these rural communities. Educating high school students on preventative measures for obesity and area specific diseases as well as providing weekly Zumba classes are two programs that are informative and help the community engage in activities to become healthy. Success is achieved if even one person's life is positively affected and changed to become healthier. The Zumba class started out with 2-3 people and has grown to 15-20 people. Program design and implementation as well as needs assessment were used to develop these programs to teach participants about healthy living.
Yue Li, HES - Health Science
Faculty Mentor: Jen Nickelson, HES - Health Science

**Biostatistics Does Matter**
I am working with Dr. Leeper, a professor of Community and Rural Medicine in the University of Alabama this semester. Our research project focuses on medical data analysis. Currently, we are working on a database from a diabetes education group, using SPSS to process data. The goal of our project is to find the health-related information and relationship through biostatistics methods. It displays basic concepts and tools of public health data collection, as well as health-specific communication in public health domains.
"She got a boyfriend": The Impact of Jealousy on Friendships

Jealousy is a relationship feature that can lead to difficulties in friendships. We examined both enacted and received jealousy across different types of friendships (i.e., best, casual) that later transformed to antipathetic relationships. An ethnically diverse (82.7% Caucasian, 9.5% Black or African American, 2.9% Latina/o, and 2.4% Asian, 4.8% other) sample of undergraduate students (N = 410, 85% female, mode = 19 years) completed an online survey responding to questions about features of their friendship followed by features of their antipathetic relationship. Males (74%) and females (85%) reported having a friend in high school who later become an antipathy, and 86% reported that the person was a best/close friend. When comparing best/close friends to other types of friends, they reported higher levels of enacted jealousy compared to all other types, F(1, 396) = 4.59, p < .05. Best/close friends also reported receiving higher levels of jealousy, as compared to other friends, F(1, 397) = 10.31, p < .001. No significant differences emerged between former best vs. other friends in enacted or received jealousy after the friendship transformed to an antipathy. A theme that emerged in the narrative responses about what led to the transformation was jealousy involving a romantic partner. One possible explanation could be that higher levels of jealousy among best friends occurred as attention shifted to a romantic partner, thus resulting in the threat of being replaced.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Feasibility of Indoor Solar Energy Harvesting
The focus of this project was to examine applications and the feasibility of solar energy harvested under indoor lighting conditions. There has been little advancement in indoor solar energy harvesting since the advent of the solar powered calculator, with a larger focus in full outdoor systems. Utilizing indoor light could enable battery-less operation of electronic devices with modest power consumption. For the initial phase of the research, solar panels of varying characteristics were gathered and exposed to various intensities of light designed to mimic a set of nominal indoor conditions. Using ancillary circuitry as part of the test setup, data was obtained to indicate an expected amount of power generated by each solar panel under each lighting condition. These results were analyzed to determine thresholds of reasonable operation. The next phase involved examining the power draw and operating characteristics of low-power common household devices. These loads included a smoke detector and an indoor temperature sensor. In comparing these results to the power output of the solar panels, expected source and load conditions were determined to predict the size of an array of solar panels necessary to power such a load under nominal conditions.
Aubrey Long, A&S - Religious Studies
Faculty Mentor: Merinda Simmons, A&S - Religious Studies

Feminism, Power, and the LDS Church
In light of the recent excommunication of Kate Kelly, a notable Mormon feminist and the founder of Ordain Women, it seems that the LDS church does not support feminism or its goals of women's equality. However, in the past, the LDS church supported movements for women's equality (most notably, the suffrage movement). Over the years, the church has changed its support as the definition and goals of what we now call feminism have changed. More interesting, however, is the fact that both the LDS church and Mormon feminists, such as those involved with Ordain Women, have used the same sources to further their claims. Both groups call on Joseph Smith's teachings and the Book of Mormon itself to claim either that women should be ordained (Ordain Women) or that they should not be ordained (LDS Church). Claiming these sources for their means effects the perceived authority of each group, though in reality, neither can truly lay claim to these words. Each group reads these sources with a particular lens, showing the impermanent and ambiguous nature of history.
*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Lauren Longobardo, Nursing - Capstone College of Nursing
Haley Sayers, Nursing - Capstone College of Nursing
Courtney Gage, Nursing - Capstone College of Nursing
Mary Carolyn Gage, Nursing - Capstone College of Nursing
Kearston Wells, Nursing - Capstone College of Nursing
Caroline Bottcher, Nursing - Capstone College of Nursing
Lucas Urbi, Nursing - Capstone College of Nursing
Alex Sawicki, Nursing - Capstone College of Nursing
Faculty Mentor: Johnny Tice, Nursing - Capstone College of Nursing

Do You Hear What I Hear? Battling Ubiquitous Alarm Fatigue

The presence of alarm fatigue in hospitals impacts the quality of patient care and increases patient endangerment. Alarm fatigue is defined as desensitization of hospital personnel to alarms due to prolonged exposure to false alarms (Sendelbach & Funk, 2013). While 85%-99% of alarms are not clinically significant, the alarms that do require intervention are not responded to in a timely manner. From 2005-2010, there have been 566 alarm-related patient deaths (The Joint Commission, 2013). To verify this is a critical problem for a unit at a hospital in Tuscaloosa, AL, 17 hospital personnel and 29 patients were interviewed. The survey revealed a trend that cardiac alarms are most commonly heard and a majority of them are false, thus compromising patient milieu. There were also deviations from hospital policy involving alarms noted during the rotation. Interventions were outlined for cardiac alarms due to their frequency and urgency. Research indicates that when default parameters are customized to the patient, a 61% decrease in false alarms occurred (Paine et al., 2016). Interventions such as changing electrocardiogram electrodes daily and proper skin preparation prior to application also reduced false alarms by 46% (Sendelbach & Funk, 2013). Additionally, to combat alarm fatigue, nurses must adhere to hospital protocol and respond appropriately. Lastly, hospitals must create and revise existing procedures to reinforce safety through increased staff education and competencies.
Kelsey Lowman, A&S - Biological Sciences  
Brelahn Wyatt, A&S - Biological Sciences  
Faculty Mentor: Laura Reed, A&S - Biological Sciences

Implications of adulthood exercise in Drosophila melanogaster fed a high-fat diet during larval stages  
Childhood obesity is an ever-growing endemic in America that leads to lifelong adverse effects, even when corrective measures are taken later in life. Metabolic syndrome (MetS) research is centered on understanding and addressing these negative effects, such as increased risk of heart disease, diabetes, and stroke. Our research, in particular, focuses on the negative effects of high-fat diet in the juvenile stages of life and the possible amelioration of these effects through exercise in adulthood. Drosophila melanogaster are common model organisms for studying MetS due to their short life span and the commonality between their genome and that of human's. Using the genetically homogenous line W1118, we fed first instar larva a 1.5% high-fat diet and transferred the flies to a normal diet after they emerged as adults. Each fly—separated by sex, diet, and exercise treatment—was placed on a strict pyramid exercise protocol using the TreadWheel for one week. Following the week of exercise, the flies were tested for triglyceride and protein concentration. Based on our results, we did not notice a significant correlation between adulthood exercise and juvenile diet. However, this does not rule out the possibility that the consequences of a high-fat juvenile diet could be reversed by adulthood exercise; instead, it suggests that further studies may need to be preformed to conclusively determine a correlation.
Characterization of Hierarchically Porous Catalysts in a Down Flow Reactor

Research conducted by the Bakker and other research groups has shown the potential of a new monolithic structure for the catalytic oxidation of alkenes in batch reactions by the addition of oxygen to a double bond. The novelty of these monoliths is their hierarchically porous nature, which gives a greater surface area for catalytic metal nanoparticles to occupy and ultimately allows for greater product conversion. This study aims to characterize the catalytic potential of these hierarchically porous catalysts in a down-flow, packed-bed reactor. Research has focused on the catalyst molybdenum oxide supported on silica (MoO3/SiO2), and its oxidation of cyclohexene to cyclohexene oxide, cyclohexanone, or 1,2-cyclohexanediol using excess oxygen. The reactor is designed so that temperature and flow rates of the cyclohexene and oxygen can be controlled. In the reaction, cyclohexene is pumped to the reactor, where it mixes with oxygen and vaporizes. This gas mixture flows over the catalyst bed, heterogeneous catalysis occurs, and the products are condensed and collected each hour for composition analysis using gas chromatography. Epoxides such as ethylene oxide are key reactants in polymer synthesis, and epoxides of other alkenes are synthetic intermediates for many organic compounds. If the hierarchically porous structure gives better product conversion than traditional monolith structure, epoxides can be synthesized more economically, making these catalysts very valuable.
John Lundeen, A&S - Chemistry  
Faculty Mentor: Elizabeth Papish, A&S - Chemistry

**Synthesis of Ruthenium-Based Anticancer Prodrugs**

The main problem with current cancer treatments is that they kill healthy cells along with cancerous cells. This causes a person undergoing chemotherapy to become extremely weak and susceptible to infection. We seek to create an anticancer therapy that is specific to cancer cells in order to reduce the damage done to normal cells during treatment. We have developed several ruthenium-based compounds that undergo ligand dissociation when exposed to light. Once this photodissociation occurs, the compounds have the potential for cytotoxicity. Furthermore, these ruthenium compounds dissociate more rapidly under acidic conditions than under basic conditions. Since cancer cells are known to be more acidic than healthy cells, we hypothesize that the cancer cells will selectively activate the drug and healthy cells will remain unharmed. Additionally, the light-sensitive nature of the compounds allows for further selectivity to be introduced.
Megan Lyons, A&S - Psychology  
Faculty Mentor: Beverly Thorn, A&S - Psychology

Predictors of Healthcare Utilization in Rural Patients with Chronic Pain  
Chronic pain affects millions of people each year with substantial inequalities in health care access and services for those in rural communities, with low-SES, and ethnic minorities. Although these disadvantaged individuals report poorer general health and higher prevalence of chronic pain, they encounter greater obstacles accessing health care services than urban populations. Given difficulties in access, we need a better understanding of why these people seek health care, so that targeted treatment can be offered. The data for the current study were collected as part of the Learning About My Pain (LAMP) trial, a ongoing randomized comparative effectiveness study of behavioral interventions (PCORI Contract 941, Thorn, PI). Medical records were analyzed from 124 patients over a one-year period prior to the trial. Potential predictors of number of clinic visits at a community health (low income) clinic were examined for patients with pain, including demographic (age, gender, race), economic/educational (annual household income, highest grade reached in school, reading level), pain (severity, interference, and disability), and psychosocial factors (depressive symptoms and pain catastrophizing). Stepwise regression analyses showed that depression remained a significant unique predictor of health care utilization after controlling for all other variables, $R^2 = .04$, $\beta = .21$, $F (1, 117) = 5.40$, $p < .05$. Treatments targeting both chronic pain and depression are thus warranted.
Emily Mace, A&S - Psychology  
Faculty Mentor: Fran Conners, A&S - Psychology  
Gayle Faught, A&S - Psychology  
Lani Shellhouse, A&S - Psychology

*Improving Auditory Skills In Children With Down Syndrome With Hearbuilder*

Children with Down syndrome (DS) struggle with auditory skills, which can impact their ability to follow oral directions. We are interested in the potential benefits of Hearbuilder software on the auditory skills of children ages 6-10 with DS. This pilot study aims to identify strengths and weaknesses of this software that might aid us in developing a larger, future research study. The software consists of 4 modules of which we are using 3: Following Directions, Auditory Memory, and Phonological Awareness. Within each module, there are several activities that address specific aspects of each skill; we are using 4 activities per module. In the pilot study, participants use the Hearbuilder software for 3-4 weeks for 10-15 minutes a day, 1 module per week. Throughout each trial, we view the participant's progress, and at the end of the trial we compare data between the different activities and modules. We also interview the children and their parents before and after each trial to get their opinions about the software. To date, 1 participant has completed the study. Participant BK made her best progress in the Following Directions module, completing up to level 3 in the Basic Directions activity. She struggled most in the Phonological Awareness module, specifically in the activities involving sequencing. Overall, our first participant had a positive experience using Hearbuilder, and we are excited to keep learning more about the software as we include more participants.
Kara MacIntyre MacIntyre, A&S - Biological Sciences
Whitney Beavers, A&S - Biological Sciences
Faculty Mentor: Laura Reed, A&S - Biological Sciences
Ruth Bishop, A&S - Biological Sciences

Determining the genetic basis of genotype-by-environment interactions of metabolic syndrome in Drosophila melanogaster

Metabolic syndrome (MetS) is a cluster of health factors such as obesity, hypertension, and high cholesterol that increase one’s risk of developing diseases such as type-2 diabetes. MetS is an epidemic in the Western world today. To investigate the genetic and environmental contributions to MetS, Drosophila melanogaster serves as a useful model organism due to its numerous metabolic pathways and disease-causing genes that are homologous to those in humans. The goal of this study was to identify genes that correlate with weight change on different diets in Drosophila melanogaster. In order to accomplish this, 650 inbred lines were raised on high-fat and low-fat diets, and then quantitative trait loci (QTL) were mapped for correlations between the genotype and a weight change in different environments (high-fat versus low-fat diets). Within these loci, candidate genes were identified. The mRNA of the flies was extracted and converted to cDNA, which will be used to perform quantitative real-time PCR (qrtPCR) in order to determine if the expression level of any of the genes correlates with weight changes in different environments. If a correlation is identified, further research can be conducted in order to understand the contributing factors to MetS, and also determine the possibility of creating personalized medicine or a diet plan for a person’s specific genotype.
Laura Mafla, A&S - Biological Sciences
Andrew Davis, A&S - Biological Sciences
Faculty Mentor: Laura Reed, A&S - Biological Sciences

Testing candidate genes thought to be associated with pupal weight in D. melanogaster
Weight gain is one of several phenotypes associated with metabolic syndrome in humans, and it can lead to comorbidities such as diabetes, hypertension, or dyslipidemia. Drosophila melanogaster share metabolic homologies with humans, thus the study of D. melanogaster produces useful data concerning changes in body composition caused by perturbations in diet. In this study, five candidate genes were selected from a quantitative trait locus (QTL) of genotype-by-diet interactions mapped to the 3rd chromosome. The genes were then selected based on logarithm of the odds (LOD) score, level of expression, and biological processes. Lines with mutations in these candidate genes introgressed into a w1118 reference background through a series of genetic crosses. Stress was then applied to both mutated and control flies in the form of a high fat diet, which can be analogized to the modern Western diet in humans, and the pupae were collected just before eclosing to analyze differences in weight. Future results of this study show promise in the field of personalized genetics to create diet plans based on an individual's genome.
**Mario Maggio**, Engineering - Aerospace Engineering and Mechanics
Faculty Mentor: Richard Branam, Engineering - Aerospace Engineering and Mechanics

*Optimizing Mass of a Rocket Engine*

My research has been advancing the state-of-the-art in rocket engines with the future goal of increasing the payload NASA is capable of putting on Mars. My efforts on the Dual Expander Aerospike Nozzle (DEAN) project with Dr. Branam have been centered on tying the geometry of the engine to the physics (power balance thermodynamics modeling) of the DEAN. The design system I created has the paramount goal of minimizing the mass of the rocket. The design system can consider a variety of geometry and material choices to account for different thrust, propellants, performance; specifically implementing properties of the different metals and ceramics. The design system is now producing results with lowest possible mass of each piece of the DEAN. My research provides guidance and direction for future research on the DEAN, paving the way for a new rocket engine and a manned mission to Mars.
**Justin Magrath**, Engineering - Chemical and Biological Engineering  
Faculty Mentor: Yonghyun Kim, Engineering - Chemical and Biological Engineering

*The Effects of Salinomycin on Glioblastoma Cancer Stem Cells*

Glioblastoma is a form of highly malignant brain cancer with a median survival rate of only 14.6 months and a two year survival rate of 30%. Studies have shown that many types of cancers including glioblastoma contain a subpopulation of cells known as cancer stem cells (CSCs) that have the unique ability to proliferate, differentiate, and generate tumors. These cells are important to recurrence and metastasis and have been found resistant to many drugs effective on normal cancer cells. One drug that has shown promising results in targeting CSCs of other cancer types is salinomycin. In this project, the ability of salinomycin to target glioblastoma CSCs was tested using U87 glioblastoma cells grown adherently (normal cancer cells) and in sphere culture (enriched for CSCs). It was found that salinomycin is in fact able to kill glioblastoma CSCs. This was confirmed using qPCR looking at the glioblastoma CSC marker SOX2. The mechanism of salinomycin's action on glioblastoma CSCs was then investigated. Flow cytometry with Annexin V showed an increase in the apoptotic population with increasing doses of salinomycin, indicating salinomycin causes cell death through apoptosis. The most recent experiments have used gene expression to determine the mechanism of salinomycin's action within the apoptotic pathway. Salinomycin upregulates CASP3 and CASP12 suggesting that it may act through the Ca2+ induced apoptotic pathway.
**Oral & Poster Presentation Abstracts**

**Brianna Malmborg**, HES - Health Science  
Faculty Mentor: Lori Turner, HES - Health Science

**Northstar EMS**  
Brianna Malmborg Human Environmental Sciences  
Faculty Mentor: Lori Turner  
Northstar EMS Northstar EMS is Tuscaloosa's primary EMS service. They provide both emergency and non-emergency transports in over 80 BLS and ALS ambulances. Working closely with hospitals and care facilities across the state, Northstar is dedicated to providing the highest quality of patient care. They offer basic life support (BLS), advanced life support (ALS), and critical care transportation (CCT) in their ambulances, as well as wheelchair vans for those who need them. Hundreds of employees work together to respond to thousands of calls each year whether there be rain, shine, or tornado. BLS trucks are in charge of non-emergency transports, which primarily consist of transports to and from dialysis, as well as transportation for those that require medical supervision or hospital discharges. While they are not normally the trucks to respond to emergency 911 calls, they are still able to provide emergency medical services if the need arises. These trucks are typically operated by two Basic or Advanced EMTs. ALS trucks are the ambulances seen racing to a scene with lights and sirens blaring. They tend to deal with emergency situations, where fast and firm decision making is key in providing the best care for the patient. Evaluation, treatment, and transport of the patient are the key aspects of this truck These trucks are operated by at least one medic (who rides in the back with the patient)
Erin Martin, Engineering - Mechanical Engineering  
Tobi Adedokun, Engineering - Chemical and Biological Engineering  
Faculty Mentor: Adam Hauser, A&S - Physics and Astronomy

**Impedance Analysis of Nanoparticle Metal-Oxide Systems**
Our objective is the creation of chemical detectors utilizing metal-oxide thin film membranes across interdigitated electrode device geometries, using state-of-the-art ultrasonic nanoparticle deposition. The resultant device will leverage our recent research on oxide nanoparticles showing them to be environmentally robust materials with both selectivity and high sensitivity to various chemicals. The nanoparticle element will be placed in a simple circuit that tests the impedance at any number of frequencies. The nature of metal-oxides leads to strong adsorption of chemicals, and that performance is enhanced in the proposed devices by optimization of the surface-to-volume ratio of the adsorbing material. A critical need for early and sensitive airborne chemical detection exists for both civilian and military applications. It is important to note that exposure to most of the chemicals discussed herein are not ones we can simply withstand: Even trace levels of these chemicals result in measurable, adverse health effects, with the most severe repercussions for our minor and pre-natal subpopulations. As such, the importance of early detection methods cannot be understated.
**Zavier Mason**, A&S - Biological Sciences  
Faculty Mentor: Laura Reed, A&S - Biological Sciences

*Effects of High Fat Diet on Glucose Concentration in Drosophila melanogaster*

Effects of High Fat Diet on Glucose Concentration in Drosophila melanogaster  
Zavier Mason  
Metabolic syndrome in humans can has been shown to lead to diabetes as well as associated health complications such as obesity and neuropathy. Insulin resistance is one of the various effects associated with diet and metabolic syndrome. Humans share many metabolic homologous with Drosophila melanogaster which in addition makes them useful as effective model organisms to study diet. Using Drosophila melanogaster in this study allows us to produce useful data involving changes in body composition. This study used genetically distinct lines of Drosophila and applied stress in the form of high fat diet. This high fat diet can be analogized to the modern Western Diet in humans. The larvae were assayed for their hemolymph glucose concentration and data from each genetic line was analyzed to search for the effect that genotype, diet, and genotype-by-diet interaction had on glucose concentration. Our results suggest that all three play a role in the concentration of glucose in Drosophila and a surprisingly strong genotype-by-diet effect on phenotype. This study has the capability to lead to a more personalized diet. With the ability to scan an individuals genome this study could help create a diet personalized to the individual depending on what diet would be most effective considering the metabolomics of the specific person.
Melissa Mathews, Engineering - Chemical and Biological Engineering
Faculty Mentor: Lin Li, Engineering - Metallurgical and Materials Engineering

Thickness Dependent Elastic Behavior of Bi2Te3 Two-dimensional Nanosheets

Two dimensional (2D) materials are a class of nanomaterials several atoms thick. They are exceptionally strong, lightweight and flexible. They exhibit outstanding thermal and electrical conductivities. Thickness dependent elastic behaviors of two-dimensional (2D) layered bismuth telluride (Bi2Te3) have been investigated by a finite element analysis (FEA) approach. An elastic transition in circular suspended Bi2Te3 2D nanosheets, subjected to a point force load at the circular nanosheet center, was identified to be isotropically from a linear to a non-linear deformation response. The elastic deformation transition is strongly dependent on the nanosheet's thickness and the prestress magnitude existing in the system. A non-linear shell model and linear shell model in the ABAQUS package, reveal these strong dependencies and help decouple the two primary behaviors exhibited by the nanosheet. This FEA model is complementary to AFM-based nano-indentations, which provide a validation to the acquisition of Young's moduli and also delineate the detailed strain/stress fields underneath the indenter induced in experiments. This model can also be applied to similar materials in order to compare and contrast different mechanical behaviors of 2D nanosheets.
Bobby McClure, A&S - Theatre and Dance  
Faculty Mentor: Sarah Barry, A&S - Theatre and Dance

Text-Based Movement Generation: How Structure Creates Freedom  
Bob McClure, Theatre and Dance Faculty Mentor: Sarah M. Barry, Theatre and Dance  
Text-Based Movement Generation: How structure creates freedom  
This project explores a process of creating dance inspired by written text. The primary method used for generating movement involved “writing” letters with the body through shape and space, as well as accounting for varying qualities in the movement related to the sound, image or context of the word from which the letters came. In addition to experimentation with movement creation, the researcher explored the use of live and recorded text and voice-based sound scores to accompany the dance. The process provided new methods for the researcher to employ, which altered and expanded his views of choreography. These methods provided a dependable choreographic structure through which endless results can be realized.
Jeremy McDoniell, A&S - Biological Sciences  
Faculty Mentor: Juan Lopez-Bautista, A&S - Biological Sciences  
Daryl Lam, A&S - Biological Sciences

The Chloroplast Genome of an Epiphytic Marine Green Alga
Chloroplasts are photosynthesizing centers and are found in plant cells. The chloroplasts have their own genome (DNA) that is vastly different from the nuclear genome. Chloroplast genomes are unique to individual plant species and provide a DNA “fingerprint” that can be used to identify a plant’s taxonomic position and evolutionary history. An unknown microscopic epiphytic (living on the surface of a photosynthetic organism) marine green alga was found in Antarctic waters growing on the surface of another green seaweed, Lambia antarctica. While studying the Lambia genome, I discovered a second chloroplast genome that belonged to the epiphytic species. I assembled, edited and annotated the 134,250 base pair long genome, which contained approximately 100 genes. Preliminary results suggest that the epiphyte genome is vastly different than the host. Furthermore, the epiphyte may in fact represent an undiscovered new microscopic species of green algae.
Hayley McGowan, HES - General Studies in HES
Faculty Mentor: Lori Turner, HES - Health Science

Patient Care Assistant
Hayley McGowan Faculty Mentor: Dr. Lori Turner, Health Science Department Patient Care Assistant I currently work at DCH Hospital in Tuscaloosa. One of the programs DCH should implement is for the nurses and PCA's to hand out pamphlets that tell the patients step by step what to do to recover and how to avoid ending up at the hospital again with the same illness. Although this method to avoid reoccurring illnesses doesn't have a specific name, it is a method that is a solution and easy guide for patients to follow. For example, I was helping a patient with diabetes that has a reoccurring past of coming into the hospital because his blood sugar would be significantly too low. The nurse could then sit down with the patient and walk him through each step and demonstrate with him the proper way to take his medicine and use his insulin. She then could allow him to ask any questions as well and ensure that his was fully educated on what was wrong with him, his medication, and the steps to follow to avoid this from happening again. A huge problem in our health field today is that there is a barrier between doctors and patients. This one on one time the patient has with the nurse is crucial for the patient to able to be completely informed of their health. These pamphlets are very ideal in the MICU and are the most beneficial way for the patients to be fully educated about their health. This method could change the patients' lives for the better, which is the whole goal of the health field.
Effects of Musical Accents, Rhythm, and Melody on Serial Recall of Monosyllabic Digits

Music therapists use songs as mnemonic devices to facilitate recall and language development in their clients. Silverman (2007) demonstrates that rhythm alone may facilitate better short-term serial recall than a song. This study was designed to replicate those results and investigate the effects of musical accents (brief bursts in intensity) on serial recall. Students (92) from a music appreciation course listened to four recordings in a counterbalanced order. Each recording consisted of nine monosyllabic digits paired to the following: rhythm only, rhythm with an accented sixth digit, rhythm and melody, or rhythm and melody with an accented sixth digit. After listening to a recording, students wrote down the digits heard in order. The rhythm only condition had significantly higher recall than all other conditions and significantly higher recall for the sixth digit, despite the lack of an accent. This confirms that rhythm facilitates better immediate recall than melody. Melody may overload working memory, especially for short sequences. The accent, lacking semantic context, may have distracted the listener or disrupted echoic memory. The use of accents in musical mnemonics is unsupported at this time; more research is needed to determine which aspects of musical mnemonics facilitate the best recall. Silverman, M.J. (2007). The effect of paired pitch, rhythm, and speech on working memory as measured by sequential digit recall. Journal of Music Therapy, 44, 415-427.
Sean Miller, A&S - Chemistry  
Faculty Mentor: David Dixon, A&S - Chemistry

**Reliable Predictions of the Bond Dissociation Energy of Mono-, Bi-, and Tri-alanine and Glycine Peptides and the Corresponding Amides**

The goal of the Human Proteome Project is to map the human proteome, all of the proteins in a cell. An important, cost effective, and reliable approach is to use mass spectrometry as it is a highly reproducible analytical technique. Currently, most such work is done in the positive ion mode. However, there is no additional cost to using the negative ion mode as only the voltages need to be changed and the negative ion mode provides complementary information. Much less is known about anion peptide chemistry in terms of the relevant thermochemistry, for example: acidities and bond energies, which are needed to understand fragmentation patterns. The bond dissociation energies of mono-, di-, and tri-alanine and glycine anions and the corresponding amide anions were calculated using the composite correlated molecular orbital theory method, G3MP2, to predict possible fragmentation pathways to improve the interpretation of collision induced dissociation mass spectrometry experiments. A broad range of conformations were sampled using density functional theory. The fragmentation products were determined by the stability of both the resulting anion and neutral products, and, in the case of dissociative electron detachment, by the energetics of two neutral products.
Genevieve Miller, A&S - Biological Sciences  
Faculty Mentor: Ryan Earley, A&S - Biological Sciences  
Kristy Marson, A&S - Biological Sciences  
Joe Styga, A&S - Biological Sciences

From water to land: jettisoning out of water in response to predator-associated cues in wild mangrove rivulus

Many species evade predators by using escape behaviors. Avoiding predation comes with costs, so prey species must be able to recognize varying threat levels so they can respond appropriately. Mangrove rivulus fish (Kryptolebias marmoratus) can emerse and locomote on land to find different environments. We hypothesized that: i) rivulus would emerse to avoid predation by mangrove water snakes (Nerodia clarkii compressicauda), ii) the geographical origin of the fish would influence its latency to emerse after being exposed to predator cues, and iii) predator-naïve lab fish would be more responsive to predator cues than predator-experienced wild fish. Fish from three Florida regions were collected and exposed to chemical cues from water snakes that had been fed rivulus or fasted. Behavior following cue presentation was compared across populations and regions to determine whether fish exposed to predator diet cues (snakes fed rivulus) would show a reduced latency to emerse after introduction of the cue than fish exposed to kairomones (fasted snakes) or control. A similar experiment was performed with lab-bred fish. Analyses indicate strong population-level differences in the tendency and latency to emerse and distance moved, along with moderate regional differences. Contrary to our prediction, we found little evidence that predator exposure regimes influenced emersion behavior. Future analyses will examine the difference in response between lab and field animals.
Dietary Impacts on Triglyceride Levels in Drosophila melanogaster

Triglyceride levels are a telling indicator of human susceptibility to Metabolic Syndrome (MetS)—a collection of risk factors that can lead to adverse health conditions such as cardiovascular disease and type-2 diabetes. The common fruit fly, Drosophila melanogaster, has many genetic and metabolic homologies with humans, which positions it as a model organism to investigate MetS. We measured triglyceride levels in 202 genetically distinct lines fed both normal and high-fat diets. The triglyceride levels indicate a significant genetic, environmental, and genotype-by-diet interaction. These results suggest that by avoiding a high-fat western diet, we can lower our risk of obesity, type-2 diabetes, and other symptoms of MetS, but some individuals with particular genotypes will benefit more from a change in diet than others.
**Brianna Milner**, A&S - Theatre and Dance  
Faculty Mentor: Sarah Barry, A&S - Theatre and Dance

*Delta S*  
The Edinburgh Festival Fringe located in Edinburgh, Scotland is the largest arts festival in the world. I am one of a small group of dance majors invited to choreograph for this festival. My choreography, titled "Delta S", is an embodied exploration of the thermodynamic principle of entropy. From a molecular level to social constructs, nature's tendency toward disorder overrides our basic desire for systematic structure. The constant pressure to collapse into chaos is combated by our will to rise. Succumbing to gravity and the momentum of one another, my dancers and I investigate the curious nature of entropy and its necessity as we seek equilibrium within the deterioration that surrounds us. My performers navigate a turbulent landscape of space and time, working together to find stability in an otherwise unpredictable world. As a double-major, I am excited to use what I've learned as an engineer and as an artist to share choreographic research with an international audience. During our eleven-day stay at the festival in August 2016, our group will present at the International Collegiate Theatre Festival. We will also have the opportunity to network with performance professionals and to attend professional and educational workshops as we market the concert and build audience interest internationally.
Allison Mollenkamp, A&S - English
Faculty Mentor: Amber Buck, A&S - English

Bridging Personal and Professional Identities Online Through Social Media

As personal and scholarship spheres move more and more into a digital age, there are many questions as to the quality of personas created online. This is particularly important for undergraduate and graduate students moving into the job market for the first time. While there has been extensive research into the role of social media in personal contexts, little has been done to explore the professional role these sites can play. This grounded theory study looked into this role through interviews with 5 undergraduate students and through screen captures of their selected social media profiles. These included a diverse array of sites, but the interview questions focused specifically on LinkedIn and Twitter. This presentation looks both at the coding process used to analyse the interviews and screen captures and at the conclusions that can be drawn from them. The coding process covered the varied roles of different social media sites, digital literacy sponsorship, and professional and personal identity online. The conclusions include the increased professionalism in use of Twitter, the pitfalls of LinkedIn as seen by college students, and the perception of a sort of safe space within Facebook.
**Madison Montanari**, Nursing - Capstone College of Nursing  
Faculty Mentor: Sara Kaylor, Nursing - Capstone College of Nursing

*The Effects of Undergraduate Research on Nursing Student Leadership*

Registered nurses in the current job market are expected to have adequate development of leadership skills. New graduate baccalaureate nurses are expected to have these skills developed before entering the work force. Baccalaureate nursing institutions are charged to provide resources and opportunities to develop and nurture leadership qualities in their students prior to graduation. The purpose of this study is to explore the effects of undergraduate research conference participation experiences on baccalaureate students' leadership development. Pre-test/post-test surveys will be sent to nursing students currently in their third semester of the Capstone College of Nursing at the University of Alabama. Clinical groups in this semester each have to develop an abstract and submit to clinical faculty for judging. Eight submissions are chosen for participation in the UA Undergraduate Research and Creative Activity Conference. With each survey, students will rate on a one to five scale their leadership abilities pre and post undergraduate research conference participation. Students not chosen to participate in the conference are the control and students chosen to participate are the experimental group. Preliminary findings indicate research experiences do improve leadership abilities in baccalaureate nursing students. Future research can look at more specific outcomes as a result of baccalaureate nursing students participating in undergraduate research.
Michael Moore, A&S - Biological Sciences  
Jaron Nix, Engineering - Chemical and Biological Engineering  
Faculty Mentor: Laura Reed, A&S - Biological Sciences

The FlyBrator: A Novel Approach to Inducing Sleep Deprivation and Metabolic Syndrome in Drosophila melanogaster

The primary goal of this study is to investigate linkages between the coincident epidemics of metabolic syndrome (MetS) and poor quality of sleep in the western world. Drosophila melanogaster has established itself as a reliable model organism for studying the genetic basis of MetS and sleep disorders. This study seeks to quantify the metabolic response as well as the genotype-by-environment interactions involved in the perturbation of circadian rhythms by means of sleep deprivation. A sleep-deprived state was induced by the FlyBrator, through a series of vibrations and exposure to blue and white light, all of varying patterns, durations, and frequencies. To perform this study, three genetically distinct lines (W1118, OregonR, CantonSB) of 15 male and 15 female D. melanogaster adults were deprived for combinations of 0, 2, 4, and 6 hours per night for 1-5 days, rendering 120 distinct combinations of potential responses. Fluorometric assays quantified the glucose, triglyceride, and protein concentrations to determine any variation in metabolic response to the different treatments. Preliminary data produced by the study supports the hypothesis that sleep deprivation does increase stored triglycerides relative to the control group. This project shows promise for producing foundational data that can benefit future experiments that will help better our understanding of the mechanisms linking sleep deprivation and Metabolic Syndrome.
Oral & Poster Presentation Abstracts

Linnea Moran, A&S - Biological Sciences
Jackie Guezille, A&S - Biological Sciences
Amanda Topolski, A&S - Biological Sciences

Faculty Mentor: Stephen Secor, A&S - Biological Sciences

Can circadian rhythm of metabolism be altered by temperature and light:dark cycles?
Animals, including humans, experience daily patterns of activity, rest, metabolism, and hormonal cycling that is driven by daily light and dark cycles. Daily circadian rhythms of metabolic rate therefore coincide with daily patterns of activity; metabolic rates are higher during the normal active period of the day and depressed during the inactive period. For many nocturnally active animals such as tree frogs, basal rates of metabolism are inherently higher after sunset when frogs are active than during the day. Given that metabolic rates are temperature dependent for tree frogs and circadian rhythms are driven by light and dark cycles, we asked whether the natural circadian rhythm of the grey tree frog (Hyla chrycocelis) would be suppressed at lower temperatures and altered by a change in light:dark cycles. At 25°C, frogs exhibited a distinct circadian rhythm of metabolic rate that was significantly depressed at 20°C, and eliminated at 15°C. For frogs that had been maintained in the dark at 10°C for two months to mimic subterranean hibernation, individuals likewise did not exhibit any rhythm of metabolic rate at 15°C. However, they experienced a reestablishment of rhythm at 20°C.
Kristen Morris, A&S - Psychology
Faculty Mentor: Jennifer Cox, A&S - Psychology

The Effect of Victim Gender and Criminal History on Sentencing
Inspired by the TV series, Dexter, this study aimed to understand the effects of victim characteristics, specifically gender and criminal history, on a defendant's sentence in a second-degree murder case. One hundred and seventy undergraduate participants were randomly assigned to one of four conditions in which victim gender (male vs. female) and criminal history (present vs. absent) were manipulated. After reading the vignette, the participants were asked to sentence the defendant and answer eight questions about their feelings regarding the victim, defendant, and general perceptions of the case. Results suggest victim gender and victim criminal history did not impact sentencing decisions. However, female victims with no criminal history were perceived as less culpable than female victims with criminal history. Further, male victims were perceived as more culpable if they had no criminal history than if they had criminal history. The participants also perceived the male victim as playing a larger role in the altercation than female victims. Results suggest a victim's criminal history and gender may play a role in juror perceptions of the case.
Julia Murphy, A&S - Chemistry
Faculty Mentor: David Dixon, A&S - Chemistry

The Reactions of CO2 with Metal Oxide Nanoclusters to Form Metal Carbonates
The management of Lewis acid gases, such as CO2, NOx, and SOx, is a major environmental issue. These gases are produced by combustion and industrial processes and their release into the environment can lead to smog, global warming, and acid rain. Conversion of these acidic gases into less harmful products can be achieved by using metal-based catalysts, but these materials are still susceptible to degradation and corrosion from the very gases they are designed to eliminate. A greater understanding of the chemistry behind the corrosion of metal oxide catalysts by Lewis acidic gases is needed to improve their design. Computational chemistry electronic structure calculations are being used to investigate the chemical changes that metal oxide nanoclusters undergo when exposed to CO2. We are modeling MO2- and MO3-based nanoclusters with the M in the +IV and +VI oxidation states. The goal is to understand the energetics controlling physisorption, dative bonding of CO2 to the oxide cluster and chemisorption, conversion of the CO2 to carbonate. We are correlating the two processes with the Lewis acidity of the metal in the cluster, the M=O bind dissociation energies, and the reducibility of the metal in the cluster. The calculations are done with density functional theory and are being benchmarked by correlated molecular orbital theory at the coupled cluster level.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Synthesis of a Five Carbon Aldol using the Enzyme Hpal

The DRE-TIM Metallolyase superfamily is notable for the building or breaking of carbon-carbon bonds using a diverse amount of reaction types, all employing an enolate-anion intermediate. Previously, a semi-conserved residue in the superfamily DRE-TIM Metallolyase was identified to potentially affect reaction specificity across the superfamily. Mycobacterium tuberculosis α-isopropylmalate synthase (MtIPMS), a member of this superfamily, performs a Claisen condensation-like reaction. By site-directed mutagenesis, it is believed possible for MtIPMS to perform an aldolase reaction with simple aldols that are substrates for a homolog of MtIPMS. In order to test this hypothesis, the five carbon aldol 4-hydroxy-2-oxo-pentanoate (HOPA) must be synthesized, to be later used in assays to determine MtIPMS aldolase activity. The enzyme Hpal has been shown to synthesize HOPA from pyruvate and acetaldehyde, so Hpal was overexpressed and purified. Coupled end-point assays were performed to measure the decrease in pyruvate over time, to determine whether or not Hpal was active using these procedures.
Secular belongingness in religious congregation leads to lower stress

Evolutionary signaling theory suggests that humans communicate the quality of their intentions through displays of commitment and gain benefits of well-being and social integration or “belongingness”. Belongingness has been associated with the construct of “spirituality” in humans, applicable to religious and secular groups. We use these cognitive science and behavioral models to examine the influences of signaling, social integration, proclivity, and perceived stress in a religious community. We hypothesize religious groups which embrace diversity and appeal to belongingness in secular and religious ways are more successful and social integration in the church should correlate positively with integration outside the church and negatively with perceived stress. For the past two years, we have collected data from congregants at a Wesleyan church in the U.S. Southeast using observational and survey methods. The church expressly states that different churches are needed to appeal to different people and provides diversity within its congregation. It has over 10 secular interest groups within the church to attract people of different socioeconomic backgrounds. Preliminary data collected from 18 church members suggests commitment is signaled via interest group membership, and the church requires training of members to facilitate this integration. High degree centrality through membership in multiple church groups appears to correlate with increased status outside the church.
Leah Nicoll, A&S - Theatre and Dance  
Faculty Mentor: Stacy Alley, A&S - Theatre and Dance

Success in "The Digital Age" of Musical Theatre  
Our society is pushing the limits and expectations of technology in all fields, and the Performing Arts are no exception. Actors are now held to very different standards in order to obtain success in "Show Business." There was once a time when actors only needed audition skills to obtain success, but the "Digital Age" has increased expectations. With hopes to find new strategies for today's aspiring theatre devotees, I requested support from the Undergraduate Creativity and Research Academy (UCRA) to attend the three-day Musical Theatre Educators Alliance (MTEA) conference in January 2016. During this conference, I gained great insight into the evolution of the pathways to successful performance careers. Since so many approaches to theatre involvement have changed over the past few decades, this conference stood to enlighten and educate me about new, more effective methods of approaching my career as an aspiring actor, singer, dancer, choreographer, and director in the Digital Age. In my poster presentation for the UCRA convention this spring, I intend to compare and contrast today's new methods of auditioning, educating, and producing theatre with the procedures of yesterday's experts by using further knowledge of new standards according to the findings of my research at MTEA. In addition, this presentation will show the pros and cons of these advancements, both of which affects an actor's strategy for a successful performance career in an ever-advancing art form.
Rachael Nowack, A&S - Political Science
Faculty Mentor: Nichole Bauer, A&S - Political Science

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
**Optimizing Synthesis of Magnetic Nanoparticles for Use in Magnetically Triggered Drug Delivery System**

Cancer is one of the leading causes of death worldwide, accounting for nearly one in four deaths in the United States. One of the most common treatments of cancer is chemotherapy, which involves infusing toxic drugs into the body killing both healthy somatic and cancerous cells. The goal of this project is to develop a targeted, magnetically triggered drug delivery system to release drugs at specifically targeted cancerous cells in order to minimize the harmful side effects associated with traditional chemotherapy. The method is to synthesize magnetic nanoparticles and modify the surface chemistry of these particles. As the core of the drug delivery system, it is essential that the magnetite nanoparticles have a small size distribution and are of optimal size. A small size distribution ensures similar properties throughout the system, and the proper radius allows for high standard absorption ratios and efficient magnetic induction heating. Single crystal magnetite nanoparticles of varying sizes were synthesized by the thermal decomposition of iron oleate in high boiling organic solvents (benzyl ether or 1-octadecene). X-ray diffraction and high-resolution X-ray photoelectron spectra were used to characterize the particles by diameter and size distribution. The effects of varying reaction time and temperature on the properties of the nanoparticles were studied in order to determine the optimal synthesis procedure.
Katherine O’Connor, C&BA - Economics, Finance and Legal Studies
Faculty Mentor: Paan Jindapon, C&BA - Economics, Finance and Legal Studies

A Sequential Rent-Seeking Experiment
The purpose of this project was to create two economic games in z-Tree to collect and analyze data on rent-seeking behavior. A one-player game against the computer is used as a control to observe differences between the two different games. The player vs. player game sets two participants against each other, fostering a competitive environment where they compete to win each round of the game and maximize their profits. With the data, we will observe each player’s strategy in the games as well as the role of the participants’ risk attitudes in their decision-making. The results for this research could be applied to things such as fundraising lotteries to determine the best price and quantity of tickets.
Electability of LGBTQ Political Candidates

Public acceptance of same sex marriage has grown more rapidly than any other social issue in the past two decades, culminating with the 2015 legalization of same sex marriage by the Supreme Court. Despite growing public support of same sex marriage, the LGBTQ community remains under represented in the legislature, with only 7 members of Congress being openly gay. This under representation can lead to increased bias and prejudice towards LGBTQ individuals. The research has failed to explain why this under representation exists, and fails to consider all relevant factors, such as gender perception and stereotypic qualities. This project will aim to determine if the sexual orientation of a candidate affects his or her electability, and whether the gender of the candidate has any impact on voter perception. To test this hypothesis, I will design and conduct an original survey experiment. This study will examine a unique dynamic between sexual orientation and gender, to determine if these characteristics work together in a subject's evaluation of the candidate. I will also look at how different demographics perceive candidates, particularly whether subject evaluation of candidates differs based on gender and political party. Overall, I expect that subjects evaluating gay or lesbian candidates will rate these candidates more poorly than subjects evaluating heterosexual candidates, of either gender.
Species abundance and composition in a biological reserve with active ecotourism on the Osa Peninsula of Costa Rica

Located in the southwest corner of Costa Rica, the Osa Peninsula is a remote and undeveloped region consisting of lowland tropical rainforests and aquatic systems. This balance of diverse habitats is one of the Osa Peninsula's most important features and supports its high levels of biodiversity. Unfortunately the Osa has been unable to escape the human threats posed to other areas throughout Central America. Deforestation and illegal mining threaten to fragment the habitats of a variety of species, many of which also face poaching and the resultant reduction of prey and food sources. Understanding species abundance and composition in the Osa is key to monitoring the health of the region's wildlife. This project seeks to determine the abundance and composition of the animal species present in the Lapa Rios biological reserve through the use of motion-triggered, high-resolution camera traps. Collection and analysis of the images provided by these camera traps reveals abundance and composition patterns of species in the region. Deviations from these patterns are often indications that adjustments need to be made in the methods of managing the species. This minimally invasive monitoring is of increased importance in ecosystems with large amounts of human interaction, such as the Lapa Rios, and allows us to protect the sustainability of the ecosystem and ensure that it is being preserved.
**Oral & Poster Presentation Abstracts**

**Samuel Ostrow, A&S - Political Science**
Faculty Mentor: Stephen Borrelli, A&S - Political Science

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*

_The Relative Impact of Party, Money, and Experience in Open Seats_

Although congressional elections have been studied extensively over the past fifty years, very few studies have focused on Open Seats. An open seat is an election without an incumbent, and studying these races in particular allows us to focus on other variables outside of the very well documented incumbency advantage. This study uses quantitative multivariate regression analysis on Open Seat House of Representative elections from 1996-2014, a total of 420 elections. The key variables which we quantified were experience difference between the two candidates, a district partisanship measure, and a quantitative hard money measurement for expenditure difference. The first key variable, experience difference, was measured on a sliding scale from 0-4 based on holding prior offices, or prior campaign experience for high profile offices. The second key variable, district partisanship, was measured by an aggregate of how each individual congressional district voted in the past three presidential elections, yielding a single measure. But perhaps most impressive, was the third key variable: expenditures difference. The third variable was measured as a difference in total expenditures reported by the Federal Elections Commission between the two candidates. This study was able to have full FEC data for all candidates for all 420 races. Upon doing regression analysis, all three key variables were found to be statistically significant with strong correlations.
Michael Outlaw, Engineering - Electrical and Computer Engineering
Faculty Mentor: David Dixon, Engineering - Chemical and Biological Engineering

**Computational Studies of the Hydrolysis of (RuO2) n ( n= 1 - 3) Nanoclusters**

Bulk RuO2 is an effective photocatalyst for solar energy capture. The goal of this research is to study water splitting using small RuO2 clusters to form oxygen and hydrogen for use as an emissions-free fuel. The singlet-triplet gaps for RuO2 nanoclusters are smaller than the group IV metal oxide clusters which include TiO2, a widely used photocatalyst for water splitting. Electronic structure theory has been used to study the hydrolysis of the ground state and the excited state of (RuO2) n ( n= 1 - 3) nanoclusters. The potential energy surfaces have been studied with the density functional theory with the B3LYP functional and ab initio CCSD(T) method. The reactions of H2O with the metal site having a Ru=O bond and/or Ru−O bonds as well as H transfer to both terminal =O atoms and bridge -O atoms have been studied. The hydrolysis reactions of studied nanoclusters with water are exothermic with low reaction barriers. The physisorption energies for the first addition of H2O to the clusters are predicted to be -10 to -20 kcal/mol and the physisorption energies on the singlet clusters are more exothermic than on the triplet. The reaction barriers for the proton transfer are predicted to be 10 to 20 kcal/mol depending on the cluster. In comparison to the reactions of the corresponding Group IV ZrO2 clusters, the physisorption energies are less exothermic and the barriers are larger for the hydrolysis reactions of RuO2 clusters.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
**Medication Administration via Enteral Tube Feeding**

Guidelines are in place for enteral tube medication administration, but often these guidelines are not known or followed by registered nurses (RNs). This topic needs further investigation, as improper techniques for administration can cause infection, enteral tube obstruction, dangerous medication interactions, and alter therapeutic drug responses. Our study aims to compare evidence based practice and hospital policy with floor RN techniques. The study was conducted by observing and interviewing six RNs over a five-week period. After observing and interviewing the selected RNs, various practices were noted. All six of the RNs were either observed mixing or said they would mix medications given through an enteral tube. Other noted practices included but were not limited to crushing enteric coated and sustained release tablets, using tap water to dilute medications, and using Coke/Sprite to unclog blocked tubing. Evidence based practice coincided with hospital policy with the exclusion of one study that found cola to have no deteriorating effect on enteral tubes, a practice that RNs claimed to use when unclogging the enteral tubes. Our study found that evidence based practice guidelines and hospital policy regarding enteral tube feeding are not followed by RNs. Additional research should be aimed at RN education on correct policy and procedure and best practice.
Catherine Owens, A&S - Chemistry  
Faculty Mentor: Silas Blackstock, A&S - Chemistry  
Ariel Kelley, A&S - Chemistry

Magnetic Anisotropy of C-nitroso Compounds  
The unique magnetic properties of the nitroso group (\(\cdot\text{N}=\text{O}\)) are investigated through the synthesis and NMR spectroscopic observation of two ortho-substituted nitrosobenzene compounds, 1-isopropyl-2-nitrosobenzene and 2-nitrosobenzonitrile. The first model substrate, 1-isopropyl-2-nitrosobenzene, contains an isopropyl group ortho to the nitroso group, while the second nitrosobenzene, 2-nitrosobenzonitrile, has a cyano group ortho to the nitroso group. These ortho substituents on the nitrosobenzene ring force the N=O group to adopt a single conformation (orientation) and will orient the induced magnetic field at the N=O group so that it can be observed by nuclear magnetic resonance (NMR) spectroscopy. 1H NMR analysis shows the hydrogen syn to the nitroso oxygen to be very shielded, while the other aryl H's on the ring are deshielded as expected for an electron poor benzene structure. 2D NMR techniques such as COSY, HSQC, and NOE are employed to accurately assign the H's of 1-isopropyl-2-nitrosobenzene and 2-nitrosobenzonitrile to their NMR signals.
Rachel Paikoff, HES - Health Science  
Faculty Mentor: Lori Turner, HES - Health Science

Get Tested Initiative
Get tested initiative is a research based health education program through The University of Alabama Student Health Center & Pharmacy and the Office of Health Promotion and Wellness. The Centers for Diseases Control and Prevention estimates that 20 million sexually transmitted infections occur each year, and that there are 110 total infections, which cost a total of 16 billion in medical costs. Two-thirds of STIs occur in Americans under the age of 25. Young people ages 15-24 have five times the reported rate of chlamydia of the total population, four times the rate of gonorrhea and three times the rate of syphilis. If you decide to have sex, you and your partner should get tested beforehand and make sure that you and your partner use a condom every time. The Get Tested initiative organizes and implements a once every semester day of free STD/STI testing on campus. This will in turn, send the message to teach students and faculty and also provide students with the educational resources and support needed in tackling this issue. The implementation of an STD/STI free testing day will show the importance of sexual health education and safe sex practices, while creating a positive environment for the Student Health Center, campus and other health buildings where resources of sex education are available to the public.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.
Blake Parker, A&S - Biological Sciences  
Brian Smithers, A&S - Biological Sciences  
Faculty Mentor: Kim Caldwell, A&S - Biological Sciences

Development of Genetic Epilepsy-like Convulsion Model in C. elegans

Epilepsy is characterized by erratic and uncontrollable neuronal impulses that lead to seizures. Whereas some forms of epilepsy have a clearly defined genetic origin, such as Miller-Dieker lissencephaly, other forms are not associated with causative genes. Furthermore, some people carry a mutant gene yet do not manifest seizures. For both of these reasons, having a model in which to analyze genetic contributors to epilepsy would further the understanding and subsequent treatment of this disorder. We have developed a model for neuronal convulsions and excitability using the roundworm Caenorhabditis elegans. Exposure of normal, wild-type, C. elegans to aldicarb (a excitatory neurotransmitter-impacting drug) has no effect. However, animals with mutations for known epilepsy genes, such as lis-1 (the cause of lissencephaly), exposed to aldicarb result in a seizure-like contraction and eventually paralyze. Alternative to genetic mutations, we can reduce the level of nervous system genes via a technique called RNA interference. This enables the testing of a broader range of candidates. We are currently investigating genes associated with glycine encephalopathy, an inherited neonatal epileptic disorder. Both the age of onset as well as the severity of symptoms varies, so we would be interested in identifying genetic modifiers that alter these features.
James Parkes, A&S - Physics and Astronomy
Faculty Mentor: Dawn Williams, A&S - Physics and Astronomy

Double Pulse Plus: An Extended Search for Tau Neutrino Double Pulse Events
The IceCube Neutrino Observatory, located at the geographic south pole, is designed to search for high energy subatomic particles from space. While it can search for several types of particles, IceCube's primary objective is to detect a type of subatomic particle called the neutrino. These particles are created by violent extraterrestrial events such as Gamma Ray Bursts and supernovae explosions. IceCube utilizes the ideal conditions of Antarctica's ice to transform over a cubic kilometer of ice into the world's largest neutrino detector. It does this by detecting the energy released by neutrino interactions within the ice. The goal of this project is to develop a method to help differentiate between the various types of astrophysical neutrinos: electron, muon, and tau. The primary objective is to locate events where high energy tau neutrinos undergo what is known as a tau double pulse interaction. By analyzing the charge distribution measured by the detector in simulated data, the goal is to develop a method which will expand the detection efficiency of double pulse events. While high energy astrophysical neutrinos have been detected in the past few years, no tau astrophysical neutrinos have been directly identified. Thus, this method has the potential to identify high energy astrophysical tau neutrinos for the first time. This in turn would generate a better understanding of the physics of high energy neutrinos.
Oral & Poster Presentation Abstracts

Morgan Parson, Nursing - Capstone College of Nursing  
Kelly Conner, Nursing - Capstone College of Nursing  
Melia Cotter, Nursing - Capstone College of Nursing  
Caitlyn Cotter, Nursing - Capstone College of Nursing  
Jaylaan Parker, Nursing - Capstone College of Nursing  
Baleigh Swaney, Nursing - Capstone College of Nursing  
Jess Wilson, Nursing - Capstone College of Nursing  
Massage, Nursing - Capstone College of Nursing  
Faculty Mentor: Leslie Cole, Nursing - Capstone College of Nursing

Appropriate Management of Unused Medications
Prevention of causing unnecessary patient charges from improper medication management (as stated by the Joint Commission standards) is vital for health care efficacy. This project identifies shortcomings in hospital policy relating to medication management and provides possible interventions. Protocol properly utilized by staff regarding returning discontinued and unused medications can result in fewer instances of overcharging patients for medication not received and can lower the risk of medication abuse by employees. Interview responses from various registered nurses on the unit presented a lack of education concerning hospital policy, a buildup of medications due to an insufficient scheduled cleanup time, an apathetic attitude towards improving the policy, and an absence of repercussions for staff not following protocol. Interventions to remedy this problem include an alert system that notifies the medication distribution system when a medication has been pulled but charted as ‘not given’ or ‘discontinued,’ pharmacists increasing rounds from once a day to every eight hours, and consulting with the nurse manager regarding protocol education and establishing repercussions for not returning medications properly. Effective implementation of the interventions by nursing and pharmacy staff would result in medications being appropriately returned by the end of each shift, medications being less accessible by staff, and a decrease in unnecessary patient charges.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Abigail Paulson, Engineering - Chemical and Biological Engineering  
Faculty Mentor: Dave Nikles, A&S - Chemistry  

Synthesis and optimization of single crystal iron oxide nanoparticles  
Single crystal magnetite nanoparticles were prepared by the thermal decomposition of iron (III) oleate in high boiling solvents in the presence of oleic acid capping ligands. The average particle diameter and particle size distribution were varied by changing the reaction variables of reflux time, reaction temperature, and reaction solvent. X-ray diffraction and high resolution X-ray photoelectron spectra confirmed the particles were magnetite. TEM imaging was used to determine particle diameter and size distribution. A systematic study of the effect of particle size and particle size distribution on the efficiency of magnetic induction heating has been initiated. These magnetic particles are developed for experimental use in a nanoscale, magnetically triggered drug delivery system for cancer chemotherapy.
Emily Pearlstein, A&S - Biological Sciences  
Tori Fields, A&S - Biological Sciences  
Kellen Cowen, A&S - Biological Sciences  
Cowen,  
Faculty Mentor: Stephen Secor, A&S - Biological Sciences

Effect of Age and Body Size on Digestive Efficiencies of Hyla cinerea (Green Tree Frog)
Throughout the aging process, animals vary in their rates of growth. Growth rates are highest prior to maturity and then taper off following adulthood. Hypothetically more rapid growth would be supported by more efficient means of energy assimilation. Predictably, digestive efficiencies would therefore be greater during early growth compared to adulthood. To test this prediction, we quantified and compared the digestive efficiencies of juvenile (mean mass = 3.87 g) and adult (mean mass = 9.39 g) green tree frogs (Hyla cinerea). Frogs were fed weekly a cricket of known mass equivalent to approximately 6% of their respective body masses. Each day feces were recorded, removed and dried. For each frog we combined and weighed the dried feces and determined the energy content of cricket meals and feces using bomb calorimetry. We calculated apparent digestive efficiency (ADE) as meal energy minus feces energy divided by meal energy. For all frogs ADE varied between 81.6% and 93.0%, averaging 88.7%. Calculated ADE of juvenile frogs (87.4 +/- 1.7%) averaged less than that of adult frogs (90.3% ± 0.8%), however the differences were not significant. Based on the results of our experiment, green tree frogs experience no reduction in digestive efficiency with age, maintaining optimal capacity for digestive performance throughout adulthood.
Rylee Perentis, A&S - Biological Sciences  
Faculty Mentor: Kim Caldwell, A&S - Biological Sciences  
Hanna Kim, A&S - Biological Sciences

Bacterial secondary metabolite alters behavior in an animal model

A hallmark of Parkinson's disease (PD) is the progressive loss of dopamine neurons in an age-related manner. Given the predominance of sporadic PD among patient populations, environmental toxins may induce the disease, although their nature is largely unknown. An unmet challenge surrounds discovering contributory factors that could account for the prevalence of sporadic PD. We have identified that a metabolite produced by Streptomyces venezuelae causes age- and dose-dependent dopamine neuron degeneration in C. elegans. This model organism is often used to study PD because of its transparent anatomy and short generation time. Here, we determine, using behavioral assays, that chemosensory detection of this metabolite promotes avoidance behavior in C. elegans. By examining the GFP expression patterns in neurons, we were able to determine that the metabolite activates a G-protein-signaling pathway in the ASJ chemosensory neuron pair that induces expression of the neuromodulator DAF-7/TGF-β. Our data point toward how metabolite exposure alters behavior through chemical, genetic, and neuronal means in this simple animal host.
Danielle Peters, C&IS - Advertising and Public Relations  
Faculty Mentor: Caryl Cooper, C&IS - Advertising and Public Relations

Women in Politics and the Media in the 19th Century
The purpose of this research is to identify whether or not Godey's Lady's Book, a magazine published throughout the Civil War, had a hidden political agenda targeted at women. This study was conducted using the historiographical method using articles, pictures, stories, and poems found in a collection of Godey's from the 1860s. Upon examination, it is clear that allusions to the war point toward a nationalist agenda. This research adds to the growing body of knowledge about intersection of women in politics and the media in the 19th century.
Taylor Petersen, A&S - Biological Sciences
Faculty Mentor: David Nikles, A&S - Chemistry

The Synthesis of Gold Nanoparticles for Laser Triggered Chemotherapeutic Drug Release

Current methods of treating malignant melanoma often cause many dangerous side effects due to the inability to deliver aggressive drugs directly to cancer cells. Instead the drugs travel to other regions of the body, attacking healthy cells and causing severe side effects. The goal of this project is to build a nanoscale drug delivery system consisting of gold nanoparticles and a chemotherapeutic drug trapped in the semi-crystalline core of polymer micelles. Conjugated to the periphery of the micelle are RGD peptides that will bind to receptor sites expressed on the surface of carcinoma. The nanoscale micelles will travel through the bloodstream until they encounter the cancer cells and then bind to the cells through the RGD peptides. Application of a near infrared laser will heat the gold particles, melting the core of the micelle and releasing the drugs, thereby creating a targeted drug delivery system. Chemical reduction of Au(III) by sodium triethylborohydride and the addition of 11-mercaptoundecanol gives purple colored gold particles with thiol groups bound to the gold surface and many primary alcohol groups extending out from the particles. Caprolactone was polymerized from the alcohol groups to give gold particles with polycaprolactone brushes projecting from the gold surface. The polycaprolactone coated particles are then compatible with the polycaprolactone core of the polymer micelles.
TB on the Hill: Tuberculosis Testing and the Legacy of Tuskegee in Perry County, Alabama

Background: In 2015, a serious outbreak of Tuberculosis (TB) occurred in Perry County, AL. Health officials sought to contain it through testing and contact tracing, but residents refused to cooperate and some people even threw beer bottles at health workers who visited a hard-hit neighborhood called "The Hill." Health officials were mystified about the basis for this hostility. Aim/Goal: To identify residents' reasons for avoiding TB screening in Perry County and to make socio-culturally informed recommendations for improved testing uptake. Methods: I conducted a telephone interview with Albert White MD, an infectious diseases specialist. I also conducted on-site, ethnographic research with 25 African-American residents of Perry County. These data were entered into Excel for data management and analyzed in conjunction with epidemiologic statistics. Results: The residents cited barriers to TB testing such as mistrust in health officials, fear of being reported to law enforcement, and misconceptions about outsiders being the source of TB transmission. Implications: Beliefs such as "Blacks are guinea pigs for medical research" are a legacy of the Tuskegee Syphilis Study, and high levels of stigma and gossip are a barrier to testing because of the lack of confidentiality in rural communities. Recommendations: The lessons of the Tuskegee Syphilis Study should be learned for improved outreach to local communities.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.
Emily Pickle, A&S - Psychology
Faculty Mentor: Ansley Gilpin, A&S - Psychology

The Improvement of Inhibitory Control and Peer Interactions of Preschool-Aged Children
The current research establishes clear associations between executive function and negative behavior. Low inhibitory control, as an executive function, is associated with high levels of negative behavior. However, previous studies have not examined whether improved inhibitory control is associated with improved peer interactions. The present study examined whether the improvement of inhibitory control is associated with improved peer interactions by using the data from the longitudinal study of the Power PATH Dual Generation Intervention. Standardized cognitive assessments were used to assess inhibitory control and parent and teacher reports were used to assess positive peer interactions. The hypothesis that the change in inhibitory control would be directly correlated with the change in peer interactions over time was partially supported. Due to the correlational nature of this study, these findings indicate the need for future studies to determine if improving inhibitory control causes an improvement in peer interactions.
Emily Pickle, A&S - Psychology
Faculty Mentor: Elizabeth Wilson, Education - Curriculum and Instruction
        Jason Garvey, Education - Educational Leadership, Policy and Technology Studies

Experiences of Perceived Discrimination among Arab Students and Arab Non-Students
The last two centuries have seen a large influx in immigrants from the Middle East and North Africa. Prior research has clearly demonstrated that Arab persons living in the United States have faced increased discrimination following the events of September 11, 2001. Interestingly, prior research regarding Arab students’ experiences of perceived discrimination in institutes of higher education have been inconclusive. Therefore, there is a gap in the literature regarding the experiences of perceived discrimination between Arab non-students in the general community and Arab students in institutes of higher education. The present research will investigate this discrepancy by seeking to illuminate the narratives of perceived discrimination experienced by both groups through the use of in-depth, one-on-one, qualitative interviews. This study has the potential to make outside groups aware of and bring to light the experiences of Arab students and Arab non-students.
Austin Pinkerton, Engineering - Computer Science
Faculty Mentor: Eben Broadbent, A&S - Geography

Tree-crown Delineation Algorithm Development Using UAV Imagery and Photogrammetric Analysis

Forest management requires close monitoring of the area which involves the gathering and analysis of relevant data. Current field-based methods of acquiring this data is expensive and timely. Because of this, many large areas of forests are left unmanaged and grow without proper structure. Automated tree-crown delineation from multi-spectral 3D unmanned aerial vehicles (UAVs) using algorithms designed to groom this spectral data could offer an inexpensive solution to this problem. The project includes the design, programming, field validation and parameterization, and implementation of an automated pattern recognition algorithm to identify individual tree-crown dimensions and related forest structural and compositional attributes from high spatial resolution visual and multi-spectral sensors acquired from UAVs. The tree-crown delineation functionality will be the extent of the first iteration of the program, and we anticipate that the algorithm will continue to be built upon and expanded with more functionality and data manipulation in the future.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Allyson Pitzel, Education - Special Education and Multiple Abilities
Faculty Mentor: Carol Donovan, Education - Special Education and Multiple Abilities

Helping to Create the Ideal Kindergarten Classroom by Gaining Insight into Early Childhood Personality Types

In an effort to identify potential needs and developmental levels, incoming kindergarten students are often screened for speech/language ability, fine/gross motor skills, and intellectual development. However, there is no widely used personality test for kindergarten students to gain insight into personal characteristics that affect learning and getting along with others. A non-optimal learning environment is being created. The present research observed students in four school environments over a period of seven months. Analysis of the data revealed five personality groups. A survey was made based loosely on the Myers Briggs Type Indicator personality test for adults reflecting the descriptions found in the five personality groups. This survey was given to the parents of children from multiple elementary schools, asking a few statements regarding his or her child’s behavior and personality. While understanding that parents might not share the same view of their child as the teacher, many trends were identified to be statistically significant. Parents with children clustered into the same grouping answered almost all the survey questions exactly the same. These patterns will be the basis for a new personality screening device to serve as a tool to evenly spread different types of personality groupings of students across kindergarten classrooms. Future research will seek to check these categories and how their use for kindergarten placement effects classroom instruction.
Norman Prince, HES - General Studies in HES
Faculty Mentor: Jen Nickelson, HES - Health Science

Building Healthy Lives
Norman Prince, Health Science Faculty Mentor: Jen Nickelson, Health Science Building Healthy Lives
Building healthy lives for patients is the emphasis at Maude Whatley center. Maude Whatley develops specific health interventions for patients with health issues like diabetes, cardiac problems, diets, and cancer. Maude Whatley is located in Tuscaloosa, Birmingham, and Montgomery. Maude Whatley’s goals are to make sure each patient is provided with substantial knowledge of their health and to leave the center knowing what to do in the future if any health crisis arises. Health educational programs are provided for new patients. They provide health lectures pertaining to certain health issues that the patient may be facing. They also supply take home learning health textbooks for chronic patients to read until they return to the center to be tested on their knowledge of certain health problems they are experiencing. Maude Whatley is determined to promote key health projects to every patient by planning out the basic outline for the certain intervention. Next, the organization follows through the certain project intervention and evaluates the health issue with patients. The health professionals at Maude Whatley push on a day-to-day basis one-on-one communication with patients having certain health problems. Health professionals at Maude Whatley promote healthy attitudes and good health for the many patients at the center.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Elizabeth Pugh, HES - Health Science
Faculty Mentor: Jen Nickelson, HES - Health Science

Pediatric Care for the Tuscaloosa Area
The University Medical Center Pediatrics clinic provides patient and family centered healthcare for children and their families. Their overall purpose is to serve the Tuscaloosa area as a resource for child healthcare. Physicians and nurse practitioners do the clinical care at the University Medical Center. Follow-ups, evaluations, and ongoing care of special needs are a few of the ways the pediatric clinicians measure the success and quality of their care. In an effort to positively impact the community, The University Medical Center Pediatrics clinic encompasses socioeconomic, behavioral, biological, environmental and other factors that impact human health and contribute to health disparities.
Paula Radcliff, Nursing - Capstone College of Nursing
Faculty Mentor: Clara (Rebecca) Owings, Nursing - Capstone College of Nursing

How Clean Is Your Cuff?
Preventing nosocomial infections, also known as hospital acquired infections, is an important part of nursing care. The purpose of this project is to identify methods to prevent the spread of hospital acquired infections due to transmission of bacteria from patient to patient via blood pressure cuffs. Centers for Disease Control (CDC) guidelines consider blood pressure cuffs noncritical patient care items and recommend that items that touch only intact skin do not necessitate disinfection between patients. In this experiment, 10 blood pressure cuffs from two different hospitals were swabbed using sterile cotton swabs. The simple streak plate method was used to transfer bacteria from the cotton swabs onto the surface of the pre-poured Luria Broth (LB) agar plates. Bacteria was incubated at 37°C for seven days. Colonies were counted on day 2, day 5, and day 7. Significantly less bacteria grew from swabs of blood pressure cuffs cleaned with sani-cloth wipes. Results reveal a greater increase in number of bacterial colonies grown on reusable blood pressure cuffs in comparison to disposable cuffs. This indicates an increased need for cleaning noncritical patient care items between patients to reduce the spread of nosocomial infections in the future.
**The Effects of Hemodynamic Shear Stress on Stemness of Acute Myelogenous Leukemia**

Cancer Stem Cells (CSCs) have recently been identified as the root cause of tumors generated from cancer cell populations. This is because these CSCs are drug-resistant and have the ability to self-renew and differentiate. Current methods of culturing CSCs require much time and money, so a need for better CSC culture protocols is needed. We will be evaluating the quantity of Acute Myelogenous Leukemia Stem Cells (LSCs) after applying shear stress to the leukemia cells in a way that mimics the in vivo bloodstream environment. We hypothesize that the shear stress will increase the expression of the known LSC markers, due to similar findings with different cancer cell lines. If the shear stress is shown to increase the LSC population of a sample, we can utilize it in larger scale applications such as bioreactor cell culture.
Prevalence of Disordered Eating Behaviors Among College Students: A Literature Review

Introduction: Disordered eating is defined as "a wide range of irregular eating behaviors that do not warrant a diagnosis of a specific eating disorder". These behaviors include chronic yo-yo dieting, extreme exercise regimes, food pre-occupation, and compensatory measures such as exercise, food restriction, fasting, purging, or laxative use. Objective: The purpose of this literature review is to summarize the current research on disordered eating behaviors (DEB) among college students. Methods: Scout Library and PubMed were searched for articles published between 2010 and 2016 that assessed disordered eating behaviors among men and women attending college. Eight articles were identified and included in this literature review. Results: Males tend to have a preoccupation with gaining weight overall, while females tend to have a preoccupation with losing weight. Difficulties with emotion regulation and adaptive strategies tend to be motivators for females to engage in DEB as compared to males. College students may engage in extreme dieting behaviors to offset binge drinking. This correlation is stronger in females than in males. College students have an increased tendency to use energy drinks as a method of facilitating weight loss. Conclusion: These findings suggest that both male and female college students engage in a variety of DEB. Clinicians should be aware of the various types, prevalence, and risk factors in order to properly intervene.
Courtney Ricciardi, A&S - Psychology  
Haleigh Hulsey, A&S - Biological Sciences  
Faculty Mentor: Jason Scofield, HES - Human Development and Family Studies

The Effect of Temporary, Transgressor Related Factors on Children's Judgments

Moral judgments play an important role in relationships, parenting, and society. Despite this, there are many unanswered questions about what information adults, and in the case of this study, kids use when judging actions and peers. This study aims to answer some of those questions by administering a questionnaire to children aged 3, 4, 5, and 6 (N=63) to determine whether information about the perpetrator of a misdeed affects the way a preschooler or early elementary schooler views this misdeed and its perpetrator. A series of vignettes depicting transgressions classified as either moral (bad across contexts like hitting) or conventional (only bad in a certain situations like yelling in the classroom) are presented with cartoon pictures. In some of these stories the characters had potentially moderating factors, such as illness or sadness, occurring and functioning as a potential excuse for "bad" behavior. A cross sectional, repeated measures design employing an ANOVA to compare the results across the 4 age groups, the presence of a factor (present or not present), and the domain of the transgression (moral or conventional) will be used to analyze this data. Preliminary results indicate that the domain of the factor does affect how willing children are to use these potentially moderating factors ("Temporary, Transgressor Related Factors") when making judgments and that there are possibly more significant relationships to be found.
Andrew Rice, A&S - Biological Sciences
Valerie Turberville, A&S - Biological Sciences
Faculty Mentor: Julie Olson, A&S - Biological Sciences

Cultivation and Characterization of Urea Utilizing Bacteria from Weeks Bay, AL
Harmful algal blooms, which often occur as the result of excess nutrients flowing into coastal waters, have become a worldwide problem. Many bloom-forming species have the ability to produce toxins that make the surrounding environment uninhabitable to many species. Thus, the removal of excess nutrient pollution before it enters coastal habitats is critical and is one of the major ecosystem services provided by coastal wetlands. In wetlands, sediment-associated bacteria are capable of degrading urea, a nitrogen pollutant, into ammonia and carbon dioxide. In this project, we isolated urea-degrading bacteria from wetland sediments on a medium with urea as the sole nitrogen source and are characterizing the genes involved with the urea hydrolysis. There are three genes thought to be necessary for the functionality of the urea-degrading enzyme urease: ureA, ureB, and ureC. Most previous studies focused on characterizing ureC, with relatively little known about ureAB. As a result, we designed PCR primers for ureAB amplification and are testing their efficacy in our wetland isolates. To date, few studies have examined the capability of wetland bacteria to degrade urea. However, as the use of urea fertilizer continues to expand, it will be vital to understand how urea is removed from ecosystems and its effects.
Ashley Robbins, C&IS - Advertising and Public Relations
Ashley Paulmeno, C&IS - Advertising and Public Relations
Turner Waddell, C&IS - Advertising and Public Relations
Waddell, Faculty Mentor: Teri Henley, C&IS - Advertising and Public Relations
Gerald Waters, C&IS - Advertising and Public Relations

Developing a Consumer Segmentation Strategy to Identify Snapple’s Target Audience
To create a 2017 national marketing campaign for Snapple, the team set out to answer three questions through primary and secondary research: Who drinks Snapple? How can Snapple best connect with this audience? How can Snapple increase its sales across the United States? In Simmons OneView, Snapple’s consumers were 20% more likely to agree with the statements "Conformity makes me uncomfortable" and "I like to be the first to try new things." Additionally, this group over-indexed on the personality traits adventuresome (152), creative (145), intelligent (126) and sociable (123). Consumers who agreed with these statements were named Seekers, while those who disagreed with one or both were classified as Sheep or Scopers. Seekers over-indexed to be Snapple drinkers while Sheep and Scopers under-indexed. Focus group participants were asked to react and comment on these segments. Sheep were considered to be safe, Scopers were analytical and Seekers were individualistic and spontaneous. One characteristic of Seekers is their attempt to sprinkle their lives with delightful moments. To connect with this audience, Snapple can create an unexpected delight for Seekers through its lively brand personality, charming packaging and variety of flavors. To grow sales across the U.S., Snapple must drive trial among Seekers outside of its northeastern Heartland market by building brand awareness that overcomes negative perceptions due to its low exposure and higher price.
Rachael Robbins, HES - Human Development and Family Studies
Emily Williamson, HES - Human Development and Family Studies
Faculty Mentor: Maria Hernandez-Reif, HES - Human Development and Family Studies
Hunter Sartain, HES - Human Development and Family Studies

The Family Interaction Project: A study on the relationships between stress and the social skills, social-emotional capabilities, and sleep quality of young children

The inner workings of the body and stress are complex and unique for each individual at all the different stages of the life span. This study aims to explore the relationship between young children's stress levels and their social skills, social-emotional capabilities, and sleep quality. Data for this project were collected longitudinally from 25 infants and toddlers through the FIP study (Family Interaction Project). Morning saliva samples were taken from each child, in order to measure their cortisol stress hormone levels. These were then put into a freezer and later sent out to be assayed by Salimetrics. Various, standardized questionnaires were also given to be filled out by the teachers and parents of the children. These questionnaires gathered data about the children's ability to relate and communicate with others, emotional stability, and sleep habits. If stress is related to children's social skills, social-emotional capabilities, and quality of sleep, then a greater understanding about such relationships can be tremendously useful for guiding children into better friendships, stability, rest, and overall wellbeing as each of these areas being studied help characterize early childhood development.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
William Robison, A&S - Biological Sciences
Faculty Mentor: Gregory Szulczewski, A&S - Chemistry
Tabitha Sutch, A&S - Chemistry

Bismuth sulfide/PEDOT:PSS thin films as thermoelectric materials
This research was motivated by the desire to develop more efficient thermoelectric materials. Thermoelectric materials convert heat into electrical power. The challenge in finding new thermal electrical materials is the interdependence of the electrical conductivity and thermal conductivity. In most materials the electrical and thermal conductivity increases(decreases) with increasing(decreasing) temperature. In thermal electrical materials the electrical conductivity needs to be high, while the thermal conductivity needs to be low. To achieve such a material we synthesized a nanomaterial from two components. Specifically, we synthesized a Bi2S3, a known poor thermal conductor/good electrical conductor in the presence of the polymer PEDOT:PSS, a known good electrical conductor/poor thermal conductor. We hypothesize that there will be optimum concentration of PEDOT:PSS with respect to Bi2S3 that yields the highest electrical conductivity. As a result, we synthesized Bi2S3 by adding Bi(NO3)3 to a solution of HNO3 followed by the addition of PEDOT:PSS and Hydrazine. The solution was then purified by centrifugation and characterized by various techniques. Thin films were made by evaporation of small volumes of the aqueous solution onto glass microscope slide. The electrical conductivity was then measured at room temperature. The results of this study confirmed the hypothesis. We observed an ratio of PEDOT:PSS to Bi2S3 that produced a maximum value in the electrical conductivity.
Robert Roderick, HES - Health Science
Faculty Mentor: Jen Nickelson, HES - Health Science

Student Recreation Center Experience
Student Recreation Center Experience Background: Students and faculty at The University of Alabama exercise through workouts and intramural sports. These activities aim to get people more involved and live healthier lifestyles. Purpose: The Recreation Center on The University of Alabama Campus aims to give students ability to exercise, participate in sports, and learn ways to be healthy. Methods: Open gym for workouts, intramural sports, and classes for students to take are some of the ways students can get involved. Also they provide personal trainers for students who need help getting a better workout. Results: The staff gets feedback from students and evaluates the programs such as intramural sports and classes. Public Health Domains: The recreation center employees work to develop plans for intramural sports and classes to help students and faculty. They implement these programs and then evaluate them when they are done to see what changes need to be made.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
**Managing The Internet of Things**

The number of devices connected to the internet has increased dramatically in recent years, driven in large part by a new movement called the "Internet of Things" (IoT). With the IoT, new applications for Internet connectivity have emerged beyond just laptops and smart phones, to unite a heterogeneous collection of connecting points tied to various aspects of daily life (e.g., Internet-enabled appliances, vehicles, and wearable computing devices). As more devices are added to the Internet each day, controlling their interaction has become very challenging. The goal of this project is to create a software solution that will manage connected devices and allow users to specify the meaning of the device interactions. To achieve this, we are currently creating software to handle device connections and a website to manage devices. In addition, we are creating a simple programming language to define the relationships between devices.
Optimizing the electrical conductivity of Ag2Te/PEDOT:PSS thin films for energy harvesting applications

Silver telluride, Ag2Te, is a known thermoelectric material that converts a heat into electrical energy via the Seebeck effect. Poly(3,4ethylenedioxythiophene): ploy(styrenesulfonate), also known as PEDOT:PSS, is an aqueous polymer that produces electrically conductive films with and low thermal conductivity. The purpose of this research was to synthesize Ag2Te/PEDOT:PSS films with various amounts of PEDOT:PSS with respect to Ag2Te and measure the electrical conductivity of each polymer film. Silver telluride was synthesized under reflux from the reaction of telluric acid and ascorbic acid in water and the subsequent reaction of the resulting solution and silver nitrate. The Ag2Te nanowires were characterized by x-ray diffraction, x-ray photoelectron spectroscopy, scanning electron microscopy and transmission electron microscopy. The results show that the conductivity of the films is maximized at 9.09%(w/w) PEDOT:PSS with respect to Ag2Te. Future work will measure the Seebeck coefficient.
Chandler Sawyers, A&S - Music  
Faculty Mentor: Andrea Cevasco-Trotter, A&S - Music

Effects of High Versus Low Pitches of Songs on Premature Infants' Physiological Parameters Across Time  

Sound levels, specifically noise, are regulated in facilities such as the Neonatal Intensive Care Unit (NICU) to decrease the potentially harmful effects to the infants that may be caused by over exposure (American Academy of Pediatrics, 1997). Although the premature infants in these units are sensitive to sound they are also in need of auditory stimulation for neurological development. Research has also supported recorded music's positive effects on physiological and behavioral. This includes improved respiration rates, heart rates, and oxygen saturation and decreased length of stay. The purpose of this study is to examine the effects of recorded songs presented in both higher and lower keys (ranges) on heart rate and oxygen saturation levels of premature infants weighing less than 1500 grams, ages 27-32 weeks gestational ages. The purpose of this analysis is to present two infants' graphic data of their responses during 12 second intervals pre, during, and post music listening. These infants were 30 weeks corrected gestational age (CGA) and receiving respiratory assistance at the time of participation in the study. A secondary purpose is to provide descriptive and inferential statistical analysis of all participants in the study. Preliminary analysis indicates no difference between higher versus lower keys on infants' heart rate, oxygen saturation levels, and respiration rate as well as no difference between silence and music conditions.
Beau Schaeffer, A&S - Biological Sciences  
Jaron Nix, Engineering - Chemical and Biological Engineering  
Faculty Mentor: Laura Reed, A&S - Biological Sciences  

Quantifying Sleep Deprivation in Drosophila melanogaster  
Sleep deprivation is quickly becoming the cause of a variety of negative health trends around the world, driven by the integration of highly accessible technology and a fast-paced culture. We are modeling these negative health effects in Drosophila melanogaster in order to raise awareness and combat the declining health of humans due to lack of sleep. Drosophila is an excellent model organism for such a study due to the large number of its genes having homologs in humans and their rapid rate of reproduction. We are depriving Drosophila of sleep using a machine that randomly emits light and vibrations for specified intervals through the night, called the FlyBrator. To measure the amount and severity of sleep deprivation, we have devised a motion tracking system, called FlyR, using infrared cameras and IDtracker software, capable of recognizing and quantifying motion during light and dark conditions. With this information, we hope to better understand the impact of disrupting circadian mechanisms in D. melanogaster to further the study of human sleep deprivation.
Elizabeth Schlichting, A&S - Mathematics
Faculty Mentor: Anneliese Bolland, ISSR - Institute for Social Science Research

Sexual Outcome Expectancy Trajectories among Impoverished Black Adolescent
In 2013, 34% of high school students were sexually active, a drop from 38% in 1991 (CDC, 2014). However, safe sex practices, such as condom use have also declined (CDC). O’Donnell and colleagues (2001) found that early sexual initiation was higher, for Black American males and females than for Hispanic or White American males and females. They also found that minority adolescents who are early initiators of sexual activity are also more likely to participate in other risky behaviors. Using Bandura’s (1986) Social Cognitive Theory as a framework, we examine outcome expectancy trajectories among Black American adolescents living in poverty. Specifically, we examine how engagement in sexual intercourse is perceived to reflect maturity, a critical milestone in adolescent development. This may be particularly important for impoverished minority adolescents, who face numerous barriers to healthy self-esteem. Data for this study come from the Mobile Youth and Poverty Study, a multi-cohort longitudinal study of adolescent risk, conducted in Mobile, Alabama between 1998 and 2011. Results of this study can provide insight into psychological reasons for early sexual initiation (rather than the often-studied health outcomes of early sexual initiation.)
**Emily Schmidt**, A&S - Physics and Astronomy  
Faculty Mentor: Bill Keel, A&S - Physics and Astronomy

*Earthshine*  
When the moon is a crescent, the dark part is still visible because it is illuminated by sunlight reflected off of the Earth. This project examines changes in the brightness and color of the Earthlit portion of the crescent moon to determine cloud cover on the part of the earth which is doing the reflecting (in this case, the Pacific Ocean). The benefits of such a study are twofold: it provides a method of interpretation for existing Earthshine data, which can reveal historic climate information; and it contributes to the study of the Earth as a planet, which aids the development of techniques for locating extrasolar Earth-like planets.
Oral & Poster Presentation Abstracts

Carissa Schreiber, A&S - English
Faculty Mentor: Lauren Cardon, A&S - English

Collective Trauma and Community Healing in Postwar American Literature
Collective trauma has been a long-running theme in American literature, including in examples like Sylvia Plath's Bell Jar, Saul Bellow's Herzog, and William Faulkner's As I Lay Dying. In this project, I suggest a potential connecting theme between Jonathan Safran Foer's Extremely Loud and Incredibly Close and Jack Kerouac's classic On the Road by examining the use of community healing in response to collective trauma, even in their drastically differing contexts. By tying in sociology theory from Dominick LaCapra and Joshua Pederson as well as Matthew Mullins's idea of traumatic solidarity, I posit that post-WWII America and post-9/11 America both act as structurally traumatizing settings in which the characters struggle to find appropriate methods of working through their individual traumas. As characters from both novels rely on community healing and communication, I argue that these examples signify the importance of community and unity in American national identity.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Andrew Schwitzgebel, A&S - Biological Sciences
Faculty Mentor: Laura Reed, A&S - Biological Sciences

“Mapping the Metabolome of Drosophila melanogaster and Drosophila pseudoobscura”
Bridging the gap between the fields of proteomics and genomics is the newer field of metabolomics, the study of an organism’s full complement of metabolites (small intermediates of cellular chemical reactions). Understanding a model organism’s metabolism can help researchers learn about and develop treatments for metabolic disorders. Drosophila, having a well-annotated genome, is the model organism chosen for this project, which uses sequenced and annotated genomes from GenBank to predict metabolic pathways present in the target organisms. The PathWay Tools software is able to predict the metabolic enzymes present in an organism by analyzing the sequenced genome. Given these enzymes, and knowing the chemical reactions that these enzymes catalyze, researchers can come closer to constructing a complete map of an organism’s metabolome. By looking at a map of the organisms’ metabolism – and how the genome influences it, researchers will be able to predict the metabolic effect of certain mutations or genes present in the organism. As Drosophila has long been used as a model organism for studying metabolic disorders, this project has the potential to influence research on human metabolic disorders from lactose intolerance to metabolic syndrome, and more.
Samuel Scopel, A&S - Biological Sciences
Faculty Mentor: Guy Caldwell, A&S - Biological Sciences
Edward Griffin, A&S - Biological Sciences

The Role of Neurotransmission in Amyloid-beta Neurotoxicity
Proper brain function is a consequence of proper trafficking of proteins and neurotransmitters to facilitate transmission of signals that represent communication between neurons. Vesicle-mediated protein sorting allows cells to effectively transport packaged materials throughout the cell. Therefore, vacuolar protein sorting genes, such as one encoding vacuolar protein-sorting protein 41 (VPS41), play a significant role in the formation and fusion of transport vesicles that allow for the movement of molecules in intracellular space. VPS41 has been shown to function within cellular complexes that play a critical role in tethering and fusion of vesicle membranes. Previous work in our lab has found VPS41 to can mitigate toxicity of the Parkinson's disease-related protein α-synuclein in a nematode model, Caenorhabditis elegans, as well as cellular models. Amyloid-β (Aβ) peptide, a causative agent in Alzheimer's Disease (AD), perturbs vesicular trafficking. Because both VPS41 and Aβ are involved in cellular transport, investigating the role of VPS41 in Aβ toxicity enhances understanding of AD pathology. Evaluating interactions in which VPS41 is involved can lead to enhanced knowledge of how Aβ is trafficked throughout the cell and, in turn, illuminate the cellular mechanisms of AD progression. Here I propose to study VPS41 in the context of neurotransmission and Aβ toxicity through the development of a model that will facilitate analysis of genetic modifiers of neurodegeneration.
Beautiful Health
Jordan Scorzelli, Public Health Faculty Mentor: Jen Nickelson, Health Sciences Beautiful Health Beautiful Health is a health education based program that allows college women to connect with adolescent girls through a mentoring based approach. According to the U.S. Department of Health & Human Services, "The choices made and behaviors adopted during these years affect adolescents' overall wellbeing and, potentially, their health throughout their lives." The Beautiful Health Program targets 7th and 8th grade girls at the Davis Emerson Middle School in Cottondale, Alabama. It is important for girls at this age to understand what it means to be healthy and have an overall well-being. Activities vary per week with different themes and topics. Each of these topics relates to physical, mental, social and spiritual health. As mentors, we begin with a short lesson then break off into one on one time with the mentees and further the lesson. At the end of each session we reflect with the group of girls on what they have learned and how they will incorporate our health lesson into their lives.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Brooke Seawell, HES - Health Science
Faculty Mentor: Lori Turner, HES - Health Science

Prevention Not Medication!
Purpose: To improve quality of life without contributing to an overmedicated society. To prevent disease and ailments rather than addressing them after they occur. To address the cause instead of the effects. The overall initiative will teach people to improve their lifestyle instead of the symptoms that develop due to poor lifestyle choices. Ultimately, people turn to prescription drugs for a "quick fix" to their problems instead of addressing the cause. • Activities: Targeting students at the University of Alabama, the initiative would partner with Project Health, Student Government Association, Pre-Health society, Faculty/Staff and Administrators, the Athletic Department, The student health center, the rec, Capstone nursing school, and the Crimson White. Put out a PSA for the student body. Offer workshops on topics that address each aspect of wellness, in order to improve overall quality of life (level one prevention!!) Offer free screenings on campus. Workshop, flyers, PSA specifically addressing the problem of overmedicated America.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
**Oral & Poster Presentation Abstracts**

**Michael Sitarz**, A&S - Physics and Astronomy  
Faculty Mentor: Jeremy Bailin, A&S - Physics and Astronomy  
Krista McCo, A&S - Physics and Astronomy

*How quickly does a galaxy’s dark matter change?*
Galaxies populate the universe in astronomical numbers, and around every galaxy is a dark matter halo. We cannot see the dark matter halo optically, but via galaxy rotation curves we can indirectly detect their presence. To study dark matter, we use cosmological simulations. Gadget-3, an N-Body cosmological simulation code is used to simulate the birth and evolution of a representative volume of the universe. During the simulation, at systematic intervals, snapshots are taken of the varying properties of the dark matter particles such as mass, velocity, and acceleration. The simulation also uses a halo finder code, SUBFIND, to define the dark matter halos and a merger tree code, L-Halo Tree, to create a halo merger history. A semi-analytic code, SAGE, defines where the galaxies form and their properties. After the simulation is completed, the data is run through the analytical code Beacon. Beacon takes in the results from the simulation and analyzes different evolutionary properties of the dark matter halos. The main purpose of our study is to analyze the evolution of a large statistical sample of dark matter halos and see how quickly these properties change throughout the simulation. Some key properties we study are position, velocity, and acceleration and specifically how fast they change between snapshots. We also can observe mergers by studying how drastically the halo masses change between snapshots.
**Hospice of West Alabama**
Amelia Sliwa, Health Science Faculty Mentor: Jen Nickelson, Health Science Hospice of West Alabama is a non-profit organization dedicated to serving the terminally ill and their families. They opened their doors in 1980. The Alabama Health Council is a major support system involved with the planning and coordination of the organization. Hospice of West Alabama covers seven different counties in our area. They offer home care as well as an inpatient unit depending on the needs of the patient and family. Hospice provides physical, psychological, social, and spiritual care for dying persons and their families. A major ideal of hospice is that they are not treating the disease they are treating the patient. They do this through pain management, educating the family on what to expect and how to care for their loved one, educating on the importance of preventative care and healthy habits, as well as helping the patient and family with health literacy and understanding their medical needs. Every patient and family works with a team of doctors and staff to create a care plan before beginning the hospice program. The success of the program relies on the care team put in action.
Kacey Smit, C&IS - Communication Studies  
Eric Mayo, C&IS - Communication Studies  
Hunter Bethea, C&IS - Communication Studies  
Bethea,  
Faculty Mentor: Darrin Griffin, C&IS - Communication Studies

Faith and Resiliency  
Resiliency has been defined as the ability to bounce back from difficult situations and circumstances. Many different elements have been found to affect an individual's personal resiliency. In the study, the researchers looked at how an individual's faith, or their affiliation with a faith-based organization, may affect their ability to be resilient. Interviews were conducted with four participants, all having an academic background as well as a strong personal faith-base. Within each of the interviews conducted, the participants mentioned the topics of meditation (or prayer), self-disclosure and vulnerability, and the aspect of community as factors leading to their own personal resilience. The participants all saw their faith base as a major factor in the development of their personal resiliency, and considered it a resource during difficult circumstances.
Michaiah Smith, C&IS - Advertising and Public Relations
Patrick Campbell, C&IS - Communication Studies
Andrew Thurman, C&IS - Communication Studies
Thurman,
Faculty Mentor: Kim Yonghwan, C&IS - Communication Studies

Student Participation in intramural athletics and student satisfaction with UA life
Tentative/ Suggested Title: 1) Student Participation in intramural athletics and student satisfaction with UA life
Abstract: Intramural sports are an integral part of student life on The University of Alabama’s campus. That being said we wanted to see if there is a correlation between social interaction, specifically intramural athletics, and student happiness and satisfaction with campus life. Since student satisfaction and involvement with and on campus is extremely important to the health of the university, if it is found that participation in intramural athletics increases student satisfaction with campus life then intramural athletics should be as heavily promoted and encouraged as other campus programs and activities. To measure each variable in our research we will use a survey our group has created in Qualtrics in order to conduct our research.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Natalie Smith, HES - Human Development and Family Studies  
Faculty Mentor: Dr. Casey Totenhagen, HES - Human Development and Family Studies

**Depression and Dyadic Coping Within Same-Sex Relationships**
Perceptions of relationship quality can be affected by a number of individual (e.g., depression) and dyadic (e.g., coping) factors. Specifically, the experience of depressive symptoms can negatively affect relationship quality (Bodenmann et al., 2008). This association may be especially true for sexual minority individuals who report higher rates of depressive symptoms compared to their heterosexual counterparts (Bostwick, et al., 2010). Previous studies have demonstrated links between dyadic coping with depressive symptoms and relationship quality, such that positive dyadic coping is associated with increased relationship quality whereas negative dyadic coping is associated with increased depressive symptoms (Falconier et al., 2015; Regan et al., 2014). Using a data from a sample of 95 same-sex couples that was previously collected by my mentor, Dr. Casey Totenhagen, I examine the interplay of perceived partner dyadic coping and depressive symptoms to understand relationship quality, which will help determine if dyadic coping is differentially protective based on depressive symptoms. The results showed that problem-focused supportive dyadic coping may be especially helpful for individuals endorsing high symptoms of depression, whereas emotion-focused may be more helpful for those endorsing low symptoms of depression. Those high in depression may benefit from situation analysis and those low in depression may benefit from their partner letting them know they "side" with them.
Systematic Review of Nurse-Led Rheumatology Research
The goal of this systematic literature review was to analyze and define the outcomes as they relate to nursing practices and rheumatoid arthritis (RA). As a part of a larger international study of 750 articles, we examined 120 articles that were collected from January 2014 through January 2016 from CINAHL, PubMed, Ovid, Cochrane, and PsychInfo databases, using "Rheumatoid Arthritis" and "nurs*" as the search keywords. The results were then examined through OMERAT 2.0 filter. This filter takes into account both biochemical data and the patient's perspective when measuring the standards of outcome data in rheumatology studies. The articles were gathered based on their relevancy to criteria regarding RA and nursing practice. Articles were either included or excluded based on five criteria: patients with RA, patients older than 16 years old, nursing specific outcome data, dated 1990-2014, and written in English. After analyzing articles based on said criteria, the majority of the articles did not fit the criteria: out of the 120 analyzed, 12 fit the criteria aforementioned. Preliminary results of the literature analysis indicated that further studies need to be done in order to develop a core set of nurse sensitive outcomes for RA nursing.
**Characterizing Mechanisms of Resistance to the Mushroom Toxin α-amanitin in Local Mycophagous Drosophila tripunctata**

Nearly all mushroom-related human deaths (90-95%) are the result of the mushroom toxin α-amanitin. This toxin's mode of action is fairly well understood, yet no viable treatments for α-amanitin poisoning exist. α-Amanitin is fatal to almost all eukaryotic organisms, with the exception of tolerant species belonging to the genus Drosophila, whose larvae develop in mushrooms containing the toxins. Many physiological mechanisms responsible for proper cellular function and genetic regulation are conserved from flies to humans. Thus, if investigators can understand the mechanisms of diseases and toxins in flies, many of these discoveries could eventually translate to therapies for humans. My research project is focused on gaining an understanding of how these fruit fly species are tolerant of this toxic compound that kills nearly all other animals, including humans. I will experimentally test for genetic variations in α-amanitin tolerance and the role of two classes of detoxification genes (Cytochrome P450s and Glutathione S-Transferases) in multiple genetic lines of Drosophila tripunctata collected from the University of Alabama's Science and Engineering Complex courtyard. The eventual goal of this research is to find an effective therapy for α-amanitin toxicity in humans.
Daryll Spangler, A&S - Anthropology
Faculty Mentor: Laura Reed, A&S - Biological Sciences

Sex Ratios and Response to Dietary Restriction in Drosophila Melanogaster
Studying the relationship between diet and sex ratios can facilitate a better understanding of how these ratios will shift during periods of nutritional stress. Drosophila melanogaster make a good model organism for this study due to its short development cycle and large number of offspring, making it possible to obtain a large sample size in a short period of time. In this research we determine how the Drosophila sexes will respond to changes in diet. By manipulating the food in a way that mimics shortages in nutrition, samples can be collected and examined for possible trends in sex ratio within the population. Data collected thus far indicate a shift toward an increase in females present in the population, suggesting that females are better equipped to endure dietary stress. This is important because it highlights the role that sex plays in regards to fitness when a population is subjected to nutritional deficiencies.
Madison Stankevich, Nursing - Capstone College of Nursing
Faculty Mentor: Michele Montgomery, Nursing - Capstone College of Nursing
Paige Johnson, Nursing - Capstone College of Nursing

Health Literacy at the University of Alabama
One in every three adults is obese in Tuscaloosa County and the leading cause of death is cardiovascular disease. The preventative care solution for these problems is to eat healthier and exercise more. This solution becomes much more difficult if you do not know how to read a nutrition label. The ability to correctly interpret information related to health (such as a nutrition label) is called health literacy. The purpose of this research is to expose the prevalence of health illiteracy on the campus of the University of Alabama. By using the “Newest Vital Sign” questionnaire; a six question health literacy series designed by Pfizer Inc., I interviewed students on campus to determine if they could accurately read a nutrition label. Not a single question was answered correctly 100% of the time. In fact, the question that was answered correctly most often was still answered incorrectly in 12% of respondents. In conclusion, not even college-educated individuals should be presumed to be able to accurately interpret health information on their own and health care professionals should take care to communicate simply and fully with the patients for whom they provide care.
Investigation of dopamine neuron degeneration as a consequence of microbiome-derived bacteria

Within the human digestive tract, thousands of bacterial species comprise the microbiome, an ecological environment that contributes to the health and longevity of the host organism. While most bacteria within the microbiome beneficially interact with the host, pathogenic bacteria can invade the gut and produce toxic byproducts that damage intestinal cells. The ability of humans to resist pathogenic bacterial colonization is dependent on the robustness of the microbiome as well as the adaptive and innate immune systems of the intestine. Although effective immune responses can neutralize pathogens, chronic immune responses can contribute to disease. For instance, Parkinson's disease (PD) associated with midbrain dopamine neuron degeneration has been linked with intestinal microbiome changes and chronic inflammation, sometimes years before clinical symptoms appear. Of the two classical human immune responses, the innate responses that alter cell-stress tolerance through growth, metabolic, and protein homeostasis pathways are highly conserved across species. This project investigates the relationship between bacterial influences upon the innate immune pathways of C. elegans with the sensitivity of its dopaminergic neurons to endogenous and exogenous stress. Our continuing research has the potential to uncover novel interactions between bacteria and the immune system of C. elegans, and potentially enlightens our understanding of the gene-by-environment intersection underlying PD.
Nicolette Stasiak, Nursing - Capstone College of Nursing
Faculty Mentor: Leslie Cole, Nursing - Capstone College of Nursing

Determining the Effectiveness of the STOP-BANG Sleep Apnea Questionnaire in Diagnosing Sleep Apnea in a Community Setting
Obstructive sleep apnea (OSA) is an obstruction in the upper airway in which a person stops breathing suddenly and restarts again while sleeping. This disorder affects mostly middle aged and older adults; however, other risk factors exist that put a person at a higher probability for developing the disorder. In order to evaluate these risks, the STOP-Bang questionnaire was developed that consists of eight questions to determine whether a patient is at high risk by evaluating the client's Snoring, Tiredness, Observed apneas, blood Pressure, Body mass index (>35 or >30 kg/m2), Age >50 years, Neck circumference > 40 cm, and male Gender (STOP-Bang). The focus of this study is to discuss the accuracy of the STOP-Bang questionnaire in predicting the probability the patient has OSA. A literature search of CINAHL and EBSCO databases was conducted and articles were retrieved related to the topic. Overall, the success rate of predicting a patient had OSA through the STOP-Bang questionnaire was shown to be successful. Researchers have found that by administering this small questionnaire before a sedating procedure, such as an endoscopy, patients are less likely to show signs of OSA that could further inhibit the success of the procedure.
Zachary Stephens, A&S - Geological Sciences  
Faculty Mentor: Yuehan Lu, A&S - Geological Sciences  
Peng Shang, A&S - Geological Sciences  

High-resolution, In Situ Records Of Dissolved Organic Matter (DOM) In A Forested Stream  
The goal of this study is to establish high-resolution, in situ records to capture changes in water chemistry up to every 10 minutes; specifically focusing on stream water dissolved organic matter (DOM). Our study site, the Mayfield Creek, is a third order, forested stream draining into the Black Warrior River. DOM is an environmentally and ecologically important parameter to study, since it is one of the main factors governing the overall health of the fluvial system and ecosystems that it supports. These data will be supplemented with high-resolution data coming from an in situ fluorescence DOM sensor sampling every 10 minutes. The Fluorescence DOM data will be converted to dissolved organic carbon (DOC) concentration based on a calibration curve established from weekly grab samples. In addition, the water level data collected every 10 minutes will be converted into discharge based on the rating curve of the study site. The DOC loading data will be derived from the product of DOC concentration and discharge, which represents the first record of DOC variation at minute timescales in the study stream. Compared to the previous records based on weekly grab samples, our results demonstrate the importance of collecting high-resolution data for generating reliable estimates of DOC loading in streams.
POSTTRAUMATIC STRESS SYMPTOMS AND ALCOHOL USE AMONG COLLEGE STUDENTS: DIFFERENCES BY GENDER AND TRAUMA TYPE

Recent studies have documented PTSD symptoms as a mediator in alcohol involvement amongst college students experiencing a wide range of traumatic events. However, studies have yet to document gender differences regarding the relationship between PTSD and heavy alcohol use for specific traumatic events. The present study used a secondary data analysis of survey data on gender specific drinking patterns for a number of trauma clusters, including: Natural Disaster, Health/Injury/Life Problems for Self, Death/Accident/Assault of Another, and Physical/Psychological/Sexual Assault. The results suggested that, for men, no specific form of trauma influenced drinking behavior more or less than another; PTSD symptoms were significantly related to heavy drinking for all types of trauma. However, the relation between PTSD symptoms and heavy drinking for women held true only for instances of Physical/Psychological/Sexual Assault. Results indicate that there is a gender difference in the mediation of PTSD symptoms and alcohol involvement related to specific traumas clusters. Findings suggest that interventions for alcohol use, mediated by PTSD symptoms, should be gender and trauma specific.
Logan Tarbox, C&BA - Information Systems, Statistics and Management Science  
Faculty Mentor: Phillip Burns, Student Affairs

*Improving Technical Literacy in Non-Profits*  
This project was launched in the fall of 2015 as an initiative through the UA Center for Service and Leadership to help the local non-profit community gain valuable technical resources and knowledge. Survey results from seminars and consultations that I held with non-profits in the fall of 2015 indicated a need for a greater partnership in technology between students and non-profits. This semester I founded a student organization, Capstone Non-Profit Consulting, in order to bridge this crucial gap in the non-profit community while providing students with valuable real-world project experience.
Caitlin Taylor, Nursing - Capstone College of Nursing  
Lucas Urbi, Nursing - Capstone College of Nursing  
Faculty Mentor: Michele Montgomery, Nursing - Capstone College of Nursing  
Paige Johnson, Nursing - Capstone College of Nursing

Health Outcomes in Underserved Preschool Children
Childhood obesity and diabetes are critical public health problems in the United States due to the future health risks that they impose. Underserved populations are particularly at risk due to lack of resources, such as healthcare or education. This study assessed these risks by performing screenings on children in the state of Alabama attending preschool in underserved regions. These screenings primarily consisted of physical assessments to measure health indicators such as blood pressure, height, weight, hearing, and vision. Diagnostic tools such as Body Mass Index (BMI) were utilized to help interpret the data and identify the presence of obesity. Also, blood work was collected to further analyze health indicators such as hemoglobin, glucose, low-density lipoprotein (LDL), high-density lipoprotein (HDL), and total cholesterol. The guardians of the children were also surveyed to assess for family history, as well as any environmental, nutritional, or lifestyle risks that may increase the likelihood of obesity and diabetes in children. Lifestyle risks include things such as inadequate or lack of exercise regimen, poor nutrition, and smoking history. The preliminary results indicate that a majority of the children that attend preschool in underserved areas of Alabama are at risk of developing obesity and diabetes.
Megan Ten Berge, Nursing - Capstone College of Nursing  
Faculty Mentor: Stephanie Turner, Nursing - Capstone College of Nursing

Resilience & Burnout in Emergency Department Nurses
For most emergency department nurses, witnessing or experiencing trauma at some point throughout their careers is inevitable. This high incidence of trauma, however, is not without negative consequences. High levels of compassion fatigue and burnout along with low levels of empathy and compassion satisfaction are common problems among emergency nurses. These psychological consequences of experiences with trauma have a negative effect on nurse retention rates and job satisfaction. High resilience in nurses may be a protective trait in preventing nurses from developing burnout and compassion fatigue. This study will aim to establish the relationship between levels of resilience in emergency room nurses and levels of burnout, compassion fatigue, empathy, and compassion satisfaction. The results of this research could assist nurse and hospital managers in creating interventions to help create a positive work environment-one with lower levels of burnout and compassion fatigue and higher levels of compassion satisfaction and empathy. By fostering resilience in emergency department nurses, hospitals may be able to both decrease nurse turnover and improve the quality of patient care by supporting empathetic nurses with high levels of compassion fatigue.
Laura Testino, A&S - Theatre and Dance  
Faculty Mentor: Lawrence Jackson, A&S - Theatre and Dance

"Tap Dance: Examining the rise and decline of the lost art and its relationship to black American culture"  
By Laura Testino  
Tap dancing does not have the same role in society today as it has had in years past, particularly in its height during the jazz age of the 1940s. Many believe that it has become a lost art. The truly American art form can be traced back to the 19th century, when African dance blended with some elements of British and Irish dancing. By analyzing the cultural background of the dance, one can see that the reasons for its origin are several of the same reasons for its decline. Some trace the origin back to Five Points, a neighborhood infamous for its crime. The blended cultures created William Henry Lane, an excellent tap dancer during the 1830s and 1840s, who went by the stage name "Master Juba." It was around this time that minstrelsy became a highly enjoyed and acceptable form of entertainment in the Americas, where white people would dress in blackface, perpetuating common stereotypes of black people. Although the art is a celebration of African culture, it is not associated with a progressive time in history of black Americans. In order to revitalize the dance form again, it will need a new place in the American culture. To determine how and if the art can be revitalized, this research will examine the cultural factors that contributed to its popularity, and then compare them to factors that contributed to the decline of tap dance in popular culture.
**Maxton Thoman**, A&S - Biological Sciences  
Faculty Mentor: John Higginbotham, Community Health Sciences

*Fit Sprint: A Healthy Gaming Initiative Seeking to Contain the Spread of Childhood Obesity*

With the rising rates of metabolic diseases in the United States reaching near epidemic proportions, and at a time when the childhood obesity rate hovers at 18.6 percent in Alabama alone, community-based participatory initiatives and technologically geared programming are being increasingly utilized as containment mechanisms for such diseases. As a result, the healthy gaming initiative, "Fit Sprint," was created under the Project UNITED initiative with the ultimate goal of enticing K-12 students into developing a greater understanding of their diet and maintaining healthy eating habits. Through an entertaining, quick and easy gaming application that requires users to input their lunch contents, "Fit Sprint" assigns basic health scores to each food entry, allowing for the collection of individual nutritional data. Once implemented within K-12 schools, said data may be tracked longitudinally for each individual participant, allowing for a quantitative record of how "Fit Sprint" and other Project UNITED initiatives impact student food selection, nutritional intake, and correlating clinical data, so as to evaluate the relative efficacy of each program. Additionally, the game will encourage students to look at their caloric and nutritional intake at the end of each game due to their subconscious food journaling, further emphasizing the importance of healthy eating, and curbing the effects of metabolic disease in American schools.
Access to Diabetes Education Services in Alabama: A Geographical Information System Analysis

Most recent estimates indicate that 21 million Americans have been diagnosed with diabetes and an additional 8.1 million are living with undiagnosed diabetes (CDC 2014). Currently diabetes is the seventh leading cause of death in the United States (CDC 2014). Patient education in diabetes self-management, including healthy eating, being active, adhering to medications, monitoring blood glucose and stress management, can improve clinical outcomes and patients' health statuses. Diabetes education programs are not uniformly accessible and can contribute to disparities in health outcomes and status. Disparities in access to healthcare services are major public health priorities. Healthy People 2020, has the goal of achieving health equity, eliminating disparities and improving the health of all groups. Studies have shown differences in access associated with age, education, race and ethnicity, sex, socioeconomic status and the location of healthcare services. The objective of this study is to explore the geographical accessibility of persons in Alabama to diabetes education services. A retrospective cohort study design will be used to determine the proportion of the Alabama population with geographical access and identify geographical areas of limited coverage. The study will use U.S. Census data and a geographical information system (GIS) to measure distance to diabetes education and percentage with access by rural status, age, education, race, sex, and socioeconomic status.
Samantha Tilson, Engineering - Chemical and Biological Engineering
Faculty Mentor: Yonghyun (John) Kim, Engineering - Chemical and Biological Engineering

The Effects of ROCK Inhibitors on the In Vitro Expansion of Glioblastoma Stem Cells

Due to their stem-like characteristics and their resistance to existing chemo- and radiation therapies, there is a growing appreciation that cancer stem cells (CSCs) are the root cause behind cancer metastasis and recurrence. However, these cells represent a small subpopulation of cancer cells and are difficult to propagate in vitro. Glioblastoma is an extremely deadly form of brain cancer that is hypothesized to have a subpopulation of CSCs called glioblastoma stem cells (GSCs). We propose the use of selective Rho-kinase (ROCK) inhibitors, Y-27632 and fasudil, to promote GSC-like cell survival and propagation in vitro. ROCK inhibitors have been implicated in suppressing apoptosis, and it was hypothesized that they would increase the number of GSC-like cells grown in vitro and improve cloning efficiencies. Indeed, our data demonstrate that transient and continuous supplementation of non-toxic concentrations of Y-27632 and fasudil inhibited apoptosis, enhanced the cells’ ability to form spheres, and increased stem cell marker expressing GSC-like cell subpopulation. Our data indicated that pharmacological and genetic (siRNA) inhibitions of the ROCK pathway facilitates in vitro expansion of GSC-like cells. Thus, ROCK pathway inhibition shows promise for future optimization of CSC culture media.
Hannah Townsend, Nursing - Capstone College of Nursing
Allie Adams, Nursing - Capstone College of Nursing
Cassidy Dillman, Nursing - Capstone College of Nursing
Sarah Lynn Dillman, Nursing - Capstone College of Nursing
Nicole Duke, Nursing - Capstone College of Nursing
Madison Wilhite, Nursing - Capstone College of Nursing
Paula Radcliff, Nursing - Capstone College of Nursing
TJ Rehmert, Nursing - Capstone College of Nursing
Faculty Mentor: Brian Dickson, Nursing - Capstone College of Nursing

Bariatric Surgery Outcomes Based on Facility Accreditation
With the increased rates of obesity in the state of Alabama many behavioral weight loss modifications have been unsuccessful leading to an increase in bariatric surgeries. Studies have shown that bariatric surgery is the most successful method of sustained weight loss in morbidly obese patients when lifestyle modifications are unsuccessful. According to literature, accredited bariatric facilities showed a decreased cost, length of stay, and mortality rates over non-accredited facilities. Currently only nine of 92 hospitals in the state of Alabama are accredited bariatric facilities. Research methods included, but not limited to, in-depth review of recent evidence based research as well as touring a large urban accredited bariatric facility. Results showed total facility charges, complications, and mortality rates were all higher in non-accredited bariatric facilities when compared to accredited bariatric facilities. Therefore, hospitals performing bariatric surgeries are advised to seek accreditation.
**Oral & Poster Presentation Abstracts**

**Hannah Townsend**, Nursing - Capstone College of Nursing  
**Mary Talbot Skinner**, Nursing - Capstone College of Nursing  
Faculty Mentor: Olivia May, Nursing - Capstone College of Nursing

*To Aspirate or to Not Aspirate?*

The issue of whether or not to aspirate the needle when giving a vaccine has become a pressing question in the field of nursing. Many nurses have been taught to aspirate for needle placement when administering vaccinations despite lack of scientific evidence that this practice is required. Determining the basis behind “to aspirate or not” will help to educate nurses about the correct evidence-based practice for vaccine administration. This literature review, examines research focusing on the scientific evidence behind aspirating for blood to verify correct needle placement when administering a vaccine. The Center for Disease Control (CDC) and The American Council on Immunization Practices (ACIP) guidelines along with other research studies were reviewed for evidence about the importance of needle aspiration. From the compilation of the research and government guidelines, it has been concluded that there is no scientific evidence in support of aspirating during vaccine administration. Lack of knowledge was found to be the major obstacle to practice change.
Melissa Uehling, A&S - Biological Sciences  
Faculty Mentor: Kim Caldwell, A&S - Biological Sciences  
Xiaohui Yan, A&S - Biological Sciences

Screening therapeutic drugs for chemical enhancement of torsinA function in C. elegans model of dystonia

Dystonia is a movement disorder that involves repetitive, involuntary muscle contractions that are painful and debilitating. A specific form of dystonia called early-onset torsion dystonia is a severe, heritable form studied in our lab. This disorder is characterized by mutations in the DYT1 gene resulting in the loss of function of a critical chaperone protein, torsinA, in the endoplasmic reticulum (ER). TorsinA regulates proper protein folding, and mutations of torsinA can result in the accumulation of misfolded proteins. These accumulated misfolded proteins interfere with nerves in the brain involved in muscle control. Consequently, patients lose control over their muscles and experience extreme pain, often confining them to a wheelchair. Our lab successfully established a C. elegans ER stress assay in order to examine the cellular activity of torsinA. Using this model, we screened numerous FDA approved drug candidates that could promote torsinA activity. C. elegans were pre-exposed to a chemical that induces protein misfolding in the ER, and we then examined whether a particular drug could enhance torsinA to reduce the stress of protein misfolding in the ER. We found that three therapeutic candidates display the desired effect. These three candidates are currently being analyzed to identify functional groups that intensify torsinA activity. The information obtained from this drug discovery project represents a promising new approach toward the treatment of dystonia.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
**Oral & Poster Presentation Abstracts**

**Clayton Wagenhals**, Engineering - Mechanical Engineering  
Faculty Mentor: Richard Branam, Engineering - Aerospace Engineering and Mechanics

*Micro-Hall Effect Thruster*

Current propulsion methods constrain the effectiveness of research and observation done by small satellites, requiring power, volume, and weight resources that could be otherwise allocated to satellite performance. Future satellite innovation and operational growth is inhibited by constraining and under-performing propulsion systems, preventing investment in low budget satellites. Small satellites require the ability to conduct orbital maneuvers, control momentum, and precisely reorient to effectively function. The research by Dr. Richard Branam and his team at The University of Alabama works to optimize and upgrade small satellite in-space propulsion systems by designing and optimizing a Hall Effect Thruster to address these propulsion constraints. The Micro Hall Effect Thruster represents a magnitude reduction in the size and weight of plasma propulsion systems while implementing a permanent magnet inside the thrust channel to optimize the propelling electric field. This study focused on reducing thruster complexity while improving thruster efficiency and specific impulse. The research conducted involved thrust measurement, voltage-current variation, propellant conservation techniques, and thruster operating boundaries. The goal of this research is to provide performance (specific impulse > 1000 seconds, thrust ~ 1.0 mN) to achieve attitude precision of 0.1 degrees, enabling high-resolution, Earth observing missions in micro-satellites.
Financial Counseling: Characteristics of Interested College Students

We investigated students’ interest in financial counseling at the University of Alabama. Specifically, what are the differences between students who are interested in financial counseling versus those that aren’t, investigating by demographics, financial attitudes, and financial behaviors? Preliminary bivariate analyses tested for differences in interest in financial counseling based on demographic characteristics, financial attitudes, financial behaviors, and financial knowledge. Marginal differences were identified between those who are interested in receiving financial counseling on campus and those that weren’t on variables including gender, class rank, financial attitudes, and financial behaviors. There was not a significant difference in financial knowledge scores. Based on preliminary results and past research, students nearing graduation have a high need of assistance as they are approaching “the real world” for finances, but these students are less likely to seek counseling. Students who have taken a financial education course or workshop may be more likely to seek help if it is offered on campus. By utilizing on campus education venues to promote the availability of financial counseling, students may respond and utilize the services at higher rates and at times that have larger impacts in their financial lives.
**Power PATH Head Start Intervention**

This is a baseline assessment with an end goal to be able to determine whether an intervention designed to improve socioemotional skills among children and address parental mental health is affected by individual children’s stress response patterns, or changes in those response patterns. Data were collected during the fall of 2014 and 2015 for the physiological component of this study using computer-based monitoring of electrocardiogram (ECG) and galvanic skin response (GSR) to examine how preschool children individually differ in their responses to everyday, mild stressors (such as speaking to an unknown adult, repeating a short list of numbers, or watching an emotion provoking video). In the spring of 2016, analysis of the ECG and GSR data began using Logger Pro, NeuLog, and AcqKnowledge. Upon completion of analysis of these data, a baseline for comparison of future observations will have been established. The results of this experiment will directly impact the Head Start programs implemented throughout the United States.
Brodie Wallace, Engineering - Aerospace Engineering and Mechanics
Faculty Mentor: Charles O'Neill, Engineering - Aerospace Engineering and Mechanics

Aircraft Dynamic Rate Derivatives Extraction for Design and Test-flight Support

Aircraft dynamic rate derivatives are measurements of how forces acting on an airplane, and the moments those forces cause, react as an aircraft undergoes a change in flight conditions, such as executing a roll or entering a dive. They are used for design and flight test support but remain difficult to estimate with large uncertainties. Aircraft with unfavorable dynamic rate derivatives must be redesigned with a large cost in both time and money. This project is working to evaluate several estimation techniques ranging from handbook to high-performance computational fluid dynamics (CFD) tools. More specifically, this project is evaluating estimation techniques from both the United States Air Force Data Compendium, a guide for calculating the flight characteristics of aircraft, and the Athena Vortex Lattice (AVL) program, a CFD tool created at MIT. In addition to testing older techniques, this research seeks to create a new method of quickly estimating dynamic rate derivatives using the open source CFD program VortexJE. The evaluation of techniques is being accomplished by comparing values for dynamic derivatives taken from flight and wind tunnel data in NASA technical reports to the estimation technique's values. The comparisons should highlight the reasons for lack of accuracy from, and consistency between, different estimation techniques.
Justin Waller, HES - General Studies in HES
Faculty Mentor: Jen Nickelson, HES - Health Science

Athletic Trainers: Helping champions everywhere
In the United States, high school athletes account for an estimated 2 million injuries annually. The DCH Sports Medicine outreach athletic trainer program, located in Tuscaloosa, is designed to address injuries among high school athletes. DCH Sports Medicine is located in Tuscaloosa. The goal for DCH Sports Medicine athletic trainers is to prevent injuries among the athletes by showing them proper training exercises or using preventative measures like bracing and taping. Athletic trainers are on site daily at the high schools for practice and games to evaluate, treat and rehabilitate athletic injuries. When injuries happen, the athletic trainers are there to evaluate and treat the injury and make the appropriate medical referral to a physician if necessary. Success is achieved when the athlete is returned to play. Athletic trainers display Communication Skills, Leadership and Systems Thinking Skills, Analytical/Assessment Skills and many more of the domains required for public health.
Wen Walsh, Engineering - Mechanical Engineering  
Faculty Mentor: Wen Walsh, Engineering - Aerospace Engineering and Mechanics

**Biofidelic Brain Model for Traumatic Brain Injury (TBI) Investigation**

Human brain is the most sensitive organ, and is protected by the skull from injuries during fall, stroke or blast wave impacts. To date, very few experimental investigations have been conducted on Traumatic Brain Injury (TBI). One of the key reasons for lack of experimental models is the unavailability of high-fidelic human brain models. In this computational work, image segmentation is performed on human brain images to generate a computational model. The brain model with various brain tissue material properties will be subjected to different loads to characterize their behavior under blast loads. This can ultimately aid in developing an ideal brain tissue model.
Michael Walters, A&S - Physics and Astronomy  
Faculty Mentor: Patrick LeClair, A&S - Physics and Astronomy  
Ali Amiri, A&S - Physics and Astronomy

The Application of Vanadium Dioxide in Audio Amplifiers

Vanadium dioxide is a unique material with a number of interesting characteristics. One of the most interesting characteristics is that at around 340 Kelvin the sample experiences a large resistance change, as much as 5 orders of magnitude. This large change could be very useful in memory and sensor applications. In addition to changing temperature, the resistance change can be induced by applied voltage, and exhibits hysteresis and nonlinearity as the voltage is changed. This loop is best seen on a graph with voltage versus current. Both the nonlinearity and hysteresis could be used to make “warmer” sounding audio amplifiers. The fact that the resistance change is not linear allows subtle reduction in gain at high intensity rather than abrupt clipping that occurs in solid state amplifiers. This is the very reason why tube amplifiers are said to sound warmer than solid state amplifiers. The sharper cutoff of solid state amplifiers leads to the addition of odd harmonics to the waveform, which creates what some call a harsh sound. A more gradual gain decrease leads to the rounding off of the waves, and less intensity for odd harmonics, leading to a warmer sound. Using VO2 as an active element in a solid state amplifier, we should be able to mimic the behavior of a tube-based amplifier. This application allows for a warmer sound without the fragile nature and high cost of a true tube amplifier.
Charles Watts-Kerr, A&S - Biological Sciences  
Faculty Mentor: Stephen Secor, A&S - Biological Sciences  

You Digest More Flies With Honey Than With Vinegaroons  
We examined the cost of meal digestion for the vinegaroon (Mastigoproctus giganteus), a desert-dwelling arachnid that inhabits the southwestern US and feeds upon small invertebrates. We used closed-system respirometry to assess postfeeding changes in metabolic rate and to quantify the specific dynamic action (SDA) of the meal, the total cost of meal digestion. Following a cricket meal, metabolic rates of vinegaroons rose sharply to peak within 12 hours at twice the prefeeding standard metabolic rates (SMR). Metabolic rates then declined, retuning to SMR within 30 hours after feeding. For cricket meals approximately 5% of vinegaroon body mass, SDA averaged 60.2 J, equivalent to 2.85% of meal energy. Across meal sizes (3.5-13% of body mass), SDA increased as a function of meal mass. Independent of meal size and energy, the SDA of vinegaroons is similar to that of various species of tarantulas and scorpions, as well as being similar to the SDA of many other species of invertebrates.
Margaret Wilbourne, A&S - New College  
Faculty Mentor: Catherine Roach, A&S - New College  
Barbara Brickman, A&S - New College

Popular Culture and Environmentalism: An Exploration of Perspective

The idea of a "zeitgeist," or a defining cultural attitude of a specific time, carries with it a certain amount of influence and potential for action. Recently, environmental trends in recreation, the arts, and even fashion have become increasingly popular, especially for the Millennial generation. This project sought to answer whether these trends have enough of a connection to foster any kind of greater environmental awareness and appreciation. Mixed methods research was utilized in the form of an online survey. The testing pool was composed of University of Alabama students of different backgrounds and majors, but the same age group. Questions ranged from topics such as the frequency and destination of childhood vacations, recognition of popular "outdoors" companies' clothing and equipment branding, familiarity of popular music and movies with environmental themes, and current opinions on environmental issues such as climate change. Survey results indicated that while respondents had been exposed to nature as children and were well aware of these various environmentally related entities, owning and using these products did not have an overall influence on their relationships with, and concern for, the environment. In conclusion, an environmental zeitgeist is not yet born. For Millennials to become more engaged and concerned with environmental dilemmas, cultural popularity must be joined by a greater sense of reality, societal balance, and personal connection.
Erica Williams, Nursing - Capstone College of Nursing
Faculty Mentor: Paige Johnson, Nursing - Capstone College of Nursing

Cobb County Health Assessment
Health promotion and disease prevention are important factors in reducing illnesses from occurring and spreading in a community by increasing health knowledge and encouraging positive lifestyle behaviors. Community health professionals are responsible for educating and providing the proper resources and finding solutions to better improve a community. Before planning and intervening, one must determine the community's priority health concern and availability of resources by researching and assessing the area. It is important to gain the community's trust and make commitments only if they are attainable. Once the needs of the community are determined, community health professionals can customize a plan that meets the needs for that specific community and implement changes using evidence based interventions. This presentation focuses on the community assessment of the city Smyrna, located in Cobb County, Georgia. The major health concern and the characteristics of the community are identified and an evidence-based intervention is established.
Emily Williamson, HES - Human Development and Family Studies  
Rachael Robbins, HES - Human Development and Family Studies  
Faculty Mentor: Maria Hernandez-Reif, HES - Human Development and Family Studies  
Hunter Sartain, HES - Human Development and Family Studies  

_The Family Interaction Project: A Study on the Relationship between Leisure Activities and Language Acquisition in Young Children_

The current study explores two questions related to factors that impact young children's development. The first question asks if infants' and toddlers' language skills are related to the daily leisure activities they do at home, such as the amount of time spent watching television, the amount of time spent playing outdoors, and how often they are read to. For that question, children's language skills are measured by a standardized questionnaire completed by their childcare teacher (CSBS: Communication and Symbolic Behavior Scales Developmental Profile). The CSBS examines young children's use of eye gaze, gestures, and words to communicate with others, as well as their understanding of adults' simple language commands or questions (e.g., "Please bring me that book" or "Do you want milk?"). Leisure activities are determined by a parent-filled questionnaire (DFA: Daily Family Activities). The second question explores if the quality of young children's sleep affects their communication skills. That question compares data from the CSBS with information regarding young children's sleep activities recorded in the DFA. The two research questions for this study are drawn from an ongoing longitudinal study that is exploring factors in early infancy/toddlerhood that predict children's school readiness. Language skills have been related to children's success in school. Thus, it is important to understand factors that might enhance or impede young children's language development.
**Life Long Fitness**

*Background:* The rec center focuses on physical wellness through exercise. Physical wellness is essential to keeping individuals from developing chronic diseases. Purpose: I am volunteering at The University of Alabama Recreation Center, which is located at 401 5th Avenue East Tuscaloosa, AL 35405. The rec center's mission is to provide opportunities for wellness, health and being a part of a community. There are group exercise classes, intermurals, and other options that lead to completing this mission. During this volunteer experience I am helping encourage students to participate and observing the daily operations of the rec center. Methods: The programs listed above as well as many other available activities and facilities lead to the desired health outcomes. Promoting these programs is essential in keeping students healthy. Results: Success is measured in participation numbers. Public Health Domains: There are not explicit displays of health education. However, the rec center does use public health concepts when planning events and trying to increase student involvement. Health Education Areas of Responsibility: Not being a health education organization, direct education in a classroom or pamphlet setting is not applicable. Instead the rec center manages health through exercise learning. Student needs are assessed to see how to improve the exercise programs. Sharing the importance of exercise to improve health is also a main focus of the rec center.
Dana Woodruff, A&S - Biological Sciences
Faculty Mentor: Stephen Secor, A&S - Biological Sciences

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*

No skin off their backs, amphiuma maintain skin structure through estivation
No skin off their backs, amphiuma maintain skin structure though estivation. The three-toed amphiuma (Amphiuma tridactylum) is a large aquatic salamander that inhabits swampy wetlands of the south-central US. During periods of drought, amphiuma bury themselves into the soil and estivate for months underground without food or water until the next heavy rainfall refills their habitat. Characteristic of fishes and amphibians that estivate underground during dry seasons is the covering of the body in a cocoon fashioned from dried skin, mucus, or mud. This cocoon reduces water loss and prevents dehydration. Interestingly this amphiuma does not cover itself in a cocoon during estivation. We therefore predicted that amphiuma employ an alternative strategy to reducing water loss by altering the structure of their skin. We examined the tissue structure of amphiuma skin for individuals in water after feeding, in water following 1, 3, or 6 months of fasting, and of individuals estivated without food or water for 3 or 6 months. We observed no differences among these different treatments in the thickness of the epidermal and dermal layers, in the relative number of dermal mucous or granular glands, or in the volume of mucous glands. Amphiuma do not form a cocoon and apparently do not alter the structure of their skin with the onset of or after extended periods of estivation. These salamanders must therefore rely on other mechanisms to prevent dehydration during estivation.
Amber Wright, A&S - Psychology
Faculty Mentor: Dr. Tricia Witte, HES - Human Development and Family Studies

Why Do We Stigmatize Substance Users?
Stigma occurs when one is disqualified from social acceptance due to specific attributes or negative characteristics. Stigma toward substance users can have a serious, wide-spread impact on their ability to obtain a job, form social relationships, and participate in the social arena. The goal of the present study was to determine specific factors that may contribute to "enacted stigma," which is discrimination based on membership in a stigmatized group. Six pairs of vignettes were used to test the influence of six variables on the level of stigma toward substance users: the voluntary nature of drug/alcohol use; the severity of consequences related to drug/alcohol use; the medical nature of the diagnosis; behaviors used to get money to support drug/alcohol use; the level of denial and willingness to recover; and relapse tendency. A randomized set of three vignettes was distributed to 359 undergraduate students in a classroom setting. Participants read each vignette and answered questions about the character in the vignette. Stigma was measured using scales for feelings toward each character, preferred social distance from each character, and perceived attributes for each character and were compared across each vignette pair to determine the degree to which each variable influenced stigma toward substance users.
Delphanie Wu, A&S - Communicative Disorders  
Faculty Mentor: Rebecca Brooks, A&S - Communicative Disorders  
Darrin Griffin, C&IS - Communication Studies

An Analysis of American Sign Language Instruction at Public Universities
This study begins with an analysis of descriptive statistics on American Sign Language (ASL) and Deaf Studies programs at public universities in the United States. Data was collected on both the occurrence and format of said programs and course offerings at public state universities around the nation. The University of Alabama currently does not offer ASL courses, despite having several areas of study which would benefit from ASL instruction, including but not limited to: Communicative Disorders, Special Education, Early Childhood Education, Social Work, Modern Languages. The data allows us to make comparisons between others schools with ASL programs and UA. This study concludes with recommendations for building ASL classes as well as evaluating how our specific goals at the University of Alabama could be met with offering this language to students of all disciplines.
Joo Young Yang, A&S - Psychology
Faculty Mentor: Giyeon Kim, A&S - Psychology

Limited English Proficiency and Psychological Distress among Elderly Asian Americans: Mental Health Disparities within Asian Population

Limited English Proficiency (LEP) is associated with poorer health and is prevalent among elderly Asians, but limited research is available for them. This study examined the relationship between LEP and mental health and the heterogeneity of the relation across five Asian subgroups and nativity. Using the 2011-2012 California Health Interview Survey, we selected Asian adults aged 60 and older (n=1,515) to test the relationship between LEP and psychological distress. Then we examined whether this relationship varies across five different Asian subgroups (Chinese n=414, Japanese n=190, Korean n=384, Filipino n=163, and Vietnamese n=364) and by nativity (US born n=225 vs. Foreign-born n=1290). Psychological distress was measured with the K6 (Kessler et al., 2002). Using hierarchical regression analysis, covariates were entered in the first step, and LEP status in the second step. In the last step, the interactions of LEP by Asian subgroups were entered. Results showed that elderly Asians with LEP were significantly more likely than their English proficient peers to suffer psychological distress (p=.002). While there was no significant variation of psychological distress by nativity (p=.949), there was a significant variability of psychological distress across five Asian subcategories (p=.005). This study suggests that generalization of the Asian population can misrepresent health burden in specific Asian categories, recommending ethnically focused approach in healthcare system.
Establishing Inter-rater Reliability on an Observer-Coding Measure

The therapeutic alliance, namely the relationship between a client and therapist, has been defined as the agreement between the two parties on the goals of therapy, the delegation of tasks and responsibilities in therapy, and development of the bond between the therapist and client. Few measures have been designed to assess this tri-part construction of the therapeutic alliance for children psychotherapy. Created to evaluate the association between alliance and the outcome of therapy, the Therapy Process Observational Coding System for Child Psychotherapy Alliance Scale (TPOCS-a) describes the bond and tasks dimensions of the therapeutic alliance in child therapy. This measure is unique in that it is specifically for children, as well as based on observer coding of therapy sessions. For the current study, Dr. Oshequilla Mitchell trained four undergraduate students to use the measure by reviewing the Scoring Manual for the TPOCS-a. The students individually watched nine previously recorded intervention sessions and completed the TPOCS-a for each session. The children, screened by teachers as highly aggressive, received a school-based cognitive-behavioral program. The individual ratings were analyzed to determine the specific items of the measure with the highest inter-rater reliability. This analysis will lead to an increased understanding of which aspects of the therapeutic alliance are most easily identified by objective observers when coding child therapy sessions.
Shuwen Yue, Engineering - Chemical and Biological Engineering  
Faculty Mentor: David Dixon, A&S - Chemistry

**Computational Studies of the Conversion of Biomass to Biofuels: Acid-Base Chemistry**

Computational studies relevant to the conversion of biomass to biofuels and intermediates for the chemical industry have been performed to develop reactivity predictors. Density functional theory and the G3MP2 composite correlated molecular orbital theory levels were used to predict the acidities and basicities in the gas phase as well as pKa's and pKb's in aqueous solution. This method has been carefully benchmarked against experimental data and has been applied to 100's of key intermediates in the conversion of biomass-derived glucose to biofuels. Excellent agreement exists between the available experiment and theoretical results.
Oral & Poster Presentation Abstracts

Megan Zartman, C&IS - Communication Studies  
Faculty Mentor: Carol Mills, C&IS - Communication Studies

The Effect of Significant Others on Sister Relational Closeness in College, and What Can Be Done About It.

Though there is research on sister dynamics in late adulthood, there is a lack of explicit research on the relational closeness of sisters during the college years. In particular, there is little documentation on the effect of significant others on sibling relational closeness. Thus, the purpose of this study is to investigate the impact of significant others on the relational closeness of sisters during the college years. This study first reviews relevant literature, and then records and analyzes interviews of six women currently enrolled in college that have a sister that is also in college or that has graduated from college in the last academic year—one of which is currently in a romantic relationship. Subjects recruited by the researcher and snowball sampling answer the International Review Board-approved interview questions with consistency and insight. With these responses, the researcher conceptualizes multiple themes regarding the three research questions and records best-practice communicative behaviors for women in this context. This information relates to existing research, reveals the presence of more novel phenomena within the sister relationship like judgement, and suggests directions for future research.

*The information presented here is intended to represent exactly what was submitted by the student. Errors can occur in the transfer process.*
Lindsey Zimmer, Nursing - Capstone College of Nursing
Nikayla Dickey, Nursing - Capstone College of Nursing
Kristen Lusco, Nursing - Capstone College of Nursing
Tatiya Lusco, Nursing - Capstone College of Nursing
Virginia Pittman, Nursing - Capstone College of Nursing
Hannah Pitts, Nursing - Capstone College of Nursing
Molly Snyder, Nursing - Capstone College of Nursing
Megan Ten Berge, Nursing - Capstone College of Nursing
Faculty Mentor: Meridith Rice, Nursing - Capstone College of Nursing

The "Silver" Lining in the Surgical Process: Silverlon
Surgical site infections (SSIs) are one of the most common hospital-acquired infections in postoperative patients. At our clinical site, measures are taken to reduce SSIs in orthopedic patients. A current form of protection against SSIs is the use of Silverlon dressings instead of a dry gauze dressing. To determine the efficacy of Silverlon dressings in reducing infection, we researched the effects of silver on microbials, as well as infection rates in randomized control trials using silver-impregnated dressings versus traditional dry gauze dressings. We interviewed the nursing staff on our unit about the use of Silverlon dressings on the unit. Typical surgical incisions are dressed with dry gauze and tape. Silverlon’s silver plated nylon dressings have the ability to bind to the surface of bacterial cells and rupture cell walls, inhibit bacterial enzyme production, and block electron transport within the bacteria. Research shows that clinical trial infection rates were significantly lower in groups who were receiving silver-impregnated dressings versus traditional dry gauze dressings. Limitations of research included finding accurate cost comparisons between traditional dry gauze dressings and the use of Silverlon dressings. We have concluded that Silverlon dressings are more efficient at decreasing SSIs, and therefore should be considered before applying a dry gauze dressing.