

# Oral & Poster Presentation Abstracts

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**Paula Adams**, Biological Sciences

Faculty Mentor: Ryan Earley, Biological Sciences

*Using Genomics to Understand the Cause of Male Development in the Mangrove Rivulus*

Environmental cues drive the development of males in the mangrove rivulus fish. Embryos were allowed to develop at 20 °C, 25 °C and 35 °C to determine the genes that regulate the emergence of hermaphrodites vs. males in response to temperature. Embryos were removed from the treatment before or after a temperature-sensitive period, and will undergo RNA-seq to determine gene expression levels in each treatment and period. These results will reveal candidate genes responsible for male development.

**Saahil Agrawal**, Mechanical Engineering

Faculty Mentor: Clark Midkiff, Mechanical Engineering

*High-Speed Photographs of Two-Phase Flow inside a Fuel Injector*

Fuel injectors supply fuel in spray form to many different energy providers including burners, turbines and furnaces. In this study, a transparent fuel injector is utilized to investigate internal two-phase flow resulting from interactions between liquid and atomizing gas flows. The flow domain within the injector is illuminated by LED lights and images are captured with high-speed digital cameras. By understanding inner injector interactions, we can improve overall system fuel efficiency.

**Stephen Allen**, Economics, Finance & Legal Studies

Faculty Mentor: Matt Van Essen, Economics, Finance & Legal Studies

*Stress Testing a Fundamental Prediction in Game Theory*

In many strategic scenarios, the number of players, specifically whether they be even or odd, effects player's optimal strategies. However these strategies may not be obvious to players who may act irrationally due to the non intuitive nature of number effects in these games. A simple experiment was designed and is in the process of being implemented to see the consistency or lack thereof of number effects on people's decision making in the real world.

**Fatimah Alsadah**, Clothing, Textiles & Interior Design

Faculty Mentor: Kristin Maki, Clothing, Textiles & Interior Design

*Children's Learning Center*

Inspired by Arab influence, The Dream Center in west of Manhattan, NY designed with fresh approach to modern convenience feeling that create a bridge of understanding between the Americans and the Arab world by sharing their tribute to the art and science of modern engineering and design in one place. The project address an interior design solution for the challenge of creating a fun learning environment that produces the desired behavior and deters undesirable behavior.

**Lauren Alvis**, Psychology

Faculty Mentor: Fran Conners, Psychology

*Executive Function in Down syndrome*

Executive function is the regulatory control of cognitive, emotional and behavioral functions. The Behavior Rating Inventory of Executive Function (BRIEF) measures functions that can be distinguished between hot executive function (inhibit and emotional control) and cool executive function (working

memory and plan/organize skills). This current study will use the BRIEF, parent version, to examine executive function profiles in school aged participants with Down syndrome vs. adult participants.

**Samuel Andersen**, Biological Sciences

Faculty Mentor: Sherry Wedgeworth, University Medical Center

*Bacterial Antibiotic Resistance in an Outpatient Medical Center*

It's well documented that many bacterial species have mechanisms for adapting to external stresses, including those from antibiotics. The acquisition of such resistance in pathogenic bacteria to antibiotics has serious implications for the effective treatment of patients. Thus, this study's systematic organization and compilation of the results from analyzing bacterial antibiotic resistance in samples collected at the University Medical Center is necessary to aid in proper patient treatment.

**Michael Arnold**, Health Sciences

Faculty Mentor: Lori Turner, Health Sciences

*Promote Awareness and Intervention of Educational Barriers that Distress Transitioning Veteran Students With PTSD : Application of Social Support Concepts*

This research is to suggest the importance of accommodating student veterans with PTSD. Post-Traumatic Stress Disorder is an anxiety disability with both mental and biological symptoms. PTSD is a recurring issue with our veterans who are returning home from combat and entering educational facilities. Student veterans who suffer with PTSD are at risk of unintentional learning disadvantages and unique challenges compared to traditional college students. Of the 289,328 Iraq and Afghanistan veterans, around 21.8% have been diagnosed with PTSD. Peer reviewed journals were referenced and VA medical professionals were interviewed to raise awareness of PTSD and to develop a program at the university for veterans per the Americans with Disability Act and Social Support Concepts.

**Michael Arnold**, Health Sciences

**MacKenzie Bethune**, Health Sciences

**Jalston Folwer**, Health Sciences

Faculty Mentor: Melanie Tucker, Community and Rural Medicine

*Distortion and Connotations of Weight Perceptions Among Traditional College Students*

The research suggests the believed abstraction that media outlets have engaged a distorted perception of appropriate weight and body image among traditional college students. The disposition was to show that college students are not dismissed from this incidence of perceived weight. A recent study completed at a south-eastern university displayed that half of students with a normal BMI felt the need to gain or lose weight. Through instrumentation of agglomerated data and the citation of peer reviewed journals, weight perception proves significant enough to suggest interventions by use of the Social Cognitive Theory.

**Travis Atchley**, Chemistry

Faculty Mentor: Silas Blackstock, Chemistry

*Novel Donor-Acceptor Complexation and Cocrystalization*

Electron rich donor structures (D) bind reversibly to electron poor acceptor quinones (A) via supramolecular DA bonding to give colored complexes:  $D + A \rightleftharpoons [D \cdot A]$ . These DA complexes can be crystallized as solid DA networks, whose atomic positions are determined by X-ray diffraction analysis. The DA cocrystal features include  $n^*-\pi^*$  DA bonding,  $\pi$ -stacking of the D phenyl rings and polar alignment of the A's. Alignment of the polar axis and  $\pi$ -stacking axis is observed in this unique DA crystal.

**Spencer Baer**, Chemistry

Faculty Mentor: David Nikles, Chemistry

*Synthesis of BiMn Nanoparticles For Use in High Energy Permanent Magnets*

BiMn nanoparticles have the potential to be useful in creating permanent magnets which may be strong enough to replace magnets created from Neodymium alloys and alloys of other rare-earth metals. This study represents progress in attempting to synthesize BiMn nanoparticles. Reactions were carried out using BiCl<sub>3</sub> and Mn<sub>2</sub>(CO)<sub>10</sub> as metal precursors. Analyses revealed two obstacles to the synthesis: a deficiency of Mn in the final product and the presence of BiClO.

**Sarah Bailey**, Geological Sciences

Faculty Mentor: Harold Stowell, Geological Sciences

*Geochronology and Geothermobarometry of the Misty Pluton in Fiordland, New Zealand*

*\*International focus*

The processes which accommodate changes from thick arc crust to collapse and the opening of ocean basins are poorly understood. Such processes can only be studied directly in deeply eroded mountain belts such as Fiordland. Using isotopic data, electron microprobe analysis, and x-ray fluorescent spectroscopy, we are able to determine the chemical composition, age, and pressure and temperature conditions at which these rocks formed, and therefore interpret the complex geologic history of the area.

**Kayla Bates**, Communicative Disorders

**Samantha Erickson**, Communicative Disorders

**Olivia Killian**, Communicative Disorders

**Sara Beth Redmon**, Communicative Disorders

Faculty Mentor: Anthony Buhr, Communicative Disorders

*Investigation of Apparent Speech Errors in a Preschool-Age Child Who Stutters*

The purpose of this study was to investigate whether the perception of velar sound errors ([k] or [g]) in a preschool-age child was indicative of stuttering or velar sound errors. Transcriptions of the child's speech were made across 8 weeks, and speech disfluencies and errors were coded. Results showed that changes in stuttering rate were related to changes in the rate of apparent sound error. This suggests that these velar stop sounds were part of the child's overall stuttering behavior.

**Elizabeth Beale**, New College

Faculty Mentor: Julia Cherry, New College

*Managing Greenhouse Gas Emissions on Croplands: An Ecological Approach to Agricultural Intensification*

The projected rise in global food demand threatens the stability of local ecosystems and the global climate. This report explores the options and challenges of increasing crop production while reducing net greenhouse gas emissions, specifically investigating tradeoffs between nitrous oxide emissions from fertilizer inputs, and carbon dioxide emissions from land clearing. It outlines a framework for sustainable methods of agricultural intensification with policy implications.

**Mirza Beg**, Chemistry

Faculty Mentor: David Nikles, Chemistry

*Magnetic Particles with a Polycaprolactone Coating and Preparation of Magnetic Micelles for Drug Delivery*

3-Aminopropyltrimethoxysilane was bound to the surface of magnetite nanoparticles to give a surface of primary amine groups. A polymerization of ε-caprolactone was initiated from the surface bound

amines to give particles coated with polycaprolactone. These were incorporated into magnetic micelles made from poly(ethylene glycol-b-caprolactone) diblock copolymers. The particles were trapped in the semi-crystalline core of the micelles and their hydrodynamic radius was determined by DLS.

**Jonathan Belanich**, Biological Sciences

Faculty Mentor: Stephen Secor, Biological Sciences

*Postprandial Metabolic Response and Specific Dynamic Action of scorpions*

For six scorpion species, the postprandial metabolic profile and the specific dynamic action (SDA) was characterized after the consumption of a cricket meal. Body mass ranged from 0.8-17.5g and meal sizes ranged from 4.6-9.5% of body mass. All species responded with a rapid increase in metabolic rate that peaked at six hours post-feeding and declined to baseline rates within three days. Postprandial metabolic peaks ranged from 1.8-5.3-fold of SMR and SDA ranged from 15 - 297 J.

**Stephanie Bevans**, Chemistry

Faculty Mentor: Kevin Shaughnessy, Chemistry

*Palladium-catalyzed cross-coupling reactions of malonate derivatives with aryl halides using DTBNpP as the activating ligand*

Carbon-carbon palladium-catalyzed cross-coupling reactions have received attention recently due to their significance in the synthesis of natural products and pharmaceuticals. Studies have been focused as of late on the development of sterically demanding, electron-rich alkylphosphine ligands due to their high efficiency in cross-coupling reactions. Previous group studies have shown that the di(tert-butyl)neopentylphosphine (DTBNpP) ligand activates palladium catalysts for the coupling of aryl

**Yuliya Birman**, Chemistry

**Brittani Hays**, Chemistry

Faculty Mentor: Patrick Frantom, Chemistry

*Determining the Influence of the Metal-Binding Site in Isopropylmalate Synthase from Mycobacterium tuberculosis*

The enzyme isopropylmalate synthase from *Mycobacterium tuberculosis* (MtIPMS) catalyzes the first step in the biosynthesis of L-leucine, a feedback inhibitor. Previous results suggest that the required Mg<sup>2+</sup> ion can bind in multiple ways. Site-directed mutagenesis has been used to probe the functional importance of each site, giving fresh insight on enzyme mechanistic regulations and the development of novel drug targets.

**Luke Bishop**, Biological Sciences

Faculty Mentor: Ryan Earley, Biological Sciences

*Discovering the Metabolic Potential of the Ideal "Cloning" Organism*

This study aimed to understand the genetic and environmental bases for among-individual variation in metabolic rate. We challenged Mangrove Rivulus fish in a swim tunnel capable of measuring metabolic rate by integrating oxygen consumption over time in a closed system. This fish is ideal for this research because it can effectively clone, producing offspring genetically identical to the parent and all siblings, which allows us to isolate how genotype and environment interact to shape metabolism.

**Elizabeth Bistrong**, Psychology

**Heather Thomas**, Psychology

Faculty Mentor: Sara Stromeyer, Psychology

*The Role of Parent-rated Child Aggression in Mothers' Emotional and Parenting Behaviors*

This research is conducted under the direction of Dr. John Lochman, with UA's Center for the Prevention of Youth Behavior Problems. This study aims to explore familial relationships among aggressive children, given previous research. Participants include 67 children and mothers, interviewed in their homes. Significant results were found between maternal depressive symptoms, child aggression, and specific parenting styles, suggesting that children and their mothers reciprocally impact each other.

**Parker Boleneus**, Information Systems, Statistics & Management Science

**Yashika Johnson**, Information Systems, Statistics & Management Science

**Will Hewson**, Information Systems, Statistics & Management Science

Faculty Mentor: Uzma Raja, Information Systems, Statistics & Management Science

*March Madness Predictions*

Were collecting datasets of collegiate basketball statistics to attempt to accurately predict the winner of the march madness tournament. We will be using JMP and Excel data platforms in order to further show how we came about our predictions.

**Jordin Bonds**, Kinesiology

Faculty Mentor: Jen Nickelson, Health Sciences

*Weight, Nutrition, and Physical Activity of UA students*

Objective: To assess the need for a physical activity (PA) or nutrition intervention for University of Alabama students. Methods: A health survey was administered in spring 2013 to 30 UA students (46% female, 93% Caucasian, 46% seniors). Results: Only 3% of UA students ate the recommended >5 servings of fruits and vegetables (F&V)/day. Most students (60%) ate only 2 servings of F&V/day. < half took part in low-moderate intensity (50%) and vigorous intensity (36%) PA for > 4 days/week.

**Akeem Borom**, Biological Sciences

Faculty Mentor: Kim Caldwell, Biological Sciences

*ALS Findings: Torsin-Mediated Rescue of SOD1 ER Stress-Related Toxicity*

Amyotrophic Lateral Sclerosis is caused by protein aggregation in motor neurons triggered by dysfunction in the endoplasmic reticulum. A mutation in the SOD1 gene has been shown to cause proteins to misfold in familial ALS. We coexpressed torsin, a protein shown to alleviate protein misfolding in other neuron-related diseases, into the ALS model. Our findings suggest that torsin rescues the SOD1 mutation-associated behavior and protein solubility malfunctioning prevalent in our disease model.

**Johan Both**, Chemistry

Faculty Mentor: Silas Blackstock, Chemistry

*A Bis(Azo) Molecule that Coils and Uncoils*

The controlled cis/trans isomerization of a novel multi-aryl bis-azo compound is synthesized and studied as an archetype of general multi-azoaryl systems. Isomerization produces a theorized molecular spring-action in which the trans,trans isomer has a more extended, elongated structure than the cis,cis isomer, which has a more coiled shape. Isomerization has been studied using UV-Vis and <sup>1</sup>H-NMR spectroscopies.

**Shayna Bourassa**, Human Nutrition & Hospitality Management

**Suzanna Niehoff**, Human Nutrition & Hospitality Management

**Kelly Simmons**, Human Nutrition & Hospitality Management

**Elizabeth Murray**, Human Nutrition & Hospitality Management

Faculty Mentor: Lori Greene, Human Nutrition & Hospitality Management

*The Effects of Weight Loss on Bone Mineral Density in Older Adults: A Review*

Weight loss in older adults has a profound effect on bone mineral density (BMD). It is not known whether standard weight loss interventions are appropriate for people of this population. This was a review of eight clinical trials examining weight loss and subsequent BMD in the older adult population. The results of four articles concluded that an intervention combining weight loss with resistance training produced the most beneficial effects on preventing the decline in BMD.

**Kyle Bourgeois**, Information Systems, Statistics & Management Science

**Chris Honeycutt**, Information Systems, Statistics & Management Science

**Michael Bartlett**, Information Systems, Statistics & Management Science

Faculty Mentor: Uzma Raja, Information Systems, Statistics & Management Science

*Student Performance based on Resources Allocated*

Our group will begin to dissect data sets regarding the educational attainments or standardized test scores by state of the U. S. population. We will also explore regional tax rates and the average incomes for households across America. The purpose of this analysis is to find correlations between school funding, student resources and educational attainments. We believe this correlation will help to identify student performance based on resources allocated to students.

**Elizabeth Brandley**, Health Sciences

Faculty Mentor: Jen Nickelson, Health Sciences

*Sexual Health and Contraception*

Background: The purpose of this study was to explore contraception use among the UA student population. Methods: 30 UA students took part in a cross-sectional health survey. Results: Participants reported an average of 3 sexual partners in the past 30 days. 28% used emergency contraception and many used contraception control ineffectively. Discussion: Despite the sexual information resources available for students on campus, many students are still not protecting themselves from STDs/pregnancies.

**Mary Margaret Braswell**, Nursing

**Kelly Brasfield**, Nursing

**Michael Ammons**, Nursing

**Kate Barth**, Nursing

**Abigail Begovich**, Nursing

**Caleigh Bolt**, Nursing

**Brittany Calloway**, Nursing

Faculty Mentor: Clara Owings, Nursing

*What Are You Carrying in Your Pocket?*

The purpose of this project is to prevent the spread of healthcare associated infections through the transmission of bacteria from technological devices used in the hospital. Improper or inconsistent disinfection of technological devices can spread bacteria to staff and patients leading to infection. CDC guidelines recommend that items that have indirect contact with or touch only intact skin do not require disinfection between different patients. Hospital protocol requires routine cleaning of multi-use electronic devices. Significantly less bacteria grew from swabs of computers and comm-link phones cleaned with sani-cloth wipes. The CDC recommends low-level disinfectant use when necessary.

**Christian Brewton**, Computer Science

**Lloyd Wyse**, Management & Marketing

Faculty Mentor: Stephen Lovell, Computer Science

### *A Timeline of Programming*

We will be doing our project on the history of computer programming. It will begin with Ada Lovelace and go all the way to present programmers. It will be designed in a timeline format with pictures that correlate with the text.

### **John Brinkerhoff**, Geological Sciences

Faculty Mentor: Ryan Ewing, Geological Sciences

#### *Hyperspectral Logging of South Australian Stratigraphy during the Marinoan Glaciation*

The Marinoan Glaciation (635 million years ago) was a critical geological time in which Earth was likely covered in ice to the equator. Firm constraints environmental conditions during this time period have proven elusive. This study utilizes rapid spectroscopic logging to examine a Marinoan age drill core of sedimentary rocks. The study reveals mineral compositions that help define stratigraphic transitions and holds implications for future studies of the Earth during this extreme glaciation.

### **Justin Brooks**, Physics & Astronomy

Faculty Mentor: Conor Henderson, Physics & Astronomy

#### *The Search for Warped Extra Dimensions at the LHC*

The Large Hadron Collider is exploring the energy frontier of particle physics. The University of Alabama collaborates on the CMS experiment, which recently discovered the Higgs Boson and continues to search for new physics beyond the Standard Model. One such possibility being explored by UA researchers is the search for extra dimensions of space, with a warped geometry. This poster presents simulation studies relevant for this analysis, performed using the ROOT(C++) data analysis framework.

### **Karson Brooks**, Chemistry

Faculty Mentor: Shanlin Pan, Chemistry

#### *Surface Enhanced Raman Spectroscopy on Single Molecules of Trans- $\beta$ -apo-8' Carotenoic Acid on Nanostructured Surfaces*

Ultra-sensitive detection of trace amount of organic substances can be enabled by Raman spectroscopy techniques. Here we used SERS on three different substrates, TiO<sub>2</sub> with silver, nanotextured silver, and aqueous silver colloid solution, to obtain single molecule spectra of trans- $\beta$ -apo-8' carotenoic acid. A single molecule spectrum was obtained through use of the silver colloid substrate, giving clearly identified peaks consistent with literature and ensemble values.

### **Evan Brown**, Information Systems, Statistics & Management Science

**Ethan Miller**, Information Systems, Statistics & Management Science

**Brittany Summerlin**, Information Systems, Statistics & Management Science

Faculty Mentor: Uzma Raja, Information Systems, Statistics & Management Science

#### *Statistical Analysis of One Million Song Dataset*

To perform data visualization and analytics on a dataset of 1 million song records to highlight trends about the music. Additionally, we plan to give predictive modeling to forecast future trends in music analysis.

### **Heather Bryant**, Human Development & Family Studies

**Margaret Hanson**, Human Development & Family Studies

Faculty Mentor: Javonda Williams, Human Development & Family Studies

#### *Does being diagnosed with a chronic illness impact a person's spirituality?*

Questionnaires and case studies will be used in this presentation to propose that a person with a chronic illness can experience a change in their spirituality level based upon the type of illness they are

diagnosed with. Flower's Theory of Spiritual Development will be explained and used to display the different levels of spirituality. The main goal in this project is to show that a change in a person's spirituality level depends upon the severity of their diagnoses.

**Cole Buchanan**, Biological Sciences

Faculty Mentor: Matthew Jenny, Biological Sciences

*Development of a Web-Based Transcriptomic Database for Marine and Aquatic Organisms*

The purpose of the Eco-Genomics Project is to develop a publicly available web-based bioinformatics database containing transcriptomic data from marine and aquatic organisms. Tools including BLAST searching capabilities and gene ontology data have been added to the database to increase the functionality and accessibility of the sequence data. The database is currently in the final stages of implementation.

**Katy Buddemeyer**, Biological Sciences

Faculty Mentor: Stephen Secor, Biological Sciences

*Negative calorie food: fact or fiction*

We tested the nutritional claim that certain foods possess "negative calories" because they require more energy to digest compared to calories assimilated. We fed celery, a noted "negative calorie" food to omnivorous bearded dragons and quantified assimilation efficiency and the energy expended during digestion. Lizards assimilated ~70% of ingested celery calories and expended ~90% of that energy on digestion and assimilation; therefore the celery meal did not result in a net loss of energy.

**Malia Bunt**, Anthropology

Faculty Mentor: Christopher Lynn, Anthropology

*A Study in Human Habitat Selection and Biophilia*

I hypothesized that biophilia, E.O. Wilson's presupposition that we crave environments that are close to ancestral, can be found in the patterns of contemporary real estate prices. I test this hypothesis by examining real estate property profiles, applying componential domain analysis, and an interview process. These findings can have implications in the real estate market, ecology, and conservation efforts.

**Kristen Calos**, Nursing

**Amanda Carden**, Nursing

**Aubry Clayton**, Nursing

**Curtis Clements**, Nursing

**Elenta Coffey**, Nursing

**Jamie Camp**, Nursing

**Veronica DiChiara**, Nursing

**Laci Colburn**, Nursing

Faculty Mentor: Sandra Ambrose, Nursing

*Do You Scrub the Hub? Reducing Central Line Associated Bloodstream Infections*

Patients can contract bloodstream infections when the providers fail to properly clean an intravenous (IV) port. Hospital guidelines have been developed to prevent infections related to accessing the IV lines. Government guidelines determine that friction and proper solution must be used to properly clean these lines to prevent infection. This presentation explains how hospitals can improve compliance by using disinfectant caps. An ICU will do a comparison study for cost and efficacy.



**Shanley Carlton**, Mechanical Engineering

Faculty Mentor: Marcus Ashford, Mechanical Engineering

*Diesel Fumigation to Reduce Ignition Delay and Rapid Pressure Rise*

We are modifying a gasoline engine to run a fumigated diesel combustion cycle, which introduces fuel vapor into the airstream before entry into the cylinder. This combustion cycle reduces the ignition delay and rapid pressure rise characteristic of diesel combustion, enough that a lightweight motorcycle engine can be used as the platform. The prototype will be a faster, lighter engine that is at least 30% more efficient than its gasoline counterpart, with less NO<sub>x</sub> emissions.

**Emily Carnes**, Psychology

Faculty Mentor: Elizabeth Wilson, Curriculum & Instruction

*Preparedness for College: Were High School Classes Enough?*

A college degree is important when searching for a job, so what will it take to ensure that American students today are ready for college? Are students prepared to be in the college environment, or do they struggle to adjust upon enrollment? This study seeks to find to what extent students feel prepared for college and what, if anything, should be changed in order to better ensure students have a successful experience in attaining a degree.

**Brian Carr**, Chemical and Biological Engineering

**Dylan Nichols**, Chemical and Biological Engineering

Faculty Mentor: Alan Lane, Chemical and Biological Engineering

*Effects of Electrolytic Solution on Cyclic Voltammetry*

We studied the effects on cyclic voltammetry test results of different electrolytic solutions. The solutions studied were of sulfuric acid and perchloric acid which varied in concentration and purity of water used. The catalyst used for testing was Pt/C nanoparticles.

**Morgan Casavant**, Advertising and Public Relations

**Tess Tarrillion**, Communicative Disorders

Faculty Mentor: Teresa Golson, Art

*The History of Photography*

Since we are both student assistants for the photography department of the Center for Instructional Technology, we were interested in studying the history of photography and the technological advances that have brought the industry to where it is today. We fleshed out all of the historical developments to create a crash course of what we thought were the most important events in the development of the photographic process.

**Siddhartha (Neil) Chakraborti**, Economics, Finance & Legal Studies

**Zhechen Yu**, Accounting

Faculty Mentor: David Ford, Management & Marketing

*A Team Project at the Tuscaloosa Water and Sewer Business Office*

This project sought to maximize customer service and process efficiency in the Tuscaloosa Water and Sewer Department during times of extreme volume fluctuation. We began by analyzing data collected from the departmental phone system, employee interviews, and the payment counters. We then examined the systems used by peer cities. We make some recommendations here that the Water Department can use to regulate the workflow during peak times.

**Matthew Chapin**, Aerospace Engineering & Mechanics

Faculty Mentor: Qi Hao, Electrical and Computer Engineering

### *Visualization For Indoor GPS On Android Platform*

This project developed a visualization software platform for an indoor GPS system based on android devices: tablet and cell phone. The conventional satellite based GPS system cannot work within indoor environments. The indoor GPS provided position information of users for many applications. This project developed the necessary 2-D and 3-D visualization software components for such an indoor GPS. The related real-time display techniques of Java programming on the android platform were utilized.

### **Kristy Cherry-Randle**, Journalism

Faculty Mentor: Jennifer Greer, Journalism

#### *Covering Conflict: How College Newspapers Framed Racial Incidents Involving African Americans, 1997-2009*

Journalists create messages in news stories that shape views of race. No study to date has examined racial framing in campus newspapers. This study analyzed 237 campus news articles, examining focus and frames involving African Americans. A third of the articles involved communication incidents. Most stories carried an episodic frame. Thematic frames increased over time. The stories show conflict on campus as communication incidents stepped in conflict and focused on individual events and people.

### **Chris Chockley**, Computer Science

Faculty Mentor: Pieter Visscher, Physics & Astronomy

#### *3D Simulations of Micro-magnetic Fields*

This project focuses on the porting of a software system used to display 3D representations of micro-magnetic simulations. The port is occurring due to a discontinuation of maintenance for the COIN Open Inventor graphics API. The new software system will be written using C++ and the OpenGL graphics library. This combination was chosen for its continued maintenance by the developers. Currently the new software is still moving towards gaining the full functionality of the original program.

### **Carmen Christensen**, Biological Sciences

Faculty Mentor: Catherine Randall, Other

#### *Alabama Academy of Honor*

The Alabama Academy of Honor is an organization whose members include many of the most historically and culturally important citizens of the state. Over the course of the semester, the organization's website was brought up to date and organized in such a manner as to make it easier to access and understand for the members of the public, and easy to maintain and update for the organization.

### **David Cifelli**, Economics, Finance & Legal Studies

Faculty Mentor: Paula Cordero Salas, Economics, Finance & Legal Studies

#### *The Economic History of Brazil: The Rise of an Industrial Powerhouse and the Previous Reign of Raw Goods Exportation*

##### *\*International focus*

From the first days as a colony to modern times Brazil has faced generally faced reliance upon a limited range of goods which were exported. In turn the prosperity of Brazil was inherently linked to these raw goods. The legal framework of the country has only served to encourage the continuation of previous trends. It has only been relatively recently that things have started to change. The paper itself will examine the economic history of Brazil and examine why it has begun to industrialize.

### **Lindsey Cobb**, Chemical and Biological Engineering

Faculty Mentor: David Nikles, Chemistry

*Doxorubicin Encapsulation in Polymer Micelles Made from a Poly(ethylene glycol-b-caprolactone) Diblock Copolymer*

PEG113PCL99 was prepared by the tin-catalyzed, ring-opening polymerization of  $\epsilon$ -caprolactone of poly(ethylene glycol) monomethyl ether. Micelles were made by dispersing the polymer in ultrapure water. The critical micelle concentration, 1.44 mg/L, increased with increasing temperature. DSC showed that the core was semi-crystalline with a melting point of 53.5 °C. Doxorubicin was trapped in the core with a loading of 9.4%. The rate of isothermal release was determined at 27 and 57 °C.

**Molly Cook**, Biological Sciences

Faculty Mentor: Ryan Earley, Biological Sciences

*Reversed Sexual Dimorphism and Male Mate Choice in Convict Cichlids (Amatitlania nigrofasciata)*

Sexual dimorphism, phenotypic differences between males and females, plays an important role in mate selection. In rare cases, such as in convict cichlid fish, females, not males, possess ornate color patches. The adaptive function of this color, however, is poorly understood. We examined whether male mate choice is influenced by variations in female coloration. Preliminary results reject this hypothesis but we discuss interesting patterns indicating that color might serve other functions.

**Chelsea Costley**, Nursing

**Brittany Covington**, Nursing

**Colbie Davis**, Nursing

**Reneka Davis**, Nursing

**Tess Davis**, Nursing

**Sarah Day**, Nursing

**Katie Delinski**, Nursing

Faculty Mentor: Delta Pate, Nursing

*Medication Safety*

The purpose of this project was to identify and determine ways to improve the storing and management of medications. The door to the medication room is often left open and unsupervised. The simplest intervention to promote medication safety is to keep the door closed at all times. Another intervention is for each healthcare worker to have their own code to the medication room. These simple interventions could help to ensure the safe storage and dispensing of medications.

**William Cox**, Chemical and Biological Engineering

Faculty Mentor: Ajay Agrawal, Mechanical Engineering

*A Novel Fuel-Flexible Combustor for Industrial Applications*

An industrial scale Flow-Blurring injector (70 kW) is investigated for use in flexible fuel combustion. While the FB injector has proven to cleanly combust vegetable oil and diesel fuels over a large range of heating rates, it is of great interest to evaluate the injector with highly viscous fuels, specifically glycerol. Glycerol is often produced as a toxic by-product of biodiesel production. In this study, glycerol combustion is evaluated as compared to other commonly used fuels.

**Danielle Crimmins**, Criminal Justice

Faculty Mentor: Kathryn Seigfried-Spellar, Criminal Justice

*Factors affecting Sexting among Undergraduate Students*

Sexting is that act of sending suggestive photos via cell phone. The current study assessed the relationships between sexting behaviors and personality characteristics, the environment and psychological traits. Eighty-eight undergraduate students completed an anonymous online survey. There was a significant negative relationship between ambivalence and sexting, which indicates people who

sext are less concerned with what others think of them. Future research should focus not only on undergraduates.

**Sarah Crocker-Buta**, Biological Sciences

Faculty Mentor: Stephen Secor, Biological Sciences

*Determinates and repeatability of specific dynamic action for the corn snake Pantherophis guttatus*

I examined the effects of meal size, body temperature, and body size on the postfeeding metabolic rate and specific dynamic action (SDA) of the corn snake. An increase in meal size (5-45% of body mass), generated matched increases in metabolic rate and SDA. From 20 to 35 °C, snakes experienced an increase in standard metabolic rate (SMR) and peak VO<sub>2</sub>, but no significant change in SDA. Over a 46-fold range in body mass, SMR, peak VO<sub>2</sub>, and SDA scaled with mass exponents of 0.77, 0.93, and 1.00.

**Elizabeth Crowe**, Human Environmental Sciences

**Kelli Mitchell**, Human Environmental Sciences

**Monica Jackson**, Human Environmental Sciences

Faculty Mentor: Lori Greene, Human Environmental Sciences

*Prealbumin: an adequate indicator of malnutrition?*

The objective of this research is to review the efficacy of using prealbumin as the primary diagnostic criteria for determining malnutrition in the geriatric population. The effectiveness of the corrected rapid turnover protein increment index (CRII) was measured to see if that is a better indicator for protein status than prealbumin. The CRII has been shown to be an early predictor of nutritional status and is not impacted by inflammation as compared to prealbumin.

**Dana Davis**, Biological Sciences

Faculty Mentor: Laura Reed, Biological Sciences

*Insulin/TOR Gene Mutations and Triglyceride Storage in Drosophila*

In my research, I use *Drosophila melanogaster* as a model organism in order to learn how mutations of genes in the insulin/dTor pathway affect triglyceride storage. In order to do this, I crossed mutant flies with wild type flies and compared the larval triglyceride storage of the mutant progeny to the non-mutant progeny, and I found that there was a significant difference between them. Based on these results, it is possible that homologous genes in humans may have similar effects on obesity.

**Amy Deeble**, Communicative Disorders

**Marie Tucker**, Communicative Disorders

Faculty Mentor: Angela Barber, Communicative Disorders

*Roll Tide: Cultural Variation in Early Language*

How does culture affect early language? Does football have the power to influence a child's early lexicon? In Tuscaloosa, Alabama football is a major part of the culture. Amy Deeble and Marie Tucker designed a survey to test for the presence of Alabama-related words like "Roll Tide", and distributed it to local daycares. The results may have application to help shaping the vocabularies of children who are not developing language at a typical pace.

**Kimberly Dismuke**, Clothing, Textiles & Interior Design

Faculty Mentor: Marcy Koontz, Clothing, Textiles & Interior Design

*American Retailers: Industry Icons / Subsidizers of Culture*

Great retailers within the American landscape have been men with vision and extraordinary willpower, starting out as peddlers, and building retailing empires that existed throughout the 20th Century. Many

were legendary community builders who invested in the social capital of their cities and developed industry standards still in existence today. This study documents nine American retailers and their contributions on both a local and industry level in an interactive, multimedia timeline format.

**Kylie Donnelly**, Psychology

Faculty Mentor: Martin Sellbom, Psychology

*Examining Gender as Moderating the Association between Psychopathy and Substance Use*

We examined whether gender moderated the associations between psychopathy and substance use in four mixed gender, college, forensic, and correctional samples. Correlation analyses revealed significant associations between psychopathy and both alcohol and drug abuse. We then used hierarchical regression analyses to test for possible moderating effects on gender on observed associations between psychopathy scores and measures of substance use. We found no significant moderating effects of gender.

**Chris Duke**, Kinesiology

Faculty Mentor: Gary Hodges, Kinesiology

*Cutaneous vasoconstriction at the onset of exercise*

Blockade of sympathetic nerves abolishes cutaneous vasoconstriction at the onset of exercise. We sought to define the roles of the sympathetic neurotransmitters norepinephrine (NE) and neuropeptide Y (NPY). We found that the antagonism NE abolished the vasoconstrictor response at the onset of exercise ( $P < 0.05$ ). Antagonism of NPY had no effect ( $P > 0.05$ ). These data indicate that NE but not NPY is responsible for the cutaneous vasoconstriction at the onset of exercise.

**Samantha Durfey**, Biological Sciences

Faculty Mentor: Robert Findlay, Biological Sciences

*Two-Stage Bioreactor for the Production of Poly-β-Hydroxyalkanoates*

Poly-β-hydroxyalkanoates (PHAs), bacteria-produced biopolymers, are being studied here as a precursor for a new biofuel. To reduce costs, a two-stage bioreactor is used where stage 1 produces volatile fatty acids (VFAs) from non-sterile feedstocks via anaerobic breakdown of lignocellulose. VFAs are transferred to stage 2 to produce PHAs. VFA monitoring, and PLP and PLFA analysis indicate that this method is a viable source of VFA. Our next step is to assess PHA production using GC-MS.

**Lauren Euler**, Human Nutrition & Hospitality Management

**Brooke Sillay**, Human Nutrition & Hospitality Management

Faculty Mentor: Lori Greene, Human Nutrition & Hospitality Management

*Omega-3 Fatty Acid Supplementation, a Prevention and Treatment for Sarcopenia: A Review*

Introduction: Sarcopenia can lessen quality of life, impair daily physical function, and could lead to premature death. This topic affects the older adult population and is a growing concern in the public today. One main cause is the inability of older muscles to increase the rate of protein synthesis in muscle tissue. The purpose of this review is to evaluate current research articles that look at the effects of omega-3 fatty acids on muscle mass treatment of sarcopenia.

**Laura "Brooke" Evans**, Clothing, Textiles & Interior Design

Faculty Mentor: Stephanie Sickler, Clothing, Textiles & Interior Design

*Collaborative Spaces: A New Take on the Living-Learning Community (An Interior Design Major's Living-Learning Community)*

Despite studies conducted on living-learning communities within university resident halls, few have been done on the environment within communities. Based on case studies, student surveys, and focus

groups, I have concluded students prefer to live in new suite style resident halls where the living, kitchenette, and bathroom are shared by 1-3 students. Projections after implementing a LLC for interior design students are: increased enrollment, retention, and matriculation in the interior design

**Grant Fairchild**, Biological Sciences

Faculty Mentor: Kimberlee Caldwell, Biological Sciences

*Development of an Animal Model for Dopamine Neuron Regeneration*

Following injury to neurons, axonal regeneration is important for recovery. Regrowth occurs in invertebrates, yet the process is not understood. When neurons begin to die in human brains, they do not recover, as in Parkinson's disease (PD), in which dopaminergic neurons die. We are modeling regeneration of dopaminergic neurons in the nematode *C. elegans*. We have determined that mutations in the cytoskeletal protein spectrin, which plays a role in maintaining the structural integrity of neurons, result in an increase in the sprouting of new dopaminergic neuron branches. This new model will be studied for PD therapeutic interventions.

**Haley Flanagan**, Advertising and Public Relations

**Julia Gardial**, Advertising and Public Relations

**Jacque McMahon**, Advertising and Public Relations

**Kelsey Balzli**, Advertising and Public Relations

**Benjamin Ladrillono**, Advertising and Public Relations

Faculty Mentor: Teri Henley, Advertising and Public Relations

*"I Can" Anti-Bullying Campaign*

To increase awareness of anti-bullying in Tuscaloosa City Middle Schools, we gave pre-surveys to students and faculty, held meetings with counselors, and did secondary research. We issued post-surveys to students and faculty after the campaign, and conducted interviews with counselors, parents and TCS administrative staff. Each middle school student pledged to Stand Strong to bullying in their school and results showed 66 percent of students would help a classmate who was being bullied.

**Benjamin Flax**, Religious Studies

Faculty Mentor: Merinda Simmons, Religious Studies

*The Effects of Stained Glass: Rose-Tinted Views of Antebellum Life*

Using the University of Alabama's Tiffany window, 1927 Corolla, and the Confederate boulder, I want to explain how the antebellum history gets distorted by memorials erected generations later. The idea known today as the "Antebellum Campus" is a mere fantastical view of what people of different eras imagine the past to have been like.

**Sean Fleming**, Telecommunications & Film

**Joy Harris**, Journalism

Faculty Mentor: Alana Baldwin, Telecommunications & Film

*The Art of an Effective PSA*

Public Service Announcements are meant to catch the attention of viewers to alert them of something important. Design is a crucial element to making a successful PSA. Effective use of design elements and principles will ensure people will notice and understand the PSA, allowing them to obtain the information designers intended to communicate. We hope to help people understand the importance of design in PSAs by outlining why certain elements of design are used and show examples of PSA design.

**Kiara Foxhall**, Clothing, Textiles & Interior Design

Faculty Mentor: Stephanie Sickler, Clothing, Textiles & Interior Design

*Built For Life: A Framework for Implementing Universal Design Principles in a New Urbanist Community*  
New Urbanism is becoming a modern movement in America for all ages and is rapidly expanding with over 4,000 New Urbanist projects undergoing planning or under construction currently. In 30 years, over 20% will be over the age of 65. This research will focus on the need for design that accommodates all populations by enforcing universal design in new urbanist communities, which ultimately saves a lot of people from being unwillingly forced out of their homes.

**Samantha Gaffney**, Management & Marketing

Faculty Mentor: Lenita Davis, Management & Marketing

*The Branding of HIV/AIDS: The Effectiveness of World Aids Day as Evidence by Social Media*

*\*International focus*

Using software, global social media data was acquired to determine the public perception of HIV/AIDS and its preventative measures. The research is focused on the effectiveness of specific promotional events such as World Aids Day have been on changing public perceptions and conversations. The goals are to compare other awareness days and the impact they have by social media, as well as, to study the association between global World Aids Day events' engagement and response on the issue.

**Erik Gentry**, Biological Sciences

**Ben Thomas**, Biological Sciences

**Chase Golden**, Biological Sciences

Faculty Mentor: Ryan Earley, Biological Sciences

*A grain of salt: salinity preferences in the mangrove rivulus fish*

Wild populations of mangrove rivulus fish exist in salinities ranging from freshwater to hypersaline. Salinity drives dramatic changes in life history, behavioral, and morphological traits in this fish. With a specially designed eight-chambered tank, we measure individual affinities for 8 different salinities ranging from 5-45 ppt and the repeatability of these preferences. We test the hypothesis that there are consistent population- and genotype-level differences in salinity preference.

**Jesse Gettinger**, Chemistry

Faculty Mentor: David Nikles, Chemistry

*Poly(ethylene glycol-caprolactone-lactic acid) Triblock Copolymers for a Magnetically Triggered Drug Delivery System*

The triblock terpolymer, MeO-PEG120-PCL40-PLA37-OH was prepared. Polymer micelles were made by solvent evaporation of THF in ultrapure water. The critical micelle concentration was 1.35 mg/L. Doxorubicin was trapped in the core with a loading of 13.8% and an encapsulation efficiency of 33.3%. The rate of thermally triggered release of the doxorubicin was determined at 27 °C, a temperature below the melting point of the polycaprolactone core, and at 57 °C, above the melting point.

**Brian Goodell**, Chemical and Biological Engineering

Faculty Mentor: David Nikles, Chemistry

*Bismuth Nanoparticle Synthesis for Application in High-Energy Magnets*

As rare earth metals become increasingly scarce in the global market, this research endeavored to ascertain whether nanoparticles composed of the elements bismuth and manganese could serve as a new, viable source of high-energy permanent magnets. Varying reaction parameters in the synthesis of bismuth nanoparticles influenced the particle size, purity, and composition. Optimal bismuth particles will facilitate future analysis of mechanisms for bismuth-manganese nanoparticle formation.

**Meghan Gordy**, Nursing

**Victoria Godber**, Nursing

**Kaitlin Garrard**, Nursing

**Logan Gilman**, Nursing

**Grace Hagedorn**, Nursing

**Julia Harris**, Nursing

Faculty Mentor: Leslie Cole, Nursing

*The Utilization of Normal Saline with Suctioning*

The purpose of this project is to determine if saline lavage prior to tracheal suctioning is beneficial to the patient. Saline lavage is used to thin secretions. There are many patient complications associated with saline lavage. One facility's protocol suggests instilling saline solution into the tracheal tube when thick secretions are present. There is not enough evidence to support saline lavage prior to suctioning. This project will provide alternate measures to saline lavage.

**Caleb Gray**, Nursing

**Haleigh Hollifield**, Nursing

**Elizabeth Jones**, Nursing

**Hayley Jones**, Nursing

**Kara Jones**, Nursing

**Grant Kelly**, Nursing

**Lauren Kennedy**, Nursing

**Laura Jones**, Nursing

Faculty Mentor: Stephanie Ragland, Nursing

*Silverlon Dressing Protocol*

Nosocomial wound infections increase patient discomfort and are expensive for hospitals. The intention of this project was to determine if using Silverlon dressings provided benefits, most notably infection prevention, that would prove them useful in post-operative wound care. Several peer reviewed studies were examined, as well as information provided by the Silverlon company's website. Our research concluded that Silverlon dressings decrease the chance of post-operative infection. This project proposes a hospital-wide written protocol for the use of Silverlon dressings on postoperative surgical wounds. This protocol will provide medical professionals a unified approach for the usage of the Silverlon dressings.

**Edward Gray**, History

Faculty Mentor: Daniel Riches, History

*Not Just a War of Religion: The Siege of La Rochelle (1627-8) and the Centralization of the French Monarchy*

*\*International focus*

My project examines the 1627-8 siege of the French Protestant city of La Rochelle by France's Catholic Monarchy. Historians usually portray the siege as a prototypical early modern 'war of religion' between the Catholic crown and Protestant rebels. My project shows, however, that the policies, propaganda, and iconography of the Crown reveal the struggle to have been as much about the centralization of the French monarchy as it was about the triumph of Catholicism.

**Olivia Grubbs**, Biological Sciences

Faculty Mentor: Julie Olson, Biological Sciences

*Soil Streptomyces: Beneficial or Harmful?*

This study examined the distribution of soil Streptomyces spp. displaying neurodegenerative properties. Streptomyces were isolated from soils, DNA was extracted and PCR-amplified to fingerprint the strains



before testing for neurodegeneration in a worm model. No ecological pattern of neurodegeneration was found in isolates based on land use or collection location of the soil. Research is ongoing to observe patterns in secondary metabolite production between producing and non-producing strains.

**Hayden Gunter**, Civil, Construction & Environmental Engineering

Faculty Mentor: Steven Jones, Civil, Construction & Environmental Engineering

*Bus Rapid Transit Potential for Major Traffic Corridors Coming into Downtown Birmingham*

Bus Rapid Transit (BRT) is a flexible rapid transit mode that provides higher performance and quality than a traditional bus system. Each system is unique and uses different operating and physical elements in order to achieve this. This study examines some of the potential impacts a BRT system might have in the Birmingham Metro area. In addition to summarizing the potential benefits of BRT from literature, this study presents the results of sensitivity analyses of hypothetical BRT deployment.

**Madeleine Haddock**, Biological Sciences

Faculty Mentor: Ryan Earley, Biological Sciences

*Parasites and personality: Do trematodes manipulate boldness in California killifish?*

We examined the relationship between boldness and parasite density in killifish naturally infected with two trematodes that alter physiology in ways that elevate predation risk. We rejected the hypothesis that parasite density would be positively associated with boldness. These results suggest that parasites exert their influence with a high degree of specificity and raise further questions about the complexities of host-parasite relationships and implications for host and parasite fitness.

**Laura Hagerty**, Music

Faculty Mentor: Andrea Cevalco, Music

*Song Suggestions by Religious Clergy for Individuals with Life-Threatening and Terminal Illnesses*

The music therapy research literature is lacking research regarding song choices for patients and families in end-of-life settings. Research has indicated that music therapy has positive effects on quality of life in end-of-life care; however, the lack of empirically-based song suggestions makes clinical training difficult for music therapy students. The purpose of this study is to survey clergy of various religious perspectives regarding song choices for individuals who have terminal illnesses.

**Elizabeth Haley**, Chemical and Biological Engineering

Faculty Mentor: Yonghyun Kim, Chemical and Biological Engineering

*Degradation of Basic Fibroblast Growth Factor in Cell Culture Conditions*

Basic fibroblast growth factor (bFGF) is an essential supplement in cell culture media to support the growth of cancer stem cells (CSCs). It is costly, yet is often used in excess to account for its depletion by CSCs. We are studying the degradation rate of bFGF in culture so that we can use more precise amounts of bFGF for CSC culture in vitro. Our work will therefore play a critical role in minimizing costs associated with CSC culture and in developing a more optimized CSC media in the future.

**Delana Harbison**, Social Work

Faculty Mentor: Javonda Williams, Social Work

*Gardening as Intervention for at Risk Teenagers*

Gardening is relaxing and productive. Accomplishment is extremely important in an adolescence life. Using Erik Erikson's developmental stage, identity versus role diffusion, I will work along with adolescence's in a garden project, and interview them about their accomplishments. I hypothesis that gardening will develop social skills, communication skills, and task completion accomplishment for this stage of Erikson's developmental stage.

**Claire Harper**, Mechanical Engineering

Faculty Mentor: Marcus Ashford, Mechanical Engineering

*Characterization of Exotic Alternative Fuels*

We are building a test platform to study dual use of alternative/exotic fuels. We are modifying a Rotax 650 (single cylinder, 4 valve) engine to accept simultaneous independent injection of liquid and gaseous fuels. Initial research will be conducted on natural gas/gasoline blends; future work will explore blends of gasoline and biofuels such as butanol and ethanol.

**Jennifer Haselden**, Music

**Rahel Kim**, Music

Faculty Mentor: Andrea Cevasco, Music

*The Effects of a Single Music Therapy Session on Self Perceived Levels of Depression, Anger, and Anxiety of Patients in an In-Patient Psychiatric Facility.*

The purpose of this study was to determine the effects of a single music therapy session on self perceived levels of depression, anger, and anxiety. Patients ages 21 to 50 participated in the study across 3 semesters at an in-patient psychiatric facility. Each participant took part in a single music therapy session consisting of relaxation techniques, lyric analyses and song writing interventions, instrument playing, movement activities, and cooperative/competitive games. Goals for this population included: socialization, relaxation, problem solving, respect for self and others, communication skills, concentration, creativity, and physical movement and coordination. Sessions were led by music therapy students and supervised by a board certified music therapist. Overall, results indicated that that self perceived levels of depression, anger, and anxiety decreased from before the session.

**Allison Haskins**, Modern Languages & Classics

**Lindsey Comas**, Art

**Ayana Gibson**, Economics, Finance & Legal Studies and Mathematics

**Taylor Lawhon**, Anthropology

Faculty Mentor: Elizabeth Cooper, Anthropology

*International Students' Perceptions of American Undergraduates*

*\*International focus*

Conventional wisdom suggests that extended cross-cultural interactions (like study abroad experiences) facilitate improved knowledge of cultural practices and lead to a better appreciation of the host country. Working with international students enrolled in the English Language Institute at the university, we assess their cultural perception of Americans, the impact of the university on their experience, and the limiting cultural barriers between international and American students.

**Alan Hawkins**, Aerospace Engineering & Mechanics

Faculty Mentor: Anwarul Haque, Aerospace Engineering & Mechanics

*Processing and Evaluation of Thermal Conductivity of Graphene/Epoxy Nanocomposites*

In this study, thermal conductivity of graphene/epoxy (Gr-Ep) nanocomposite materials was examined by experimental and analytical methods. Gr/Ep samples with 1%, 3%, and 5% weight percentage of graphene nanopowder were fabricated. Analytical models were used to predict thermal conductivity of Gr-Ep nanocomposites. These models predicted a significant increase in thermal conductivity with increased graphene concentrations. The experimental measurement of thermal conductivity is still in progress.

**Anna Hawkins**, Biological Sciences

Faculty Mentor: Leslie Rissler, Biological Sciences

*Flattened Musk Turtle Population Data Analysis*

The flattened musk turtle is an endangered species of turtle native to the upper Warrior River basin in central Alabama. In the summer of 2012, turtles and environmental data were collected in order to assess the current population. The environmental and GPS data were analyzed in order to determine where the population is currently located and what environmental factors most greatly affect it. The current data was then compared with a 1981 study to determine how the population has changed.

**Stephen Heacock**, Communicative Disorders

**Hayley Mitchell**, Communicative Disorders

**Sarah Ondocsin**, Communicative Disorders

**Kathleen West**, Communicative Disorders

Faculty Mentor: Anthony Buhr, Communicative Disorders

*The 2012 Presidential Debates: Does speech fluency influence debate outcome?*

The purpose of this study was to investigate whether speech fluency influenced the outcome of the first debate of the 2012 presidential election. A transcript of the first debate was segmented into utterances and coded for several disfluency types. Results showed that President Obama was more disfluent, and this was due to a greater number of filled pauses (UMs or UHs). Results indicate that speech disfluency may have contributed to the perception that President Obama lost the debate.

**Danielle Herubin**, Chemical and Biological Engineering

Faculty Mentor: David Nikles, Chemistry

*Bismuth-Manganese Nanoparticle Synthesis for Application in High-Energy Magnets*

High-energy permanent magnets have vital applications in numerous fields, such as clean energy, data storage, and defense technology. These magnets are produced employing rare earth metals not found in the United States. The purpose of this project is to determine whether nanoparticles can serve as a viable replacement in magnet assembly to minimize dependence on foreign entities. The procedure involves synthesis of bismuth-manganese nanoparticles with controlled size, purity, and composition.

**Hannah Hicks**, Philosophy

Faculty Mentor: Merinda Simmons, Religious Studies

*Modern Family Law: Developing Emotional Abuse Statutes that Will Effectively Serve LGBT Youth*

In my thesis, I examine laws on emotional abuse that likely contribute to LGBT youth homelessness. I address the question of whether the state should intervene in a family's life in order to protect an LGBT child from emotional abuse. I offer a definition of emotional abuse that I believe better serves LGBT children. I then argue that my definition is preferable to the ideas about emotional abuse that are employed in current statutes.

**Nathan Holmes**, Mathematics

Faculty Mentor: Drew Lewis, Mathematics

*Polynomial Automorphisms*

In the 2012-13 academic year, Nathan Holmes worked with Dr. Drew Lewis of the math department in researching the Venereau polynomial. The ultimate goal of the research is to determine whether the Venereau polynomial is an automorphism. The approach to solving this problem is open ended. Much of the progress has involved hand calculations of compositions of polynomials. Nathan has worked on hand calculations and studied Dr. Lewis's publications in search of deriving contradictions.

**Matthew Honkanen**, Biological Sciences

Faculty Mentor: Jeffrey Lozier, Biological Sciences

*Analysis of genetic diversity among North American bumble bees*

Bumblebees (*Bombus*) are important pollinators in agricultural and natural ecosystems, but some populations are declining. Microsatellite analysis shows that declining species have less genetic diversity. However, microsatellites represent a small part of the genome. We studied genetic diversity of the declining *B. pensylvanicus* and the stable *B. impatiens* by comparing traditional and genomic markers. Results suggest differences in diversity in microsatellites are not found in genomic markers.

**Grace Hoover**, Chemical and Biological Engineering

Faculty Mentor: Marisa Giggie, Community Health Sciences

*Psychiatric Co-morbidity in Collegiate Recovery Communities*

Collegiate Recovery Communities (CRCs) have been created at schools across the nation (including UA) to encourage college students in recovery to protect their sobriety despite the collegiate climate that promotes substance abuse. Given the high co-morbidity between substance use and mental health disorders, the goal of this research is to investigate the rates of psychiatric diagnosis and treatment within the CRC and whether members are educated on resources available for mental health care.

**Chelsea Howard**, Communicative Disorders

**Ashley Bishop**, Communicative Disorders

Faculty Mentor: Anthony Buhr, Communicative Disorders

*Alabama Football: Fluency of Commentators*

Abstract. The purpose of this study was to investigate speech fluency of professional sports commentators. Speech disfluencies (e.g., repetitions) were counted from two commentators across two University of Alabama football games during the 2012 to 2013 season. Results indicated that one commentator was far more fluent than the other. This study concludes that commentator role (e.g., play-by-play) has a major impact on speech fluency. Future studies can investigate this further.

**Joana Hubickey**, Biological Sciences

Faculty Mentor: Laura Reed, Biological Sciences

*The Use of a *Drosophila* LanA Mutant as a Model for Gestational Diabetes*

This study was aimed to model gestational diabetes in *Drosophila* using a previously implicated LanA mutant. The following phenotypes were measured in the mutant flies and compared to the wildtype; total glucose concentration, total triglyceride concentration, egg volume, and pupae weight. The results showed that mutant larvae had significantly higher glucose levels but lower TAG levels than the wildtype. Also, mutant flies laid larger eggs, but mutant pupae weighed less than the wildtype.

**Lauren Huffman**, Psychology

Faculty Mentor: Lisa Hooper, Educational Studies in Psychology, Research Methodology, and Counseling  
*Associations Among Depressive Symptoms, Patient Involvement, Provider Cultural Competency, and Treatment Nonadherence: Findings from an Exploratory Study Among University Student-Patients*

Treatment adherence is a major problem in clinical and community populations, but has seldom been studied in college students. The current study examines the relations among depressive symptoms, wellness, patient involvement, provider cultural competency, and treatment adherence in 243 university student-patients. Results showed all four study factors were related to treatment adherence and two factors (depression symptoms and patient involvement) predicted nonadherence to treatment.

**Marshall Huynh**, Special Education & Multiple Abilities

Faculty Mentor: Kevin Besnoy, Special Education & Multiple Abilities

*The Underrepresentation of African American Students in Gifted Placement*

Since schools have integrated African American students have been overrepresented in special education and underrepresented in gifted education. The purpose of this study is to present research examining factors that affect African American student's placement in gifted education. The following research presentation analyzes data and shows reports on tendencies in the placement and sustainability of African American students in gifted education classes.

**Chisom Ifediba**, Biological Sciences

Faculty Mentor: John Wheat, Community and Rural Medicine

*Assessment of the state of Diabetes Mellitus treatment in Hale County, AL*

Diabetes Mellitus II is one of the most prevalent chronic diseases among Alabamians in the blackbelt today. Lack of access to care and inadequate standard of care are some of the possible reasons why the Diabetes is so common in this area. I interviewed a doctor, nurses, and patients at a health center in the blackbelt of Alabama in order to assess to the current treatment methods and standards for Diabetes Mellitus II in Hale county .

**Nicholas Izor**, Biological Sciences

Faculty Mentor: Laura Reed, Biological Sciences

*Genotype-by-Diet Interactions in Blood Glucose Levels of Drosophila Melanogaster*

With the rapid growth of obesity and diabetes in Westernized human populations, it has become important to determine the causes of Metabolic Syndrome. To examine these causes, *Drosophila melanogaster* serves as a model organism in which the effects of diet and genotype on the risk factors for obesity and Type-2 diabetes can be viewed. To test these factors, recombinant inbred genetic lines were fed a control diet and a high fat diet, and the blood sugar levels in the adult flies were measured.

**Rachel Jackson**, Psychology

Faculty Mentor: Natalie Dautovich, Psychology

*Perceived Effects of Daytime Napping in Older Adults*

Many older adults experience difficulty sleeping. Fifty older adults responded to questions about the effects of napping on nighttime sleep, daytime tiredness, and the intentionality of napping. Results indicated that 22% of older adults reported that daytime napping worsened nighttime sleep, 30% reported that napping made them feel less tired during the day, and 40% of older adults reported intentional napping. These results encourage further investigation of the reasons older adults nap.

**Lindsey Jacobi**, Religious Studies

Faculty Mentor: Merinda Simmons, Religious Studies

*Southern Femininity In Film*

The media has served to perpetuate an unchanging representation of the "southern belle" and there are very problematic issues with such a construction. I will use the three popular films, *Gone With The Wind*, *Steel Magnolias*, and *Sweet Home Alabama* to historically trace and compare this construction of an idealized southern feminine identity and analyze the ways in which this identity has remained relatively stagnant.

**Andrea Jaegge**, Geography

Faculty Mentor: Yuehan Lu, Geological Sciences

*Land-derived Dissolved Organic Matter and Nutrients in Washington-Oregon Coastal Waters*

Coastal water is a dynamic environment where land-derived materials enter the ocean. To understand the significance of this material, water samples were collected along the Washington-Oregon coast. The

concentrations of dissolved organic carbon, nitrogen, and inorganic nutrients were measured. Using 3D-fluorescence and absorbance techniques, the sources of the dissolved organic matter were then characterized. This data provides important insight on the role of organic matter in coastal waters.

**Ansley Johnson**, Human Nutrition & Hospitality Management

**Amelia Foster**, Human Nutrition & Hospitality Management

**Bentley Bruhn**, Human Nutrition & Hospitality Management

**Judson Williams**, Human Nutrition & Hospitality Management

Faculty Mentor: Lori Greene, Human Nutrition & Hospitality Management

*Older Adults and lack of fluid intake: A Review*

Inadequate fluid intake in older adults is a common problem that often leads to dehydration. A literature review was conducted using a literature search with Google Scholar, Science Direct, and SCOUT to examine why older adults are more susceptible to dehydration, factors leading to dehydration, and strategies to help improve fluid intake.

**Jacob Johnson**, Special Education & Multiple Abilities

Faculty Mentor: Tracy Weston, Curriculum & Instruction

*Early Childhood Mathematics: A Study of Teaching Strategies.*

Mathematic concepts begin developing in children at a very early age. It is important to foster this development through structured, research-based practices and materials and not stifle it with detrimental instruction and discourse. Studies from the What Works Clearinghouse will identify which practices work best for the continued development of mathematical concepts in early childhood. The use of manipulatives, software, and group activities are consistent throughout the studies found.

**Margaret Johnson**, Chemistry

Faculty Mentor: David Nikles, Chemistry

*Use of Quantum Dots as Nanothermometers for Measuring the Heating of Magnetic Nanoparticles in Micelles*

The linear dependence of the peak in the fluorescence spectrum for CdSe-ZnS core-shell quantum dots (QDs) makes them ideal candidates to determine temperature with nanoscale spatial resolution. In this study the QDs were used to measure the temperature rise inside magnetic micelles during magnetic induction heating by a radio frequency ac magnetic field. The presence of magnetite nanoparticles did not interfere with the ability to detect the QD fluorescence. Furthermore the QD's were not heated by the ac magnetic field. QDs and magnetite nanoparticles were loaded into the core of polymer micelles made from poly(ethylene glycol-b-caprolactone) and the micelles subjected to a 590 Gauss ac magnetic field. The QDs were excited with 390 nm light, while the magnetic micelles were subjected to a radio frequency ac magnetic field, which heated the magnetite particles, and in turn heated the core of the micelles. The peak in the emission spectrum for the QD's moved to higher wavelengths, thereby allowing a measurement of the temperature rise in the micelles.

**Mellonee Johnson**, Human Nutrition & Hospitality Management

**Colleen Dawley**, Human Nutrition & Hospitality Management

**Dayle Van Ess**, Human Nutrition & Hospitality Management

Faculty Mentor: Lori Greene, Human Nutrition & Hospitality Management

*The importance of recognizing dehydration and associated risk factors in older adults: A Review*

Dehydration often goes undetected and undiagnosed in older adults by care givers and healthcare providers. The purpose of this review is to identify common risk factors associated with dehydration and increase awareness of the need for early diagnosis and treatment. Patients and caregivers must be

educated about the risks and issues associated with dehydration. Health providers must educate the public about signs and symptoms of dehydration and how to treat it once identified in a patient.

**Nick Johnson**, Electrical and Computer Engineering

Faculty Mentor: Patrick Kung, Electrical and Computer Engineering

*Photon Sensors Based on Semiconductors and Nanostructures*

Photodetectors are devices that can exhibit a change in their electrical conductivity due to incident light that can generate extra electrons. Nanostructured semiconductors can improve upon performance by capitalizing on quantum effects that take place when dimensions are minimized to a nanometer scale. Our research focused on the photoresponse of various materials due to specified wavelengths of light in order to determine electrical transport characteristics.

**Will Johnston**, Economics, Finance & Legal Studies

Faculty Mentor: Daniel Henderson, Economics, Finance & Legal Studies

*Developing Course Packet for Econ 413: Economic Forecasting in R*

This project details the implementation of the open-source programming language, R in producing and analyzing economic forecasts. The resulting packet includes various ARMA models, in-sample forecasting, and diagnostic checking using the GDP growth rates of the following five nations: Argentina, France, Sierra Leone, South Korea, and the United States. The packet will be used in a classroom setting to aid students in Econ 413: Economic Forecasting with the programming aspects of forecasting.

**Andrew Jones**, Chemical and Biological Engineering

Faculty Mentor: David Dixon, Chemistry

*Computational Studies of the Properties of Biomass Intermediates*

The development of carbon-neutral, renewable fuel from biomass is essential in supplying the world with sustainable energy in the face of globally growing energy demands. In order to develop new methods of biomass processing, accurate thermodynamic data is needed. This research has used the high level G3MP2/SCRF/COSMO electronic structure method to predict thermodynamic properties, gas-phase acidities and basicities, and pKa's in aqueous solution for a range of biomass intermediates.

**Caroline Jones**, Human Development & Family Studies

**Heather Thomas**, Psychology

Faculty Mentor: Sherwood Burns-Nader, Human Development & Family Studies

*How Do Toys Influence Children's Play?*

The study examines if the appearance of a shape impacts children's ability to make object substitutions. Children, ages 4 and 5, will be shown either a circle block, a rectangle block, a circle block painted as a clock, or rectangle block painted as a camera. The children in both conditions will be read a story that asks them to perform object substitutions. The expected findings are young children will be more likely to use a simple object to generalize to other like shaped objects.

**Ryan Jones**, Biological Sciences

Faculty Mentor: Ryan Earley, Biological Sciences

*Using 3D Quick Prototyped Models as Biological Analogs for Size Dependent Aggression*

This study examined whether relative body size mediates fighting behavior in the mangrove rivulus fish using 3D quick prototyped models as biological analogs and standardized stimuli for eliciting aggression. Focal fish will be pitted against models of smaller, equal and larger sizes and aggression towards the

models will be quantified. Comparing behavioral responses among treatments will reveal how relative size influences the likelihood of contest initiation and overall aggression levels.

**Patrick Joswick**, Nursing

Faculty Mentor: Sara Kaylor, Nursing

*An Emphasis of Men in the Nursing Practice*

This presentation reveals a complete approach to men in the nursing practice. Men in nursing make up only 10 percent of Registered Nurses. Male nurses are primarily seen in critical care and advanced practice. Male nurses have a higher salary than their female counterparts with the same position. As a student nurse, I have developed my own thoughts on the struggles men in nursing universally feel and encounter every day. By this study, more questions have arisen with regards to men in nursing.

**Holly Judge**, Mechanical Engineering

Faculty Mentor: Marcus Ashford, Mechanical Engineering

*Measuring Volatility of Motor Fuel*

A probe was developed for measuring the volatility of a motor fuel. The probe is based upon boiling heat transfer about a horizontal platinum wire that served as heating element and temperature probe. Initial work with gasoline yielded a correlation between the probe data and the results of the industry standard ASTM D86 distillation test. This research seeks to define the coefficients of that equation in terms of the thermophysical properties of the fuel.

**Courtney Kaderbek**, Telecommunications & Film

Faculty Mentor: Alan Blum, Family Medicine

*Tanning Bedlam: Can we prevent a melanoma epidemic?*

Tanning bed use by college students is increasing, especially in the South. Discount coupons and frequent-tanning-session promotions proliferate. This illustrated presentation presents the history of tanning bed use by college students; the promotion of tanning beds in college newspapers; the growing evidence linking tanning bed use to melanoma; and efforts to curb tanning bed use, including a new website created by the author.

**Koushik Kasanagottu**, Biological Sciences

**Eric Wenzinger**, Chemistry

Faculty Mentor: Janis O'Donnell, Biological Sciences

*The Role of Leonardo in Alpha-Synuclein-induced Neurodegeneration*

Current research has strongly linked alpha-synuclein ( $\alpha$ -syn), a human protein of unknown function, with Parkinson's disease (PD) pathology by causing the death of dopamine neurons in the brain. Leonardo (leo), a gene in the 14-3-3 family, is associated with a wide range of diverse molecular functions, among which is the direct modulation of dopamine biosynthesis. In this study, we use *Drosophila melanogaster* to elucidate the role of leo and its isoforms in  $\alpha$ -syn-induced PD pathology.

**Cassady Keller**, Advertising and Public Relations

**Brittany Carl**, Advertising and Public Relations

**Cody Dearman**, Advertising and Public Relations

**Sarah Helms**, Advertising and Public Relations

Faculty Mentor: Dylan McLemore, Journalism

*Eighteen and Under: American and Chinese Journalistic Approaches to Children in the News*

*\*International focus*



This project looks to examine the differences that exist between the restrictions against and the use of children as sources in the media in China and in the United States. Also, this project investigates what accounts for these discrepancies, including the roles of government control, family values and societal standards.

**Samantha King**, Religious Studies

Faculty Mentor: Merinda Simmons, Religious Studies

*A South Full of Beautiful Creatures?*

In the novel, *Beautiful Creatures*, Garcia and Stohl cast a restrictive picture of the South that they claim is universal. They also use homage to Harper Lee to help authorize this claim. Through a discussion concerning the translation of Amma's black femininity and hybridized religion from text to film in *Beautiful Creatures*, I investigate these claims used to authorize and protect their specific brand of black Southern feminine identity and religious purity and the dangers therein.

**Nicholas Kling**, Aerospace Engineering & Mechanics

Faculty Mentor: Stephen Lovell, Computer Science

*Javascript vs HTML*

HTML and Javascript are two of the most popular languages to write coding for websites. Both have their advantages and disadvantages. I looked into the syntax of both languages and checked online for professional opinions on the languages. The purpose of this study is to look at the two languages. Another purpose is to decide what uses each language serves.

**James Koch**, Mechanical Engineering

Faculty Mentor: Marcus Ashford, Mechanical Engineering

*Controlling Mixed-Mode Combustion Through VVT*

New combustion technologies like Homogeneous Charge Compression Ignition (HCCI) work well only for certain power bands in the operational range on an internal combustion engine. By combining multiple combustion strategies, such as lean-burning cycles and conventional power-dense cycles, the operational range of a lean-burning engine can be vastly expanded to meet the needs of commercial or industrial power generation.

**Taylor Konkell**, Information Systems, Statistics & Management Science

**Robert (Kyle) Bourgeois**, Information Systems, Statistics & Management Science

Faculty Mentor: David Hale, Information Systems, Statistics & Management Science

*8760, Inc. Realizing the Smart Grid*

8760, Inc., a startup energy management firm, would like to develop a portfolio of products feeding into the future 8760 Smart Grid System. To achieve this goal, the team has identified market opportunities within the smart grid space, documented gaps in 8760's current offerings, and developed a conceptual model to appeal to a targeted marketing segment. Moving forward, the team will pitch the system to industry executives and assist in the creation of promotional videos for the firm.

**Danny Laderberg**, Biological Sciences

Faculty Mentor: Stephen Secor, Biological Sciences

*The regulation of blood glucose for the diamondback watersnake*

We examined changes in blood glucose for the carnivorous diamondback watersnake to feeding and to a glucose load (9 mg/g body mass). The ingestion of a catfish diet did not alter blood glucose; however the glucose load generated a 10-fold increase in blood glucose levels. Blood glucose levels remained

elevated for up to 8 days before returning to normal fasting values (25-30 mg/dL). When faced with an unnatural glucose load, watersnakes are unable to rapidly remove glucose from their blood.

**Brent LaForte**, Aerospace Engineering & Mechanics

Faculty Mentor: Amy Lang, Aerospace Engineering & Mechanics

*Low Reynolds Number Drag Alteration Inspired by Butterfly Scales*

This research looks to find a means of reducing drag over a surface in an effort to increase the efficiency of, for instance, a Micro-Aerial Vehicle. The work was inspired by butterfly scales which are hypothesized to reduce surface friction over wings. Drop tests were performed on rapid-prototyped teardrop models which were covered with cavities in various orientations. Analysis of the results indicates a correlation between the shape and ratio of the cavities and the amount of drag reduced.

**Emily Lakey**, Political Science

Faculty Mentor: Daniel Levine, Political Science

*Political Science/ International Relations- Camp David Accords*

*\*International focus*

My research is on the regional peacemaking efforts facilitated by the United States that occurred beginning in the 1970s up until the Camp David Accords. I will draw upon information gained throughout the course (PSC 321- Israeli-Palestinian Conflict) regarding the history of the conflict & leading up to these peace-making efforts. This information, along with additional research collected concerning the Accords will be used to compose a presentation compiling all my research and findings.

**Elizabeth Landers**, Music

Faculty Mentor: Andrea Cevasco, Music

*An Evaluation and Compilation of Multiple Apple iOS Based Applications and Their Potential Uses Within Music Therapy Settings*

The purpose of this project is to 1)gather information about applications, 2)explore their use within music therapy settings, 3)compile lists of apps organized by suitable populations, and 4)discuss the importance of technology in music therapy clinical work. The Certification Board for Music Therapists lists the development and enhancement of technological skills within the Scope of Practice, a list of skills music therapy candidates must demonstrate for competent practice on the board exam.

**Jennifer Landry**, Political Science

Faculty Mentor: Barbara Chotiner, Political Science

*The Belarusian Language: Crisis in the Former Soviet Republic*

*\*International focus*

In Europe, the Belarusian language is losing a tough battle to remain a language of communication. Despite gaining independence in 1992, Belarus lags behind other former Soviet republics in the development of its titular language. The main question is if and how the Belarusian language can survive. This study analyzes a variety of scholarly articles, news reports, and books. An analysis of these sources reveals that under the current political regime, the future of the language looks grim.

**Matthew Larkin**, Biological Sciences

Faculty Mentor: Stephen Secor, Biological Sciences

*Variation in organ and tissue mass loss during fasting for the diamondback watersnake*

We examined how different organs of the body respond to long-term fasting and body mass loss. After 6 months of fasting, diamondback watersnakes experienced a 33% reduction in body mass, similar to that of the stomach (35%). The lung and large intestine did not change in mass, whereas the liver,

pancreas, small intestine, kidneys, and fat experienced 61-74% decreases in mass. Snakes varied considerably in the use of fat during fasting, possibly due to variation in metabolic rate.

**Nicholas Laskay**, Chemistry

**Kevin Duque**, Chemistry

Faculty Mentor: Kevin Shaughnessy, Chemistry

*Application of new water-soluble phosphine ligands in palladium catalyzed coupling reactions*

Over the last decade, palladium catalyzed coupling reactions have become increasingly utilized in organic synthesis for the formation of carbon-carbon or carbon-heteroatom bonds. New approaches are being pursued to minimize the use of traditional organic solvents and develop recyclable catalysts. We have designed and synthesized new water-soluble ligands for catalysis in biphasic systems. We have been studying the activity of these new ligands in palladium-catalyzed coupling reactions.

**Kendra Lee**, Nursing

**Liu Qiaorong**, Nursing

**Marissa Marshall**, Nursing

**Molly McLaughlin**, Nursing

**Brittany Meeks**, Nursing

**Julia Meneghetti**, Nursing

**Shelby McNutt**, Nursing

**Savannah Lee**, Nursing

Faculty Mentor: Regina Bentley, Nursing

*Endotracheal Suctioning: Continuous vs. Intermittent*

The purpose of this study was to determine best practices for endotracheal suctioning. Following a review of the literature and interviews with critical care nurses, results showed that there is no difference in the complications that occur with either method with regards to mucosal membrane damage; however 70% of the nurses interviewed used continuous suctioning. This presentation will examine the most effective method of suctioning and make recommendations for changes in hospital policy.

**Annie Lenox**, Biological Sciences

Faculty Mentor: Ryan Earley, Biological Sciences

*Effect of Male Presence on Outcrossing in *Kryptolebias marmoratus**

*Kryptolebias marmoratus* is capable of self-fertilization, yet hermaphrodites occasionally mate with males. This study examines how social environment affects this mixed-mating strategy. We hypothesized that hermaphrodites exposed to males would forgo selfing and lay more unfertilized eggs than when alone or when paired with other hermaphrodites. Hermaphrodites laid more total eggs when with males but there was no significant increase in unfertilized eggs laid and no hybrid offspring produced.

**Leah Leonard**, Biological Sciences

Faculty Mentor: Laura Reed, Biological Sciences

*The Effects of High Fat and Normal Diets on the Dark Pupa Weight of *Drosophila melanogaster**

Type-2 diabetes is a growing problem in today's society. *Drosophila* is a good model organism to study the environmental and genetic interactions, which we expect to play a role in the symptoms associated with type-2 diabetes. By crossing different lines, our experiment focuses on differences in specific phenotypes, such as obesity, when fed a normal vs. high fat diet. We hope to better understand the role of the genetic and environmental interactions on the precursors to type-2 diabetes.

**Emily Liang**, Biological Sciences

Faculty Mentor: Jeremy Bailin, Physics & Astronomy

*Synthetic Images of Simulated Galaxies*

Polychromatic, synthetic images of simulated galaxies were generated using Sunrise, a Monte-Carlo radiation-transfer code that calculates the transfer of radiation through interstellar dust. A selection of galaxies similar in size and shape to the Milky Way was analyzed and depicted at various points in the galaxies' evolution, which allowed for the comparison of structure and composition of simulated galaxies to those of real galaxies and helped further the understanding of galaxy evolution.

**Emily Liang**, Biological Sciences

Faculty Mentor: Jeff Gray, Computer Science

*The Adjustable Grid: A Grid-Based Cursor Control Solution using Speech Recognition*

Individuals with motor disabilities often find hands-free, speech-based systems as alternatives to traditional mouse-based navigation. Grid-based cursor control systems using speech recognition, though restrictive in grid size flexibility, are available commercially. The objective of this research was to develop a grid of adjustable granularity to compare efficacy among various grid dimensions in regard to timing and error, and to provide users with more flexibility than current systems offer.

**Katherine Lisciani**, Communication Studies

Faculty Mentor: Meredith Bagley, Communication Studies

*What's Love Got To Do With It?: A Pentadic Analysis of Contemporary Marriage Equality Rhetoric*

This project uses Burkean pentadic analysis to explore protest rhetoric generated by Proposition 8, the controversial California law disallowing same-sex marriages. Specifically, I examine the emergence of the term "love" within these debates. Updating Brummett (1979), I suggest that the "love" motif exposes a parallel opposition in each side's understanding of and criteria for marriage, and may help explain recent legislative, electoral, and judicial success for marriage equality supporters.

**Yifan Liu**, Mathematics

Faculty Mentor: Zhijian Wu, Mathematics

*Predictive interest rate modeling with binomial distribution*

This paper's idea is derived from a previous research paper called "Estimating market probabilities of future interest rate changes" by Dr. Martin Hlusek. Dr. Hlusek uses Poisson jump process with certain frequencies as the model to estimate the expectation of future interest rate changes. My goal of this paper is to keep the main advantage of his model, which its simplicity and wide applicability, and to use binomial distribution as the new model.

**Brendan Mangan**, Aerospace Engineering & Mechanics

**Christopher Simpson**, Aerospace Engineering & Mechanics

Faculty Mentor: Vinu Unnikrishnan, Aerospace Engineering & Mechanics

*Mechanical Properties Of Multi-Wall Carbon Nanotubes Using Molecular Dynamics Simulations*

Carbon nanotubes are excellent reinforcing materials that can be used in the aerospace mechanical and other industrial applications. The purpose of this study is to estimate the mechanical properties of single and multi-walled carbon nanotubes by considering their atomistic interactions. Molecular dynamics simulation software, LAMMPS was used to study the mechanical characteristics of armchair, zig-zag, and chiral nanotubes. These simulations were carried out for pristine and defect nanotubes.

**Dylan Marchione**, Biological Sciences

Faculty Mentor: Stevan Marcus, Biological Sciences

*Fission Yeast as a Model Organism to Elucidate Molecular Targets of the Anti-Tumor Drug Avicin*

Avicins are plant-derived triterpenoid compounds that act as potent inhibitors of mammalian tumor cell growth. Although they are undergoing Phase I clinical trials, the molecular targets of avicins have yet to be identified. Identification of their molecular targets and mechanism of action would facilitate the designing of drug analogs and potentially suggest new modes of cancer intervention. Here we propose a possible mechanism supported by genetic and molecular evidence.

**Ivan Matchett**, African American Studies

Faculty Mentor: Maha Marouan, African American Studies

*Southern Black Culture vs. Media*

In my research I will show the deep rooted ties of Southern African-Americans to religion. In my research I also will expand on the role the media has taken in not only exploiting negative characteristics of Southern Blacks, but also show the role the media has taken in capitalizing on the big business of Christianity in America. I will highlight the different media outlets that have displayed these characteristics and show them during different my presentation.

**Erica Mathis**, Psychology

Faculty Mentor: Jason Scofield, Human Development & Family Studies

*Children's Trust in Testimony and the Formation of Opinions*

Few studies have investigated the role of factual reliability in children's opinion formation. In this study, children were asked to endorse one of two animated speakers' testimonies about familiar objects and form an opinion after the speakers provided various opinions about novel objects. These data showed that children were able to distinguish speaker reliability based on factual information, but showed no preference for the reliable speaker's opinion when forming their own opinions.

**Angelo Maxim**, Psychology

Faculty Mentor: John Lochman, Psychology

*The Effect of Ethnic Identity on Peer Preference*

Although there has been research investigating the connection between ethnic identity and various variables, little research has previously been done specifically on the connection between peer perception and ethnic identity. This study will analyze a longitudinal sample collected in a CDC grant funded study. By analyzing Multigroup Ethnic Identity Measure (MEIM) and Sociometric measure data, this study will explore the longitudinal relationship between ethnic identity and peer preference scores

**Evan McConnell**, Chemistry

Faculty Mentor: Laura Busenlehner, Chemistry

*Investigation into the overall conformational changes of human estrogen receptor- $\alpha$  (hER $\alpha$ ) upon ligand binding*

Human estrogen receptor- $\alpha$  (hER $\alpha$ ) is a ligand-activated transcriptional factor that plays a key role in the development of ER+ breast cancer. Despite the important role of hER $\alpha$  in human health, there is little information regarding the structure-function relationship of full-length hER $\alpha$ . The protein was over-expressed in *S. pombe* and purified. We will perform hydrogen-deuterium exchange mass spectrometry to determine conformational changes of hER $\alpha$  upon binding ligand.

**Paul McKelvey**, Civil, Construction & Environmental Engineering

Faculty Mentor: Yingyan Lou, Civil, Construction & Environmental Engineering

*Bridge Rail Safety Analysis*

The purpose of this project was to collect and process data from Alabama Critical Analysis Reporting Environment (CARE) database and National Bridge Inventory; develop a protocol to identify bridge-related traffic incidents; and identify study sites through random sampling. This was done using Access, Excel, Minitab, SPSS, and ArcGIS.

**Malcolm McMillan**, Geological Sciences

Faculty Mentor: Andrew Goodliffe, Geological Sciences

*Evaluation of hydrocarbon source rock maturity and generation potential in the Black Warrior Basin beneath Gorgas power plant, Walker County, AL.*

The Black Warrior Basin (BWB) of Mississippi and Alabama is a foreland basin that formed at roughly 300 Ma. A 4915 ft well drilled by UA near Gorgas power plant (Walker County) in the BWB encountered many hydrocarbon shows. In this project we assess hydrocarbon source rock maturity and hydrocarbon generation potential around Gorgas power plant. Results, constrained by geophysical well logs and downhole samples, suggest that mature oil generation is possible at depths ranging from 4000-6200 ft.

**Sean Mendez**, Biological Sciences

Faculty Mentor: Laura Reed, Biological Sciences

*TreadWheel - Novel Exercise Apparatus for D. Melanogaster*

Obesity is one of the dramatic health issues affecting this country and exercise is a well-established intervention strategy. While exercise by genotype interactions have been shown in humans, overall little is known. Using a the natural geotaxis of *D. melanogaster*, an important model organism for the study of genetic interactions, a novel exercise machine, the TreadWheel, can be used to shed light on this interaction allowing for simultaneous comparison of large cohorts of genetic lines.

**Jordyn Merriam**, Chemical and Biological Engineering

Faculty Mentor: Laura Reed, Biological Sciences

*Mediterranean Diet Modeled in *Drosophila melanogaster**

The Mediterranean diet consists of more plants and unsaturated fats than the standard western diet. It has been shown to lengthen life span and lower the risk of heart disease and other chronic diseases. By feeding *D. melanogaster* diets based walnut, olive, and no oil, while measuring lifespan, weight, and glucose levels, we have elucidated the effects of the Mediterranean diet on overall health.

**Ashley Peel Miller**, Nursing

**Brianna Miller**, Nursing

**Zach Morgan**, Nursing

**Heather Mullens**, Nursing

**Maggie Pitts**, Nursing

**Ashley Polk**, Nursing

**Sarah Nierman**, Nursing

**Jessica Penunuri**, Nursing

Faculty Mentor: Ann Graves, Nursing

*Personal Items Worn by Nurses and Related Contamination*

Student nurses observed differences in hygienic care of personal items among nurses. A review of current literature revealed that hand hygiene can be impeded by wearing hand jewelry. However, the evidence in these studies did not support that wearing personal items contributes to hospital-acquired infections. In the promotion of evidence-based practice, this review would support a change in related hospital policies.

**Max Mittenthal**, Chemical and Biological Engineering

Faculty Mentor: Robin Rogers, Chemistry

*Polyethylene glycol based ionic liquids to improve transdermal penetration of active pharmaceutical ingredients*

Polyethylene Glycol (PEG) has been previously utilized as a transdermal enhancer to improve penetration of active pharmaceutical ingredients (APIs) through skin. By synthesizing an ionic liquid (IL; a salt with a melting point below body temperature) comprised of PEG and an API, we hope to create compounds that have enhanced API transdermal penetration compared to their neutral or non PEG-IL counterparts. Here, novel salicylate and ibuprofenate ILs will be discussed.

**Joshua Moncrief**, Criminal Justice

Faculty Mentor: Mark Lanier, Criminal Justice

*Attitudes of Correctional Officers in Tuscaloosa County*

Research on correctional officers' level of cynicism towards administration and desensitization towards inmate needs and behaviors has been sparse. Using an adaptation of prior measures on police cynicism and correctional officer desensitization, this study measures and compares cynicism and desensitization in correctional officers. This study is an exploratory analysis. The study population is all correctional officers employed by the Tuscaloosa County Jail.

**Joshua Moon**, Chemical and Biological Engineering

Faculty Mentor: David Dixon, Chemistry

*Reactions of CO<sub>2</sub> and H<sub>2</sub>O Mediated by Metal Dications for the Geological Sequestration of CO<sub>2</sub>*

The capture and storage of carbon dioxide and other greenhouse gases in deep geologic formations represents one of the most promising options for mitigating the impacts of greenhouse gases on global warming. Electronic structure theory at the DFT level has been used to predict the reactions of hydrated CO<sub>2</sub> with solvated Mg<sup>2+</sup> and Ca<sup>2+</sup> in water to form carbonate, bicarbonate, and carbonic acid. Transition states for kinetics and reaction energies for thermodynamics have been calculated.

**Amanda Morel**, Communicative Disorders

**Shelby Francis**, Communicative Disorders

**Hillary Catlin**, Communicative Disorders

Faculty Mentor: Anthony Buhr, Communicative Disorders

*The Relation Between Stuttering and Speech Errors: A Longitudinal Study*

The purpose of this study was to investigate the relation between stuttering and speech errors using longitudinal data. Conversational speech over 9 weeks of a five year-old child was transcribed and coded for stuttering and speech sound errors. Results showed that stuttering rate was stable across the 9 weeks, whereas speech error rate was highly variable. Results suggest that the frequency of stuttering was independent of the frequency of speech sound errors.

**Stephanie Morris**, Electrical and Computer Engineering

Faculty Mentor: Rick Swatloski, AIME

*Database Development to Facilitate Intellectual Property Evaluation*

The project involves the creation of a database for the compilation of intellectual property evaluation scores associated with various stages of the commercialization process. The database will be utilized to determine the technologies with the highest probability of success along with cross-referencing the scores by inventor, department, invention classification, etc.

**Zack Morris**, Mechanical Engineering

Faculty Mentor: Brian Fisher, Mechanical Engineering

*Characterization of Soot Generated in a Diffusion Flame*

This project focuses on the testing and sampling of a diffusion flame burner system. The goal of the research is to better characterize how different fuels and fuel components soot during combustion using the burner system created. The specific scope of the current research is to collect and analyze soot sample from these different fuels.

**Anna Moyer**, Biological Sciences

**Emily Peel**, Biological Sciences

Faculty Mentor: Janis O'Donnell, Biological Sciences

*Paraquat-induced Oxidative Stress in a Drosophila von Hippel Lindau Mutant*

VHL is a gene associated with highly vascularized tumors in humans. Its functions include regulating response to hypoxia and modulating production of an enzyme needed for dopamine synthesis. The herbicide paraquat causes hypoxia in Drosophila brain and promotes an angiogenesis-like response. We found that Drosophila VHL mutants are resistant to paraquat, and we examined whether this increased survival involves changes in dopamine levels or the abatement of the neuroinflammatory response.

**Elizabeth Murray**, Human Nutrition & Hospitality Management

Faculty Mentor: Kristi Crowe, Human Nutrition & Hospitality Management

*Deconstructing a Fruit Serving: Comparing the Phytochemical Content of Solid versus Beverage Forms of a Fruit Serving among Select Fruits.*

Phenolic compounds in plant foods possess powerful antioxidant activity. Unfortunately, these compounds often lack stability during food processing. The purpose of the study was to assess antioxidant density and phenolic content of fresh fruit and 100% fruit juice servings. Methods of analysis included oxygen radical absorbance capacity and Folin-Ciocalteu assays. Significant ( $p < 0.05$ ) differences in antioxidant density and phenolic content were observed between whole fruit and 100% juices.

**Divya Nadella**, Biological Sciences

Faculty Mentor: Laura Reed, Biological Sciences

*Gene Effects on Triglyceride Concentration in Drosophila melanogaster*

Genetics plays a vital role in triglyceride concentration and metabolic syndrome in animals. Previous research shows that certain genes have an effect in pathways linked to metabolic syndrome. This study takes genes implicated in past research and studies their effect on triglyceride concentration in the fruit fly, *Drosophila melanogaster*, via fly crosses to create flies with specific genotypes. The results show a significant difference between mutated flies and their wild type siblings.

**Christopher Nix**, Music

Faculty Mentor: Andrea Cevasco, Music

*The Effects of a Single Music Therapy Session on Self Perceived Levels of Pain, Relaxation, Fatigue, and Overall Mood of Patients in an In-patient Oncology Unit*

The purpose of this study was to determine the effects of a single music therapy session on self-perceived levels of pain, relaxation, fatigue, and overall mood of patients in an in-patient oncology unit. Twenty-three oncology patients (ages 40 to 83 years) took part in the study over a 5 month period of time. During that period, participants took part in a single music therapy session consisting of live music listening with patient preferred music from a variety of genres. Patients were referred by nursing staff for pain, anxiety, stress, new diagnosis, quality of life, etc. A pretest/posttest questionnaire were used to assess levels of self-perceived mood levels. Results showed significant decrease in pain and increase



in relaxation (from pre-session levels to post-sessions levels) after involvement in a music therapy session. Implications for future research are discussed.

**Je-Young Oh**, Advertising and Public Relations

Faculty Mentor: Yonghwan Kim, Telecommunications & Film

*Music Preferences among Northeast Asian Students at UA: Motivations and Consequences*

*\*International focus*

This research will focus on the music consumption behavior among Northeast Asian students in the University of Alabama and its influence or motivation to those students who prefer either Northeast Asian music or American music. A survey questionnaire and in-depth interviews will be conducted for the research.

**Margaret O'Keeffe**, Telecommunications & Film

Faculty Mentor: Meredith Bagley, Communication Studies

*Life's a Pitch*

I have written a fact book that compiles vital facts and figures for each of the 30 MLB teams along with some interesting tidbits of information concerning their histories. The book is 125 pages and I also have a poster that I created to accompany it. My goal is to become the first female play by play announcer in baseball history, and this book has helped to prepare me for my intended career goal.

**Casey O'Quinn**, Psychology

**Dyan Demyan**, Psychology

Faculty Mentor: Jeffrey Parker, Psychology

*Winds of Change: Youth Perspectives on Community Recovery*

"Winds of Change: Youth Perspectives on Community Recovery" was a student-led project designed to apply the best practices of service learning and the theoretical framework of positive youth development to mobilizing high school and middle school students to participate in meaningful ways in the rebuilding and recovery of their community following the April 27th, 2011 tornado.

**Lena Oshinskie**, English

Faculty Mentor: Kevin Besnoy, Special Education & Multiple Abilities

*The Effects of Technology and Social Media on the Educational Environment*

The emergence of social media and technology has changed the way that people relate to each other. This study concerns how teachers and counselors interpret technology acceptable use policies to fit their classrooms, and how technology impacts the way that they create effective relationships with their students and how their students create effective relationships with each other. It also examines the impact technology and social media communications have on the self-esteem of students.

**Matthew Outlaw**, Chemical and Biological Engineering

Faculty Mentor: David Dixon, Chemistry

*Computational Studies of the Hydrolysis of  $(MO_2)_n$  ( $M=Ti, Zr, Hf$ ) Nanoclusters*

Titanium dioxide ( $TiO_2$ ) is a photocatalyst for splitting water into  $H_2$  and  $O_2$  and the  $H_2$  can be used in a fuel cell. Small nanoclusters can have much smaller band gaps than the bulk and may be of use in solar cells. Electronic structure theory is used to study the initial steps of water activation on these nanoclusters in the ground and first excited triplet state to understand the reactions leading to the design of new materials to reduce carbon emissions.

**Cheyenne Paiva**, Biological Sciences

Faculty Mentor: Laura Reed, Biological Sciences

*Genetic Basis of Genotype-by-Environment Interactions Underlying Physiological Modules of Metabolic Syndrome-like Symptoms in Drosophila*

Roughly 500 million adults and 43 million children worldwide are obese, thereby qualifying obesity, and as a consequence, metabolic syndrome, as a global epidemic. With the promises of genetically personalized medicine in mind, the genetic linkage between the onset of metabolic syndrome-like symptoms brought on by diet selection were sought by screening for those symptoms in *Drosophila melanogaster* and eventually mapping the genetic basis of those phenotype and genotype-by-diet interactions.

**Andrew Parks**, Civil, Construction & Environmental Engineering

Faculty Mentor: David Grau, Civil, Construction & Environmental Engineering

*Separating Structures from Noise in Scans Taken Using 3D LIDAR Technology*

This project was designed to take the point cloud obtained through the use of a LEICA Geosystems LIDAR scanner and LEICA's Cyclone software and create a program that will segment the cloud until only the scanned building structure is left.

**Jesseca Paulsen**, Chemical and Biological Engineering

Faculty Mentor: Christopher Brazel, Chemical and Biological Engineering

*Materials for Cancer Hyperthermia: Magnetic Heating of Maghemite/Polycaprolactone Nanocomposites*

Iron oxide nanoparticles have potential applications in magnetically-triggered local hyperthermia for cancer therapy, whereby cancerous tissue can be selectively targeted while minimizing side effects associated with systemic heating. In our work, high frequency magnetic coils were used to conduct heating experiments to determine the specific absorption rate (SAR) of maghemite nanoparticles, investigate parameter-dependent trends, and compare different methods of calculating the SAR.

**Susanna Payton**, Nursing

Faculty Mentor: Paige Johnson, Nursing

*Nursing Death: Lessons from a Hospice Internship*

Inspired by a summer internship on a hospice unit, this study explores the degree to which current nursing curriculum prepares students on death and dying. After surveying 2nd and 4th semester upper-division students at the Capstone College of Nursing, results showed a need for more education on the dying process. Based on the survey findings, this study addresses five things the student nurse should know about death and dying, and provides recommended curriculum additions to the CCN.

**Sean Perry**, Metallurgical & Materials Engineering

Faculty Mentor: David Nikles, Chemistry

*Synthesis of MnBi Nanoparticles Through a Two-Stage Nucleation Then Growth Mechanism*

This research aims to discover a method to reliably synthesize MnBi binary alloy nanoparticles and MnBiX tertiary nanoparticles with X being either Cr, Fe, or Ni, and to produce these particles with a controllable particle size and composition. After synthesis, these particles will be characterized through X-Ray diffraction and Transmission Electron Microscopy in order to determine the chemical composition and physical structure.

**Elyse Peters**, New College

Faculty Mentor: Ellen Spears, New College

*Expanding Environmental Justice: The Impact of Lisa P. Jackson Administration*

With the resignation of Lisa P. Jackson, the first African-American (woman) administrator of the Environmental Protection Agency (EPA), it is important to reflect and analyze the impact her administration has had on the EPA. Jackson's interest in Love Canal (a founding moment in EJ history) spurred her to devote her life to chemical engineering (a male-dominated workforce). Lisa P. Jackson's experiences as an engineer and woman of color greatly shaped the goals and initiatives of her administration. Seen as a revolutionary to environmental NGOs and as a radical to the energy industry, Jackson has refocused the goals and actions of the EPA to uphold scientific integrity, increase transparency, and enforce existing environmental legislation. Not only did the Jackson administration have a strong agenda that promoted EJ issues, but it also redefined what it means to be an "environmentalist," acknowledging the intersection of race, place, and health. Most of the information analyzed was gathered through reading newspaper articles, listening to speeches, and examining government documents and websites. However, some of the information will be notes and observations I personally recorded during my time as an EPA EJ intern.

**David Phelps**, Civil, Construction & Environmental Engineering

Faculty Mentor: John Dantzler, Curriculum & Instruction

*Perceptions of the K-12 Teaching Profession from High-Achieving College Students*

High-quality teachers are considered the single most transformative factor for improving student achievement, so it is imperative for the profession to maintain prestige and attractiveness. Unlike many regions of the world, however, the United States struggles to cultivate such acclaim for K-12 teachers. To better understand why top scholars rarely consider teaching a viable long-term career option, this mixed-method study explores the perspectives of diverse high-achieving undergraduates.

**Charles Phillips**, Civil, Construction & Environmental Engineering

Faculty Mentor: Yingyan Lou, Civil, Construction & Environmental Engineering

*Evaluating the Operational Efficiency of The University of Alabama 348-RIDE On-Demand Transit System*

348-RIDE is a free on-demand transportation service for UA students. Current projections estimate a demand of 170,000 trips for 348-RIDE in 2013, a 22% increase from 2012. With increased demand, efficiency and dependability are top priorities. This project investigates the current practices of 348-RIDE through data collection and statistical analysis. Measurements such as dispatch time and wait time were examined to determine efficiency of the system. Suggestions for improvements are provided.

**Hudson Pierce**, Chemistry

Faculty Mentor: Kevin Shaughnessy, Chemistry

*Synthesis of Air-Stable Palladium Precatalysts and Their Reactivity in Cross-Coupling Reactions*

Transition metal catalyzed cross-coupling reactions have become important tools in organic synthesis. A series of air-stable trialkylphosphine palladium dichloride dimers ( $[\text{Pd}(\text{PR}_3)\text{Cl}(\mu\text{-Cl})]_2$ ) and  $(\text{Pd}(\eta^3\text{-allyl})(\text{PR}_3)\text{Cl})$  complexes containing neopentylphosphine ligands were prepared as potential precatalysts for cross-coupling reactions. The palladium complexes were found to be effective precatalysts for Suzuki, Heck, Sonogashira, and Hartwig-Buchwald couplings.

**Courtney Pixler**, History

Faculty Mentor: Margaret Abruzzo, History

*The Redefinition of Sin: Intellectual Conceptions of American Slavery from 1750-1830*

This paper focuses on the institution of slavery in the United States from 1750-1830, and more specifically on how intellectual conceptions of sin changed during this time. I examine the issue in three parts: the Quaker abolition movement of the 1700s, the American Colonization Movement, and the

early immediate abolitionists. I argue that the redefinition of slavery as a sin played a crucial part in the success of radical emancipation.

**Catherine Porter**, Economics, Finance & Legal Studies

Faculty Mentor: Paula Cordero, Economics, Finance & Legal Studies

*Role of Organizations within REDD+*

*\*International focus*

REDD+ initiatives attempt to both reduce emissions from deforestation and forest degradation and provide economic benefits to participants. As these programs' structures evolve, finding a process that maximizes environmental benefits and participants' benefits is crucial. This study, conducted in Tanzania, aims to show what types of organizations may best implement REDD+, what factors can potentially impact program success, and what role these organizations should play in implementation, monitoring, and enforcement.

**John Porter**, Biological Sciences

Faculty Mentor: Julie Olson, Biological Sciences

*Pigmentation of Neurodegenerative and Non-Neurodegenerative Streptomyces Species*

The common soil bacterial genus *Streptomyces* contains species capable of neurodegeneration in a worm model. To evaluate visual mechanisms to identify producing strains, colony and agar pigmentation were compared for known producing and non-producing *Streptomyces* strains. Preliminary results indicate that neurodegenerative compound-producing strains exhibit agar pigmentation more often than non-producing strains. Studies are ongoing but may provide a rapid method to differentiate between strains.

**Alexis Poston**, Religious Studies

Faculty Mentor: Merinda Simmons, Religious Studies

*Still Standing: The Role of Kahal Kadosh Beth Elohim in the Physical and Spiritual Growth of the Jewish Community of Charleston, South Carolina*

The first record of Jews in South Carolina date back to 1695 & in 1740 Kahal Kadosh Beth Elohim was first established. Claiming that the historical roots of KKBE & the role it has played on the physical and spiritual growth of the Jewish community in Charleston, South Carolina, I will examine William A. Rosenthal's collection of papers, the contributions to the community made by well-known members of KKBE's congregations, as well as the role that KKBE currently plays in the community.

**Michael Raddatz**, Chemical and Biological Engineering

Faculty Mentor: David Dixon, Chemistry

*Gas-Phase Deprotonation of Acid-Substituted Tripeptides*

The lowest energy conformers for neutral and deprotonated trialanine substituted at each position with glutamic acid or aspartic acid were predicted. The reliable correlated molecular orbital theory G3MP2 method was used to predict the gas-phase acidities. Both carboxylic acid sites have stronger acidities than the amide sites by ~10 kcal/mol. The results show the importance of intramolecular hydrogen bonding and its effect on acidity.

**Greg Randall**, Art

Faculty Mentor: Sarah Marshall, Art

*Panoramic Viewing System in an Artistic Context*

I researched, designed, and built a rear projection system to display seamless immersive panoramic images. After building the viewing system I created panoramic images tailored to the display system.

The panoramic images are displayed in sequence to allow the person viewing the panoramic images a way to momentarily experience a separate world.

**Amelia Randazzo**, Biological Sciences

Faculty Mentor: Stephen Secor, Biological Sciences

*Rapid upregulation of the python's small intestine*

In this study I characterize changes in intestinal morphology and function of the Burmese python's small intestine within the first 6 hours after feeding. Feeding sparked within 6 hours shows significant increases in gastric acid production, hypertrophy of the intestinal epithelium, lengthening of the intestinal microvilli, and upregulation of intestinal aminopeptidase activity. We suspect this initial response is generated by posttranscriptional mechanisms later enhanced by a genomic response.

**Eugene Randle**, Anthropology

Faculty Mentor: Cameron H. Lacquement, Ph.D., Anthropology

*Sunken Treasure in the Deep South: Assessing the Accuracy of Remote Sensing Technologies in Marine Archaeology*

Marine archaeology is constantly changing due to advances in technology. This research tests the capabilities recent technological advancements in marine archaeology: differential global positioning system, magnetometer, and side-scan sonar. The focus for this study was accomplished by surveying artifacts present in a marine archaeological site and testing their capabilities. These technologies have not been fully explored for use in marine archaeology, and will add to the knowledge available.

**Savannah Reach**, Chemistry

Faculty Mentor: Silas Blackstock, Chemistry

*Molecules That Dance*

A new bis(azo) compound has been designed and synthesized to undergo reversible shape change from an elongated (trans) to a contracted (cis) form in response to photochemical and electrochemical stimuli, yielding a molecular mechanical switch. To illustrate the molecular motions (chemistry) with a more artistic format (dance), choreographed dance phrases are presented to simulate the shape changes. The photochemical and electrochemical properties of the new molecular switch are presented.

**Meagan Reif**, Educational Studies in Psychology, Research Methodology, and Counseling

Faculty Mentor: Lisa Hooper, Educational Studies in Psychology, Research Methodology, and Counseling

*The Relations among Parentification, Race, Gender, and Psychological Health*

Parentification has significant psychological effects on individuals, although little is known about the implications of race and gender on these aftereffects. We examined the associations among parentification, race, gender, and psychological health in 977 college students. Results showed White Americans reported lower rates of parentification than Black Americans or Latino/a Americans. Males were more parentified than females. Parentification related to psychological health differentially.

**Meredith Rickard**, Chemistry

Faculty Mentor: David Dixon, Chemistry

*Frustrated Lewis Pairs for Catalyzing the Reduction of Carbon Dioxide*

Frustrated Lewis pairs (FLPs) are Lewis acid/base pairs that cannot form bonds with each other to form a Lewis acid base adduct because of steric hindrance and can serve as catalysts. The bond dissociation energies for FLPs with central atoms B and Al, and substituents Br, Cl, CH<sub>3</sub>, F, and H were calculated at

the DFT B3LYP/DGDZVP2 and G3MP2 levels of theory to predict the amount of frustration. Magnetic shielding for each of these pairs was computed using the B3LYP level of theory.

**Elizabeth Roberts**, Information Systems, Statistics & Management Science

Faculty Mentor: Robin Buell, Information Systems, Statistics & Management Science

*Generating an ALISE Statistical Report*

ALISE is concerned with collecting and analyzing information pertaining to library education. Information is gathered through online surveys utilizing an open source survey generation tool. ALISE compiles all the data from its 70 member schools to create an annual statistical report. The team is extracting data from the survey results database in order to generate the report with the new tool. We are also evaluating the current system and developing a recommendation for improvements.

**Joanna Robinson**, Anthropology

Faculty Mentor: Matthew Wolfgram, Anthropology

*The 'Magic' of 'Diversity': The Language of a Socially Charged School Board Debate*

This research analyzes a school board meeting during which participants voiced opinions about a controversial plan to relocate displaced students from a lower-income to a higher-income school. The study provides insights into the discourse strategies used to debate socially charged issues in democratic/bureaucratic settings. The data illustrates strategies of indirection, such as the use of culturally-loaded words like "diversity" to ambiguate the socioeconomic conditions of the debate.

**Brittney Rodriguez**, Psychology

Faculty Mentor: Giyeon Kim, Psychology

*Correlates of Serious Psychological Distress among Latino and Asian Immigrant Elders*

*\*International focus*

The present study examined the prevalence of serious psychological distress (SPD) among Latino and Asian immigrant elders. Descriptive statistics and hierarchical logistic regression analyses were conducted and showed that limited English proficiency was a significant correlate of SPD for Latino and Asian immigrant elders. The findings suggest that there is a need to develop immigrant-specific intervention strategies to improve immigrant mental health.

**Matthew Rodriguez**, Computer Science

Faculty Mentor: Qi Hao, Electrical and Computer Engineering

*Programming Android Mobile Devices for Interfacing Intelligent Sensors*

This project aims to develop an integrated program on the Android platform that provides flexible interfaces with a series of sensors and robots. The developed program can visualize sensor signals, control robots, and display the information of human subjects under examination. The long-term goal of this project is to develop a mobile platform that enables users to interact with an intelligent sensor-actuator network for indoor human monitoring and surveillance.

**Bethany Rogers**, Telecommunications & Film

**Morgan Kendrick**, Telecommunications & Film

Faculty Mentor: Rick Dowling, Telecommunications & Film

*Making the Final Cut: A Guide to Nonlinear Editing*

As student assistants for Multimedia Services of the Center for Instructional Technology, we have the opportunity to create a variety of video projects. On one occasion, we were given the chance to create a Public Service Announcement for keeping art in education. This poster will demonstrate how we took

the unprocessed video footage and turned it into a creative final piece for this project. We'll take you through the creative activity known as nonlinear editing.

**Jonathon Romero**, Center for Materials for Information Technology

Faculty Mentor: Bill Butler, Center for Materials for Information Technology

*L21 Structure Full Heusler Alloys with Low Moments*

We have recently completed a survey of L21 structure Heusler alloys which have composition A<sub>2</sub>BC where A and B are transition metals but C is not. Our survey included alloys for which A=(Cr, Mn, Fe, Co, Ru, or Rh), B=(Ti, V, Cr, Mn, or Fe) and C=(Al, Ga, In, Si, Ge, Sn, P, As, or Sb). In this presentation we will describe the calculated electronic structure and the unique characteristics of the L21 alloys in our survey that have 23, 24 and 25 electrons per formula unit.

**John Roveda**, Chemical and Biological Engineering

Faculty Mentor: Heath Turner, Chemical and Biological Engineering

*The Chemical Engineering App: Engineering in the 21st Century*

This application was designed to consolidate the problem solving process as well as provide users with an educational resource. The initial design process was to develop general tools such as a linear equation solver and graphing capabilities as well as tools for fundamental equations. After creating these tools, randomly generated practice problems were developed for student use. These problems are the foundation for a future homework site and test bank for teachers due to their random nature.

**Jocelyn Rozanski**, Advertising and Public Relations

Faculty Mentor: Chip Brantley, Journalism

*Community Journalism Research Projects*

The goal of this project is to inform people of important social issues surrounding the University and Tuscaloosa areas. Each issue has a designated website and provides information, testimonials, audio and video, and pictures to help people understand why these issues are important. Topics include bike theft on campus, how people with mental illness are viewed, and how people define beauty.

**Amanda Sams**, Journalism

Faculty Mentor: Alexander Parks, Curriculum & Instruction

*"Uncovering the Common Personality Identifiers of Teachers Who Have a Long-lasting Positive or Negative Influence On Their Students"*

This study will involve research to identify perceptions of current college students regarding the personality identifiers of their favorite and least favorite elementary school teachers. The purpose of this qualitative phenomenological study is to find common themes throughout a small sample size of students' views of the qualities that help to determine whether a teacher will leave a long-lasting positive or long-lasting negative influence on his or her students.

**Tawanna Samuel**, Social Work

Faculty Mentor: Javonda Williams, Social Work

*The Effect of President Barack Obama Presidency on Academic Achievement of African American Students.*

The purpose of the research is to determine the effect of President Barack Obama presidency on academic achievement of African American students. Literature shows that racial identity relates to high academic success. I will sample students from at least four different high schools in the Tuscaloosa area to measure if any academic changes have occurred since 2008. I will use the racial identity development

theory as the basis for my research. I will examine if there is a gap in academic success between black and white students.

**Dylan Sandy**, Economics, Finance & Legal Studies

Faculty Mentor: Stephen Black, Center for Ethics and Social Responsibility

*Increasing the Effectiveness of SaveNow WinLater*

I am working with SaveFirst, a program that provides free tax services to low-income families, and more specifically, SaveNow WinLater, a program that encourages these families to use their tax refund to increase their savings. I have researched other programs similar to SNWL as well as collected data from SaveFirst participants to help increase the effectiveness of the program.

**Erinn Savage**, Psychology

Faculty Mentor: John Lochman, Psychology

*Predictors of Change in Child Emotional and Behavioral Functioning Following a Natural Disaster*

Research shows that children are affected by natural disasters. However, very few studies have examined changes in child functioning from before to after a natural disaster. The current study used pre and post disaster data to identify predictors of change in child emotional and behavioral functioning following a tornado. Specific exposure predictors were identified, and perceived social competence was identified as a characteristic that increased children's success in coping.

**Kelsey Schlichter**, Human Nutrition & Hospitality Management

**Sarah Dallam**, Human Nutrition & Hospitality Management

**Lauren Silvio**, Human Nutrition & Hospitality Management

**Morgan Patterson**, Human Nutrition & Hospitality Management

Faculty Mentor: Lori Greene, Human Nutrition & Hospitality Management

*Older Adults and Omega 3 Supplementation: A review*

Omega-3 supplementation has been shown to benefit adults as they progress through life. Studies have shown that EPA and DHA are linked to improved retinal function, decreased inflammation, benefits with cardiovascular disease symptoms, improved protein synthesis and wound healing, and in some cases can delay the progression of cognitive decline and help with diseases such as Alzheimer's and dementia. EPA and DHA, often found in omega-3 supplements, are associated with better health outcomes.

**Savannah Senicz**, Biological Sciences

Faculty Mentor: Lisa Hooper, Educational Studies in Psychology, Research Methodology, and Counseling

*Relationships Between Religiosity, Depressive Symptoms, Well-being, and Gender in College Students*

Depression is one of the leading and most deleterious disorders that college students face. Religion has been shown to serve as a coping strategy for psychological distress in adult populations. Few studies have examined the extent to which religion may be related to depressive symptoms in college students. Using data drawn from a larger study, the current study will explore the association among religious involvement, depressive symptoms, well-being, and gender in a college student population.

**Emily Sharman**, Health Sciences

**Alexis Stewart**, Health Sciences

**Chelsea Lipin**, Health Sciences

Faculty Mentor: Joyce (Jen) Nickelson, Health Sciences

*College Students and Alcohol, Tobacco, and other Drugs*

Objectives: The purpose of this study was to 1) determine how prevalent the use of tobacco, alcohol, and other drugs is among UA students, 2) compare reported actual substance use to perceived peer



substance use and 3) report the most commonly-described consequences of substance use/abuse. Results: Through the use of anonymous surveys, we found that perceived substance use was higher than actual substance use. The top 4 consequences were all centered on doing something the subject regretted.

**Ben Sigmon**, Electrical and Computer Engineering

Faculty Mentor: Kenneth Lichstein, Psychology

*The Web-Based Sleep Diary - A Website for the UA Sleep Research Project*

The Web-Based Sleep Diary for the Sleep Research Project was developed as a more reliable and convenient way to collect study data. Originally, paper forms were used, and data could be missing, nonsensical, or entered incorrectly into databases. The Web-Based Sleep Diary was developed to capture data more robustly and simplify making and carrying out sleep studies. It contains ten forms frequently used in Sleep Research Project and the Sleep Diary.

**Christopher Simpson**, Aerospace Engineering & Mechanics

Faculty Mentor: Shanlin Pan, Chemistry

*Examination Of Chemical Properties Of Flyash With And Without Carbon Nanotubes*

Carbon nanotubes are excellent reinforcing materials that can be used in the civil construction and other industrial applications. Fly-ash is a cheaper, stronger alternative to concrete. The data gathered showed an increase in amorphous material in the fly-ash. The amorphous material was removed from the left-over fly-ash. The fly-ash left was shown to be stronger than normal fly-ash as Raman spectroscopy showed that it still contained the carbon nanotubes after treatment.

**John Skelton**, Mechanical Engineering

Faculty Mentor: Xiangrong Shen, Mechanical Engineering

*Design of A Powered Lower-Extremity Orthosis for Sit-to-Stand and Ambulation Assistance*

The focus of the project is the design of a powered lower-extremity orthosis used to assist a user sit-to-stand transition and ambulation. Pneumatic actuators are used to provide power to the orthotic joints, leveraging their high power and force densities. A knee-ankle-foot orthosis serves as the basis of the design with two pneumatic cylinders attached at knee and ankle joints. Calculations show that the orthosis design is able to provide the required assistive torque for a range of motion.

**Kasi Smart**, History

Faculty Mentor: Ariane Prohaska, Criminal Justice

*Social Inequality after the Tornado: A Critical Analysis of Rebuilding Efforts*

This study assesses how rebuilding efforts after the April 2011 tornado have affected the landscape of Tuscaloosa and how various economic and social groups were impacted by the storm. Using the theory of Hazard Vulnerability, which focuses on how social factors affect a population's preparedness for a natural disaster, I discuss the rebuilding of Tuscaloosa. I examine how rebuilding efforts are displacing low income families and perpetuating the cycle of hazard vulnerability.

**Brad Smith**, Information Systems, Statistics & Management Science

**Jackie Farrow**, Information Systems, Statistics & Management Science

Faculty Mentor: Uzma Raja, Information Systems, Statistics & Management Science

*Predictive Model of Fire Occurring in Seattle, Washington*

This project attempts to create a predictive model to determine the probability of a fire occurring on a specific lot. Utilizing Seattle datasets on fire-based 911 calls and property evaluations, we will attempt to determine the relative weight of different factors such as lot size or property type in predicting the

probability of a fire. Using SAS software and various modeling techniques, an overall formula will be created to predict the probability of fire based off of all relevant attributes.

**Sean Stalley**, New College

Faculty Mentor: Thomas Sawallis, New College

*Darmok and Jalad at Tanagra*

*\*International focus*

Conceptual metaphors have been an integral part to understanding the cognitive processes behind language and how we perceive the world. Continuing in the same vein as George Lakoff in his seminal work *Metaphors We Live By*, I explore the idea of conceptual metaphor that permeates natural languages and how this shapes our thinking. Moreover, I focus on the use of metaphor in Japanese and English by comparing and contrasting their respective cognitive schemas.

**Asia Stephens**, Human Development & Family Studies

Faculty Mentor: Tricia Witte, Human Environmental Sciences

*The influence of social support on stress-related gastrointestinal symptoms*

There have been numerous studies on the influence of stress on physical health. Research has shown that stress can lead to and/or exacerbate a wide range of gastrointestinal symptoms, such as irritable bowel syndrome, stomach pain, and bloating. I will be investigating the role of social support on stress-related gastrointestinal symptoms, specifically testing the buffering effect that social support may have on these symptoms.

**Maura Stephens**, Anthropology

**Andrew Wills**, Anthropology

Faculty Mentor: Elizabeth Cooper, Anthropology

*Why They Come: Factors Influencing Remote Versus Onsite Library Use*

The institution of the academic library is clearly changing with the integration of electronic resources into the library system. However, little data exists about what influences a student's choice to visit the physical library or to only use library services remotely. This project looks at how graduate students think about resources and choice of location for accessing them. Using ethnographic interviews, we determined specific ways in which these students approach resource utilization at UA.

**Tom Stolaski**, New College

Faculty Mentor: Matthew Wolfgram, Anthropology

*How Do Verbal Disputes Function to Reinforce and Maintain Social Relations?*

Verbal conflict is often seen as antithetical to cooperative social interaction. The sociologist Georg Simmel (1955), however, argues that low-level social conflict can function to reinforce social relations. This research provides a detailed analysis of a verbal dispute. The data illustrates that disputants must actively produce a common social understanding to serve as a cooperative basis for disagreement, which supports the theory that conflict can function to maintain social relations.

**Paul Strickland**, Political Science

Faculty Mentor: Glenn Davis, Institute for Rural Health Research

*Analyzing the Effects of Sleep on the Performance of Emergency Medical Service Providers*

The purpose of this study is to analyze the effects of sleep on EMS personnel. Prior research has shown that fatigue results in negative effects on the quality of patient care in emergency situations. This study investigates the severity of those effects through a survey of local EMS personnel and trials in which

paramedics are measured on the performance of emergency medical tasks (intubation/airway management, CPR, cardiac rhythm monitoring) in a scenario at day and night during an EMS shift.

**Christie Talley**, Human Nutrition & Hospitality Management

Faculty Mentor: Laura Reed, Biological Sciences

*Egg Dumping Patterns in Drosophila melanogaster*

Many insect species rely on energy conservation methods for nutrient uptake, longevity, fecundity, and survival. *D. melanogaster* has been found to "egg dump," or release unfertilized eggs, potentially influencing these phenotypes. This research utilized this model organism and its mutant lines to evaluate genes potentially responsible for nutrient reabsorption, necessary for energy conservation.

**Gabrielle Taylor**, Telecommunications & Film

Faculty Mentor: Stacy Morgan, American Studies

*The K-pop Phenomenon*

*\*International focus*

The K-pop fan culture is a difficult one to understand by viewing on the outside. A k-pop fan has to be built and molded. There is much that a fan new to k-pop must learn to better understand other branches that fall under the k-pop umbrella. How do international fans support the bands they love, and in what ways do fans delve deeper into Korean culture that k-pop has opened the door to?

**Sarah Tharani**, Health Sciences

**Ashley Winn**, Health Sciences

**Adam Pounds**, Health Sciences

**Kristel Vourna**, Health Sciences

**Calvin Russell**, Health Sciences

Faculty Mentor: Melanie Tucker, Health Sciences

*The Impact of Academic Stress on College Campuses*

A series of studies determined that over 75% of college students claimed to being "moderately stressed," while 10% reported being "severely stressed" most of the time (Casazza & May, 2012). In order to further research this claim, 30 surveys were handed out to 19-24 year olds attending The University of Alabama. Upon analysis, it was determined that 50% of our population has moderate stress, and 33.3% of our population has high stress. Of this, 37% claim this stress due to academic stressors.

**Mallory Thompson**, Nursing

Faculty Mentor: Kevin Shaughnessy, Chemistry

*Neophylphosphine-supported palladium catalysts for cross-coupling reactions*

Palladium-catalyzed cross coupling reactions are known to be effective methods for forming carbon-carbon and carbon-heteroatom bonds. Sterically demanding, electron rich phosphines have been proven to offer high efficiency catalysts for these reactions. Our group has shown conformationally flexible neopentylphosphines to be especially effective catalysts in many cross-coupling reactions. Here, we report the use of neophylphosphines (neophyl = 2-methyl-2-phenylpropyl) in palladium-catalyzed cross-coupling reactions. The conformationally flexible, sterically demanding neophyl substituent allows for potential coordination of palladium to the  $\pi$ -system thus stabilizing the active species. We have shown that di-(tert-butyl)neophenylphosphine provides a useful catalyst for both Heck and Hiyama couplings of aryl halides.

**Shey Thorn**, Theatre & Dance

Faculty Mentor: Sarah Barry, Theatre & Dance

*Dancer's Anatomical Functions Through Bartenieff Fundamentals*

The main objective of my research is to examine strengths, weaknesses, and boundaries of the human body through a dancer's eye with focuses through concepts of the Bartenieff Fundamentals. The methods used were the reading and research of Peggy Hackeny's book "Bartenieff Fundamentals" which also incorporated full body movement in each area of the fundamentals. The results of my research is to simply find a better understanding of how to better utilize our bodies for the purpose of movement.

**Sarah Tooker**, Communication Studies

Faculty Mentor: Meredith Bagley, Communication Studies

*A Health Critique of High Fashion: Reconfiguring Symbols in Trash Art*

A chainsaw made of Chanel bags. A fast food tray wrapped in Tiffany blue. By linking functional common objects to icons of high fashion, artist Tom Sachs critiques health and individuality while simultaneously promoting critical thinking. I use two modes of rhetorical criticism, metaphor and ideological, to evaluate Sachs' success in changing perceptions of capitalist culture. Within limits, I find connecting opposites allows rhetors to redefine hegemonic values and obtain a powerful response.

**Marc Torrence**, Journalism

Faculty Mentor: George Daniels, Journalism

*Lessons learned from sports blogging: A Southeastern Conference study*

This project focused on blogging habits of newspaper beat writers covering Southeastern Conference (SEC) football. A content analysis of blog posts during one week when 10 of the 14 SEC teams were in action produced a multitude of results about their habits. To provide context to these findings, follow-up interviews with a subset of blogging beat writers were conducted. Most writers confirmed the findings, while bringing other points into focus.

**Lynda Truong**, Chemistry

Faculty Mentor: Stephen Woski, Chemistry

*The Synthesis of Molecular Electronics*

This project covers the synthesis of 4-(4'-bromo-2'-5'-dimethoxyphenyl)-2,5-dioxobenzonitrile, or bromo-cyano hemibiquinone. We postulate the molecule will act as a molecular diode due to the low-lying LUMO of the quinone structure and the high-lying HOMO of the dimethoxyphenyl structure. During the synthetic process, we have also explored other derivatives of the hemibiquinone. The synthesis of molecular electronics will ideally supplement existing circuitry in computers to enhance performance.

**Marie Tucker**, Communicative Disorders

**Amy Deeble**, Communicative Disorders

Faculty Mentor: Angela Barber, Communicative Disorders

*Roll Tide: Cultural Variations in Early Words*

Amy Deeble and I worked in the fall with the Speech and Hearing and created a survey to analyze data for our project that attained information about children's first words. We are continuing to obtain this work in the spring to get more information for our research and how culture affects early words.

**Ryan Turner**, Business Administration

Faculty Mentor: Janis O'Donnell, Biological Sciences

*A novel web application for rapid multi-functional genetic analyses of multiple genes: TFconnect*

Though many online resources exist to research gene associations, most have complicated, limited interfaces lacking mobile device support. Also, few of these tools are in easy-to-use, multi-functional platforms. Motivated by our own complex genetics workflow, we have created a novel computational application that combines identifying transcription factor binding sites, human orthologs and gene summaries of multiple genes in one, user-friendly interface for rapid analysis and comparison.

**Marc Vital, Theatre & Dance**

Faculty Mentor: Donna Meester, Theatre & Dance

*The Costume Design Process*

Costume Design is a rewarding field and integral part of visual storytelling. Clothes label a person allowing other people to identify their occupation, age, gender, and status without words. Many times people take costumers for granted not realizing how important it is for an audience to identify a character on stage in a matter of seconds. My poster would take the viewer through the design process using the musical, A New Brain, leaving them with a better understanding of costume design.

**Alexandra Waits, Biological Sciences**

Faculty Mentor: Ryan Earley, Biological Sciences

*Temperature Effects on Sex Steroids and Gene Expression in the Hermaphroditic Fish *Kryptolebias marmoratus**

Temperature plays a major role in sexual development and differentiation in mangrove rivulus fish. We hypothesized that temperature would influence hormone production and the activity of enzymes involved in sex hormone synthesis pathways. We developed primers and conducted PCR to reveal the sequence of genes that code the enzymes. Quantitative PCR will be performed to determine how exposure to 20 °C, 25 °C, and 30 °C during adulthood influences gene expression related to sex hormone synthesis.

**Sergei Wallace, Chemistry**

Faculty Mentor: Robin Rogers, Chemistry

*Extraction of Uranium from Seawater Using Modified Chitin Fibers Derived From Shrimp Shell Waste*

With a 1000x more uranium in the oceans than on land, there is an untapped supply for our increasing energy demands. We propose an effective, sustainable extractant using chitin fibers pulled directly from a solution of shrimp shells and ionic liquids. The fiber surface has been modified with a uranium selective ligand and shows excellent uptake of uranium from aqueous solutions. We present the methods, results, and future direction of our modified chitin polymer for uranium extraction.

**David Walston, Economics, Finance & Legal Studies**

Faculty Mentor: Shane Underwood, Economics, Finance & Legal Studies

*Accuracy of SEC Filing Statements*

This year I have done research with Dr. Shane Underwood studying the SEC Filing systems and their accuracy. The process has been done using Python programming languages to extract data from the Security Exchange Commission files and used a combination of other languages and data sets to help store the data and compare it. The research is ongoing but the results for some businesses has been completed.

**Jason Wang, Chemistry**

Faculty Mentor: Kevin Shaughnessy, Chemistry

*Air-Stable Trialkylphosphine Palladium Complexes as Precatalysts for Cross-Coupling Reactions*

Palladium catalyzed cross-coupling reactions are important for the formation of C-C bonds. One disadvantage of this methodology however is the use of air-sensitive phosphine ligands. Our work has focused on synthesis of a series of trialkylphosphine palladium dichloride dimers ( $[\text{Pd}(\text{PR}_3)\text{Cl}(\mu\text{-Cl})_2]$ ) and  $\text{Pd}(\eta^3\text{-allyl})(\text{PR}_3)\text{Cl}$  complexes containing neopentylphosphine ligands. Reactions were performed to evaluate the effectiveness of the palladium complexes as precatalysts for cross couplings.

**Randy Warren**, Mechanical Engineering

Faculty Mentor: John Baker, Aerospace Engineering & Mechanics

*ALSAT Mission Planning (AMP) Toolkit*

Femto-satellites, or PocketQubs, are classified as satellites with mass on the order of 100 grams. Such satellites are attractive due to their low cost and their potential to enable future satellite concepts, such as coordinated satellite constellations. ALSAT is The University of Alabama's femto-satellite development project. The AMP Toolkit has been developed to supplement commercially available software for predicting satellite performance, specifically in the area of communication.

**Amelia Warriner**, Health Sciences

Faculty Mentor: Hobson Bryan, Geography

*Discrimination: Homosexuality in the South*

I will delve into the culture of the South and touch on two topics that give light as to why the south is very anti-gay. I will bring up politics and religion.

**Matt Weider**, Civil, Construction & Environmental Engineering

Faculty Mentor: Stephen Lovell, Computer Science

*The Coping Power Program Application*

The Coping Power Program Application is a web-based cognitive-behavioral study for at-risk children in the late elementary and early middle school years. The application is designed to integrate interactive features for the child and parents to explore. As a result, the activities from the application are used to develop and reinforce positive actions. The data collected from the students is used to measure child development and patterns of improvement of the program.

**L. Michael Wells**, Biological Sciences

Faculty Mentor: Carol Duffy, Biological Sciences

*Analysis of the effects on Tetherin expression and associated virions among Human Herpes Simplex Virus 1 mutants*

Hosts susceptible to enveloped viruses have evolved to produce an interferon-induced integral membrane protein, Tetherin, as a defense. This protein binds nascent virions to the cellular membrane, slowing further infection. Using Transmission Electron Microscopy and Protein Immunoblots, we hope to quantify relative Tetherin expression levels and qualitatively examine virus morphology and associated virions.

**Olivia West**, Art

Faculty Mentor: Stacy Morgan, American Studies

*Faith Ringgold's 'American People Series' and the Fight to Break the Silence*

Faith Ringgold, an African American painter during the Civil Rights Movement, found her voice in The American People Series. In this series, Ringgold discovered her own style and a message. She had a unique, woman's point of view on the slow progress of Civil Rights. Her use of violence in the paintings caused a stir among critics and viewers and pressed the urgency of her issues. Ultimately, Ringgold's series of paintings was a unique and dynamic voice of change in the Civil Rights Movement.

**Morgan Whitaker**, Chemistry

Faculty Mentor: David Nikles, Chemistry

*Polymer Coated Magnetite Nanoparticles as Cancer Drug Delivery Devices*

Magnetite nanoparticles were made by the decomposition of iron(III) oleate in refluxing 1-octadecene. A diblock copolymer with an alcohol group at a polycaprolactone terminus reacted with 3-isocyanatopropyltrimethoxysilane to give a silane-terminated polymer, which was covalently bound to the surface of the magnetite particle. These polymer micelles, when crystallized, can encapsulate cancer drug and become the basis for a targeted, magnetically triggered drug delivery system for cancer therapy.

**Alex White**, Religious Studies

Faculty Mentor: Merinda Simmons, Religious Studies

*Southern Gentlemen*

The allusive appeal of the southern gentleman has remained constant. This has a great deal to do with "southern identity" and what it actually means to be southern. I will compare and contrast the terms courting and dating and how they have evolved over time. I will also suggest the reasons for "southern hospitality" and the "southern gentleman" to be so appealing and the meaning behind them by reflecting on term definitions, environment, and genealogy between the years 1949 and present day.

**Jessica White**, Psychology

Faculty Mentor: Beverly Thorn, Psychology

*Patients presenting to the Emergency Department with pain: Relationship of pain intensity and vital signs with psychological variables*

Contrary to popular thought, previous research has shown that pain intensity is not associated with changes in vital signs. It is important to examine other potential pain variables affecting the physiological response of the body to pain. The present study, focused on ED patients with pain, hypothesized that the vital signs would not be correlated with pain intensity. Instead pain intensity would be associated with psychological variables: pain catastrophizing and state anxiety.

**Sarah White**, Biological Sciences

**Ryan James**, Biological Sciences

Faculty Mentor: Ryan Earley, Biological Sciences

*Developmental Response to Predator-Related Cues*

Mangrove rivulus fish self-fertilize to generate isogenic lineages, which provide the opportunity to resolve how the environment shapes phenotypic traits. Rivulus' ecology is not well understood, but the mangrove water snake is known to be a major predator. We investigate the developmental response to predator-related cues in lineages derived from regions with and without snakes. This study will illuminate whether predator exposure triggers major shifts in phenotype during development.

**Meghan Wilgus**, Information Systems, Statistics & Management Science

Faculty Mentor: Christopher Sims, Computer Science

*Survey on Interaction with MyAlabama and MyDHR UX2014 Design*

The researchers aim to provide an intuitive and widely available system to enhance usability and accuracy of MyDHR e-government citizen access portal. Participants will be provided with access to the application, and will then be asked to interact with it using a mock family profile. Half the participants will interact with Version A, and half with Version B. The usability of the application, time spent on the application, and accuracy of data collected are the principle focuses of the study.

**Bradley Williams**, Information Systems, Statistics & Management Science

**Matthew Rieger**, Information Systems, Statistics & Management Science

**Nathan Baker**, Information Systems, Statistics & Management Science

Faculty Mentor: Uzma Raja, Information Systems, Statistics & Management Science

*Effects of Flight Cancellations and Diversions on Airline Ticket Sales*

Our team will be conducting an analysis of aviation datasets that include information such as expected/actual departure and arrival times, cancellations, and diversions categorized by airport and airline. We'll use data regarding ticket fare prices and quarterly operating sales to observe the effects of cancellations and delays on ticket sales. The insight gained from our research can potentially benefit airline passengers and employees by helping determine appropriate pricing schemes and make more informed purchasing decisions.

**Carolyn Williams**, Psychology

**Bridget Jackson**, Psychology

Faculty Mentor: Javonda Williams, Psychology

*The effects of homelessness on middle age adults*

The homeless community often faces hardships such as harsh living arrangements, poor nutrition, substance abuse, poor medical care, limited job resources and mental illnesses. This study will focus on the effects these hardships have on the homeless in middle adulthood. We will use personal interviews and a questionnaire survey to evaluate the effects by comparing them to Erik Erikson's life span theory, stage of generativity versus stagnation. We expect to find a decline in middle adult's cognitive abilities, tendency to work, spirituality, both physical and mental health, and also an increase in substance abuse.

**Emily Williamson**, Nursing

Faculty Mentor: Angela Collins, Nursing

*Disparity in Treatment of Pain in Patients with Acute Neurological Injury*

As nurses we are taught that it is imperative to quickly and adequately address a patient's pain. However, with patients with traumatic brain injuries, pain medication is held. Seeing this in the clinical setting led students to question the reason behind the protocol. This led us to our review of the literature as to why patients with head injuries are required to endure pain without medication.

**David Wilson**, Economics, Finance & Legal Studies

Faculty Mentor: Paula Cordero Salas, Economics, Finance & Legal Studies

*The Alabama Accountability Act and Alabama's Schools*

The Alabama Accountability Act, passed by the Alabama State Legislature in 2013, provides tax credits and scholarships for families who desire to send their child from a failing public school to a non-failing public school or a non-public school. This presentation seeks to give an overview of the legislation, analyze arguments for the potential positive and negative effects, and, finally, recommendations for the future of the legislation to best benefit the state of Alabama.

**Leighton Wilson**, Computer-Based Honors Program

Faculty Mentor: Shan Zhao, Mathematics

*New Algorithms for Biomolecular Solvation Analysis*

This research explores new schemes for solving pseudo-time coupled nonlinear partial differential equations used in biomolecular solvation analysis, with the goal of finding methods that are more efficient and more stable than previously established schemes. Multiplicative operator splitting methods



and additive operator splitting methods are explored as potentially more stable alternatives to previous schemes.

**Kristi Wisniewski, Psychology**

Faculty Mentor: Rebecca Allen, Psychology

*Decision Making Capacity and Social Support among Community-Dwelling Older Adults*

Emotional well-being and social support among older adults may contribute to everyday life decision-making (DM) and overall health. Sixty-two percent were classified as having mild cognitive impairment (MCI). In an analysis of racial differences between white and African American participants, white participants scored significantly higher on measures of health literacy ( $t=2.61(15.2)$ ,  $p<.05$ ) and DM capacity ( $t=2.13(18.8)$ ,  $p<.05$ ).

**Ali Yousuf, Chemistry**

Faculty Mentor: Gregory Szulczewski, Chemistry

*Conductivity Studies of Tellurium and Bismuth Telluride Nano-wires in PEDOT:PSS Thin Films*

PEDOT:PSS, is a polymer that creates electrically conducting films upon evaporation of the water, which are poor thermal conductors. A thermoelectric material can spontaneously convert a temperature gradient across the material into electrical power. We synthesize Te and Bi<sub>2</sub>Te<sub>3</sub> nanowires in the PEDOT:PSS and measure the electrical conductivity of the composite film. This results in an increase in conductivity of the PEDOT:PSS in the presence of the nanowires.

**Shuwen Yue, Chemistry**

Faculty Mentor: Martin Bakker, Chemistry

*Formation of Hierarchically Porous Carbons and Application as Catalyst Supports*

Hierarchically porous materials are of interest for many applications in energy storage, separations, and catalysis. We report here on an efficient, one pot synthesis for making hierarchically porous carbons, characterization of these materials by electron microscopy and gas adsorption, and the use of such materials as catalyst supports for various hydrogenation and carbon-carbon bond forming reactions.

**Shuwen Yue, Chemistry**

Faculty Mentor: David Dixon, Chemistry

*Computational Studies of Models of the Schrock and Grubbs Catalysts*

The Nobel Prize winning Schrock and Grubbs transition metal catalysts are used in olefin metathesis to produce a wide range of organic compounds. In order to better model the actual catalysts leading to new catalyst designs, an efficient computational method is needed. Thermodynamic properties for these catalysts were benchmarked for a range of density functional theory exchange-correlation functionals against reliable coupled cluster CCSD(T) values to obtain an efficient method.

**Jessica Zielinski, Biological Sciences**

**Joshua Beckedorf, Biological Sciences**

Faculty Mentor: Stephen Secor, Biological Sciences

*Impact of incubation hypoxia on digestive energetics for the snapping turtle*

We explored the effects of incubation environment on turtle physiology by comparing pre- and postprandial metabolic rates and SDA of snapping turtles incubated under normoxic and hypoxic conditions. Incubation environment had no impact on standard metabolic rates, however hypoxia-treated turtles experienced a 23% greater postprandial metabolic scope and a 45% greater SDA and SDA coefficient. The greater cost of digestion for hypoxic-treated turtles may contribute to their slower growth rate.

# Oral & Poster Presentation Abstracts

*Emerging Scholars Division*

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**Alison Adams**, Biological Sciences

Faculty Mentor: Laura Reed, Biological Sciences

*The study of genetic variation in Drosophila melanogaster: energy allocation for reproduction*

Life history theory has shown that natural selection favors organisms that efficiently capture and allocate their energy for activities that enhance survival. In this study we examine the genetic variation within the activity of egg-dumping in various mutant lines of *Drosophila melanogaster*. Three mutant lines of *D. melanogaster* were crossed with wildtype W1118, and both the pure-breeding parents and their heterozygous offspring were observed and quantitatively measured for egg-dumping.

**Cole Adams**, Economics, Finance & Legal Studies

Faculty Mentor: Jesse Ellis, Economics, Finance & Legal Studies

*How Connected Are They?*

Many in the investment community feel the high risk adjusted performance seen in the past decade is much too high to have been completely gained legitimately. We are seeking to provide a connection between common past experiences and lucrative trades. Our goal is to find a correlation based on prior employment, education and geographic location. Once biographical data is analyzed, the portfolios of the individual hedge funds will be analyzed for patterns of investment behavior.

**Erin Adams**, Economics, Finance & Legal Studies

Faculty Mentor: Jun Ma, Economics, Finance & Legal Studies

*Measuring Changes in External Wealth of Italy and Spain*

*\*International focus*

In recent years, many industrial countries have had large budget deficits financed by an ever increasing debt and decreasing external wealth. This situation was further worsened during the 2008 financial crisis, which proved the instability of many countries. Two such countries, Italy and Spain, are examined in this project. Their external wealth is measured between 2005 and 2011, and the causes for the changes each year are examined, focusing on yields of investment income and capital gains.

**Amira Aglan**, Chemical and Biological Engineering

**Lingling Guo**, Chemical and Biological Engineering

Faculty Mentor: Hung-Ta Wang, Chemical and Biological Engineering

*Selective Patterning of Bi<sub>2</sub>Te<sub>3</sub> Nanoplatelets via Microcontact Printing*

Bismuth Telluride, Bi<sub>2</sub>Te<sub>3</sub>, and other chalcogenides are recently confirmed as topological insulators. The chemistry of selectively patterning Bi<sub>2</sub>Te<sub>3</sub> nanoplatelets on silicon substrates using micro contact printing,  $\mu$ CP, technique has been accomplished. This indicates that Bi<sub>2</sub>Te<sub>3</sub> nanoplatelets are immobilized on the APTMS printed regions, implying an electrostatic interaction between amine groups and Bi<sub>2</sub>Te<sub>3</sub> nanoplatelets.  $\mu$ CP is a controllable process for making two-dimensional Bi<sub>2</sub>Te<sub>3</sub> nanosheets.

**Kevin Allen**, Economics, Finance & Legal Studies

Faculty Mentor: Paul Drnevich, Economics, Finance & Legal Studies

*Slack and Growth Performance*

In this study, I examine how a business's access to Internal and external resource "slack" contributes to its current performance and future growth expectations. I will use data from the National Federation of Independent Business's Small Business Economic Trends survey of around 35,000 businesses from 2009 through 2012. I offer some preliminary results from examinations of several hypothesized relationships, and conclude with a discussion of implications and examples for future research.

**Brittany Allums**, Biological Sciences

**Connor Smith**, Mechanical Engineering

Faculty Mentor: Anthony Arduengo, Chemistry

*Chemical Hydrogen Storage Through The Use Of Carbene-Based Frustrated Lewis Pairs*

Even in the absence of any scientifically well-founded environmental concerns, a hydrogen-based energy economy would offer number of potential advantages. Not the least of these advantages is the potential for safer handling and use over conventional petroleum based fuels. Problems arising from hydrogen storage are some of the most easily recognized and important barriers to the use of hydrogen as a safe and reliable alternative source of energy. This is due to the dangers and difficulties experienced during the use of current containment methods, such as heavy high-pressure cylinders and cryogenic vessels, necessary while transporting or storing the material. The focus of this research is to develop a method for storing hydrogen in a chemical form which could be stored and released as needed. By utilizing the unusual valence of the Arduengo (persistent) carbene, we intend to create a series of frustrated Lewis acid-base pairs which will be tested for their ability to absorb and release hydrogen gas at low activation levels on a consistent and repeatable basis. If successful, the result would be an easily storable and transportable solid that could hold the useful quantities of hydrogen.

**August Anderson**, Communicative Disorders

Faculty Mentor: Anthony Buhr, Communicative Disorders

*Startle Response During a Modified Stroop Task*

This study investigated magnitude of startle response during a modified Stroop task. The words "blue" or "red" were presented on a computer monitor in either blue or red color. Participants responded to color or word, depending on instructions they were given. 500 ms noise bursts were randomly presented among Stroop trials. Results revealed individual differences in magnitude of startle response and a decrease in magnitude over time. Results will be used to refine the study design.

**Emily Austin**, Kinesiology

Faculty Mentor: Beverly Thorn, Psychology

*Attitudes about Yoga as a Predictor of Intent to Try Yoga in Older Adults with Chronic Pain*

Multiple studies have shown that yoga is a low-cost, nonmedical treatment for chronic pain. Older adults with chronic pain can participate and benefit from yoga because it can be adapted for their pain condition. Attitudes about yoga and other factors can influence a person's intent to do activities when a person has a pain condition. The research raises the question of what factors and attitudes about yoga influence older adults' intent to try yoga as a treatment for their chronic pain?

**Jeromey Beaman**, Biological Sciences

Faculty Mentor: Shadi Martin, Social Work

*Qualitative Research with Older African American Women About Treatment for Breast Cancer Recruitment and Interviewing Challenges*

Although mortality rates from breast cancer increase for all women with age, the mortality rates are highest among older African American women. The combination of age and ethnicity puts older African American women at high risk for negative cancer outcomes. Treatment decision-making particularly

with a life-threatening illness such as cancer can be confusing and stressful for patients and families. Our goal in conducting this experiment is to find similarities amongst African American women's regarding decision making treatments for breast cancer. We also hope to find out some of the causes and influences of these decisions. To answer these questions, we recruited thirty-eight participants to tell us their stories in their fights with cancer, and later, we compiled and compared the statements between each of the participants to find the common similarities in them. As of yet, our results have yielded some common themes between the participants such as: a delay of screening, doctor's unwillingness to listen to the concerns of patients, fears of receiving treatment, and reactions of the post affects of receiving treatment are a few such themes that present a problem in the efficiency of African American women to receive appropriate treatment. From the data we have gathered thus far, we can conclude that the role of family members play a significant role in the decision making process of women to receive treatment, as well as the patient's own stresses with the medical staff assigned to them. However, further analyzing of the remaining data remains to be studied further.

**Mirza Beg**, Chemical and Biological Engineering

Faculty Mentor: Dave Nikles, Chemistry

*Co-Crystals of 10-methylphenothiazine and 1,3-dinitrobenzene: Implications for optical sensing of TNT-based explosives.*

Our objective is to design polymers for a waveguide sensor with an affinity for nitroaromatics to detect explosive materials by changes in refractive index of the polymer films. Co-crystals were grown between 10-methylphenothiazine and 1,3-dinitrobenzene forming a crimson charge transfer complex. Spin coated polystyrene films doped with 10-methylphenothiazine were exposed to 1,3-dinitrobenzene vapors producing a change in refractive index in the doped polymer films characterized by Ellipsometry.

**Jonathan Bell**, Electrical and Computer Engineering

Faculty Mentor: Jaber Abu-Qahouq, Electrical and Computer Engineering

*Adaptive Wireless Power Transfer System*

Wireless power transfer via inductive and resonant coupling has started to attract more attention recently due to many interesting applications. This work focuses on studying the effect of design parameters on the efficiency of power transfer systems. Currently, the frequency is the main targeted parameter. Based on studying the effect of frequency tuning on the efficiency under different positions and orientations, an adaptive frequency auto-tuning controller and system will be developed.

**Amanda Bennett**, English

Faculty Mentor: Trudier Harris, English

*A Burning House: An Analysis of Criticisms of Dr. Martin Luther King Within the Black Power Movement*

This project examines critiques of Dr. Martin Luther King by writers and activists within the Black Power Movement of the 1960s. An analysis of these critiques explains the origins of the Black Power Movement and the gradual transition from the nonviolent Civil Rights Movement to the more militant Black Power Movement. To observe this shift in ideologies, I searched the writings of Amiri Baraka, Nikki Giovanni, and Stokely Carmichael for references to King in their works of fiction and essays.

**John Bentley**, Biological Sciences

Faculty Mentor: David Nikles, Chemistry

*Polymeric Vesicles for use in a Drug Delivery System*

The project objective is to create polymeric vesicles, which can be used as a drug delivery system for cancer chemotherapy. Because the core of the vesicles is comprised of water, it can contain a hydrophilic drug. A diblock copolymer was made by the tin-catalyzed ring opening polymerization of  $\epsilon$ -

caprolactone from the alcohol terminus of poly (ethylene glycol) monomethylether. Vesicles were formed by dropping a THF solution into pure water with ultrasonication.

**Jillian Bibbins**, Electrical and Computer Engineering

**Jay Hamilton**, Computer Science

Faculty Mentor: Monica Anderson, Computer Science

*Teach the Future of Tomorrow: Engineering Edition*

Soon, the United States will be unable to fill a large amount of the jobs available, and shall be unable to compete adequately globally. To lessen this gap, more engineering programs should be implemented in high schools around the country to expose students to basic engineering concepts, so students can be more prepared when entering college. The objective of this research project is to create a kit that can be distributed to high school students to motivate interest in the engineering field.

**Ruth Bishop**, Biological Sciences

Faculty Mentor: Laura Reed, Biological Sciences

*The Roles of Pupal Adhesion Genes in Regulating Drosophila melanogaster Pupal Weight*

Recent findings suggest that pupal adhesion genes in *Drosophila melanogaster* may be involved in regulating pupal weight. To determine whether a causal relationship exists between pupal gene expression and pupal weight, pupa from mutant and wildtype backgrounds were weighed. An analysis of the weight data has shown that this causal relationship likely exists; thus, these results could have implications in elucidating the roles of pupal adhesion genes on body weight in *Drosophila*.

**Sarah Black**, Human Nutrition & Hospitality Management

Faculty Mentor: Linda Knol, Human Nutrition & Hospitality Management

*Obesity Rates of Third Grade Children in Alabama*

The Alabama Obesity Task Force and Oral Health Program of Alabama completed a five year follow-up study of obesity rates in Alabama school children. Heights and weights of 3,952 third graders were collected between November 2012 and December 2013. Rates of overweight and obesity are 16.6% and 21.7%, respectively. When compared to current national statistics, children in Alabama have higher rates of obesity.

**Kate Blackwell**, Accounting

Faculty Mentor: Janis Edwards, Political Science

*Determining Rhetoric in Politica through Pictures in Newspapers*

This study focuses on photos of Presidential candidates in newspapers the day after the presidential debates. By taking a sample of newspaper photographs we were able to categorize the photos into different sub categories and, using prior research of Janis Edwards, determine the reasoning behind the use of each photograph. Based on our research, we agreed on the basic rhetoric of clash in every aspect between the candidates.

**Emily Bloomquist**, Chemical and Biological Engineering

Faculty Mentor: Robin Rogers, Chemistry

*Effect of graphene vs. graphite on the electrochemical properties of azolate based ILs*

This presentation discusses our results toward the development of new ionic liquid (IL) based electrolytes with improved electrochemical properties. Recently, the Rogers group developed a new class of azolate based ILs which proved to have a greater electrochemical stability than aqueous electrolytes. Here we show an improvement in the electrochemical stability of these azolate based ILs by loading them with small amounts of graphene and graphite (0.01 - 0.03 wt%).

**Jessica Boozer**, Human Nutrition & Hospitality Management

Faculty Mentor: Jeannine Lawrence, Human Nutrition & Hospitality Management

*Factors Associated with Weight Maintenance following Weight Loss in African-American and European-American Females Living in Alabama*

This study will investigate factors associated with successful weight maintenance in African-American and European-American women. Eighty women who have recently completed a weight loss program will be assessed. Participants will complete a questionnaire evaluating health, weight history, goals, social support, and activity level, and anthropometric data will be collected to estimate body composition. Results could be used to improve incidence of successful weight maintenance in this population.

**Jamie Bowman**, English

Faculty Mentor: Emily Wittman, English

*Confronting Ghosts: Seeing the Past in the Present*

This project uses the autobiographies of University of Alabama alumni and books about the ghosts of Tuscaloosa and UA in order to consider the ghosts that haunt this region. The resulting project is a multiform journal that confronts the ghosts of Tuscaloosa and fellow personal "ghosts". By this confrontation with the past, this project seeks to find a new way to respond to the idea of ghosts. Hopefully readers will gain a greater understanding of ghosts and begin to think on them in new ways.

**Morgan Brasfield**, Biological Sciences

Faculty Mentor: John Yoder, Biological Sciences

*The Role of Ultrabithorax in Adult Spiracle Development*

Although it was previously thought that Ubx was not expressed posterior to the first abdominal segment in *Drosophila melanogaster*, we have recently discovered that Ubx is instead restricted to developing spiracles. Thus, we hypothesize that Ubx is necessary for proper spiracle development. We will use RNAi to knock down Ubx in developing spiracles, then dissect and image our samples to look for morphological deformities. If our hypothesis is correct, we should reduce or eliminate the spiracles.

**Rachel Brasier**, Political Science

Faculty Mentor: Douglas Gibler, Political Science

*Legislative Signaling and the Democratic Peace*

*\*International focus*

The project aims to determine the credibility of legislative signaling of a democratic leader's perceived resolve by using textual analysis software to measure the tenor of British Parliamentary debates during international crises from 1918 to 2004 and aligning those psychological findings with the record of militarized action by and against Britain. Results show that certainty and anxiety in debate increase the probability of an escalation within the conflict both by Britain and its adversary.

**Daniel Brown**, Mechanical Engineering

Faculty Mentor: Ajay Agrawal, Mechanical Engineering

*Observation of effects of Porous Inert Media on a nonreactive flow field using Particle Image Velocimetry*

Particle Image Velocimetry(PIV) is used to quantify the effects of a Porous Inert Media(PIM) on a non-reacting flow field. PIM is used as a passive method to mitigate combustion noise and/or thermo-acoustic instabilities in swirl-stabilized combustion, but little is known about the mechanisms responsible. PIM alters the flow field in an advantageous manner by eliminating the corner recirculation zones, decreasing the shear layer spreading angle, and increasing the turbulent kinetic energy.

**Kaitlin Burchett**, Psychology

Faculty Mentor: Martin Sellbom, Psychology

*The Effect of Hostile Attribution Bias on the Relationship Between Psychopathy and Aggression*

The purpose of this research was to determine the relationship between psychopathy and aggression. Investigating this relationship involved self-report scales to measure psychopathy, aggression, and hostile attribution bias (HAB) and an in-lab task involving hot sauce as another measure of reactive aggression. The results indicated that the social deviance traits of psychopathy predicted reactive aggression and that this relationship is partially mediated by HAB.

**Haley Burhans**, Chemistry

Faculty Mentor: Timothy Snowden, Chemistry

*Construction of Chiral Polysubstituted Tetrahydropyran Rings Featuring a Novel Jovic-Type Reaction*

The goal of this project is to create individual functionalized tetrahydropyran rings in an efficient, stereoselective manner. The significance of these structures lies in their diverse bioactivity as components of anti-bacterial, anti-tumor, and anti-inflammatory agents. Completing all six steps will highlight this new, highly adaptable synthetic strategy as a viable means of expediting drug discovery efforts.

**Craig Burns**, Chemical and Biological Engineering

Faculty Mentor: Pauline Johnson, Civil, Construction & Environmental Engineering

*Water Quality in the Alabama Black Belt*

Dr. Pauline Johnson and Dr. Joe Brown have been testing soil to understand the severity of malfunctioning septic tanks and unfit water treatment in the Alabama Black Belt. An issue the group has been facing has not been lab work but the lack of a file containing the basic information of the project. By sifting through the data already found by the team and the federal census, I have compiled a set of information available to all team members able to be easily referenced to find project details.

**Kyle Burns**, Metallurgical & Materials Engineering

Faculty Mentor: Nima Mahmoodi, Mechanical Engineering

*Flapping Wing Inspired Piezoelectric Energy Harvester*

As technology becomes smaller it becomes more important to replace the conventional battery as a means of power supply. Piezoelectric materials are an attractive alternative because they produce power indefinitely from environmental stresses. In our project we studied existing piezoelectric devices and developed a simple design of our own to demonstrate the effect. Our device harvests energy from the deformation of an aluminum beam to illuminate an LED through vibrational energy harvesting.

**Jonathan Burrows**, Biological Sciences

Faculty Mentor: Ryan Earley, Biological Sciences

*Choosing a Caretaker: Alloparental Dynamics in Fish*

Bluenose shiners deposit eggs in nests of male sunfish, who guard their own and shiner eggs. Female sunfish prefer males that have large opercular flaps, a trait indicating male quality. We hypothesize that shiners will also exhibit a preference for males with large opercular flaps. We put shiners in a tank with sunfish of varying flap sizes and tracked their movements to examine preferences. Our data suggest that shiners prefer to spend more time near male sunfish with longer opercular flaps.

**Blair Butler**, Civil, Construction & Environmental Engineering

**Morgan Hendon**, Civil, Construction & Environmental Engineering

Faculty Mentor: Glenn Tootle, Civil, Construction & Environmental Engineering

### *Wind River Range Glacier Area*

The purpose of our research is to determine the area change of glaciers in the Wind River Range in WY, US between 2006 and 2009. Using USGS aerials for specific glaciers, we are able to calculate area using GIS. We plan to publish our findings as a technical note to Derrick Thompson's report, which found that the area change was -13% from 1966 to 2006. We expect to see the same trend. Our research supports climate change, demonstrating a reduction of glacial area due to rising temperatures.

### **Melinda Carr, Psychology**

Faculty Mentor: Kristina McDonald, Psychology

#### *"You Don't Have to Like Me, But You Have to Respect Me": A Comparison of How Dislike and Disrespect Experiences Elicit Aggression*

Sociometer theory suggests that perceptions of being disliked should encourage prosocial behavior. Ethnographic research suggests that perceptions of being disrespected are likely to lead to aggressive behavior. Current research that examines responses to rejection confuse these experiences. To address this issue, participants will respond to vignettes that portray "pure" disrespect and "pure" dislike in social situations. Results will clarify the findings of prior research.

### **Cody Caver, Mechanical Engineering**

Faculty Mentor: Keith Williams, Mechanical Engineering

#### *Controlling a Robotic Arm Using a Microcontroller*

In laboratories across the nation, robotic lab equipment is becoming outdated due to the recent switch from analog signal interface, to a digital signal interface. To operate compatibly with modern computers and other lab equipment, a conversion from analog to digital signal must be engineered. With a newly revamped signal interface, modern laboratory practices can be performed using older equipment, thus saving exorbitant amounts of money that would otherwise be used to update equipment.

### **Gianna Ceophas, Political Science**

Faculty Mentor: Anne Williamson, Political Science

#### *Mapping Fair Housing Progress*

This study seeks to identify the prevailing impediments to fair housing and action plans that seek to remedy the issue in an effort to increase knowledge of the laws that promote fair housing and limit discrimination in housing practices. We looked to the Analysis of Fair Housing Impediments (AFHI) that each district who receives federal aid from HUD (US Department of Housing and Urban Development) must construct and deliver to HUD in an effort to show that strides are pushing toward fair housing.

### **Ryan Colaianni, Biological Sciences**

#### **Hunter Dean, Biological Sciences**

Faculty Mentor: Janis O'Donnell, Biological Sciences

#### *Low Doses of Iron Oxide Nanoparticles Have a Detrimental Effect on Reproduction and Development*

Nanoparticles are becoming increasingly used in target drug delivery systems and medical imaging technology. This increase in use calls for an in-depth toxicological study of their effects. In this study, larvae of *Drosophila melanogaster* were fed various concentrations of iron oxide nanoparticles to observe reproductive effects as well as innate immune response. We found a tight concentration window in which there seemed to be a discernible response to the nanoparticles.

### **Elijah Coleman, Physics & Astronomy**

Faculty Mentor: Dean Townsley, Physics & Astronomy

#### *Detonation Strength in Stellar Explosions*



This is part of a larger study of characteristics of the explosion of white dwarf stars. We are using one-dimensional simulations of a propagating detonation wave front to calibrate the multidimensional simulations of supernovae that cannot be run at high resolution due to limited computing resources. Specifically, we are studying the effects of varying density on how quickly a detonation strengthens. From the strength of the detonation, we can determine what material results from the explosion.

**Veronica Coleman**, Biological Sciences

Faculty Mentor: John Wheat, Community and Rural Medicine

*Analysis of Factors Pertaining to Local Physician Density in Alabama Counties*

The research is based on a secondary data analysis of data available in the public domain. Our research will focus on the 67 Alabama counties. The majority of the research will focus on the black belt counties which are identified by Governor's Belt belt action commission. The purpose of this study is to determine whether areas with higher agricultural economies have fewer physicians and whether health status correlate with density of local physicians.

**Megan Costello**, Nursing

Faculty Mentor: Anthony Roberson, Nursing

*Community Based Participatory Research in Adolescent Mental Health*

The State of Alabama has the lowest rates of mental health care among children and adolescents, and yet the highest need for it. Dr. Roberson (the Capstone College of Nursing) and Dr. Church (School of Social Work) will study the availability of mental health care to incarcerated adolescents in the Tuscaloosa area. They will be implementing Community Based Participatory Research (CBPR) model to engage community stakeholders in the process of assessing the current health care needs of adolesc...

**Solitayr Cotten**, Human Development & Family Studies

Faculty Mentor: John Bolland, Human Environmental Sciences

*The Effects of Family Instability on Adolescent Risk Behaviors*

Family instability has a substantial effect on engagement in at-risk behavior. Using data from the Mobile Youth Survey, we investigated the difference in effects of a change in mother figure and no father figure on male and female risk behavior. The analyses used a linear mixed model to control for repeated measures in the longitudinal design. The results indicate that family instability is associated with aggressive and violent behaviors, substance use, and that males are at a greater risk.

**Sarah Cox**, Biological Sciences

**Taylor Colon**, Biological Sciences

**Rowdy Allen**, Biological Sciences

Faculty Mentor: Katrina Ramonell, Biological Sciences

*The Transportation and Accumulation of Iron Oxide Nanoparticles in Arabidopsis Plants*

Nanoparticle (NP) use has increased recently across various fields including medicine, agriculture, and electronics. Tissue samples from plants treated with NPs were taken and the magnetic moments were measured. Results showed that the NPs were absorbed by roots and transported to leaves within 72 hours. This project is focused on understanding the transport and accumulation of NPs into the reproductive tissues of plants and the effects of NPs on seed germination and seedling development.

**Stephanie Craig**, Social Work

Faculty Mentor: Debra Nelson-Gardell, Social Work

*Mapping the Development of an Intervention: Resiliency and Child Sexual Victimization*

This research emerges from Bronfenbrenner's Ecological Systems Theory and research showing that certain variables and factors can predict resiliency in sexually abused children. This research project will map the development of an intervention based on these findings. One step of this intervention is to pair a child with a mentor who will be taught a specific curriculum to gain knowledge of the affects of sexual victimization and how to intervene in order to improve the child's functionality.

**Grace Cunningham, Kinesiology**

Faculty Mentor: Monica Anderson, Electrical and Computer Engineering

*Using AL5D Robotic Arm and iRobot Create to Maneuver Techniques in the Aid of Disadvantaged Citizens  
Stage 1: Customized Grippers*

The AL5D and iRobot will be able to aid disadvantaged citizens in a variety of cleaning and also in the aid of picking up different items that the person cannot reach originally with the different customized grippers. The AL5D Robotic arm and the iRobot Create are connected by a synthetic plate by bolting the two machines between the plate. There were two different programs, the Lynxmotion RIOS SCC-32 and iRobot create program, which controls the movement of both robots.

**Casey Dalton, Chemistry**

Faculty Mentor: Shanlin Pan, Chemistry

*Monitoring Single Particle Electrochemistry via Dark Field Microscopy*

Dark-field scattering microscopy was used to monitor the electrochemical growth of individual Ag nanoparticles at the surface of an Indium Tin Oxide (ITO) electrode. This combined optical/electrochemical method enables the observation of heterogeneities in reactivity from particle to particle. By correlating the optical scattering signal with scanning electron microscopy (SEM) measurements, converting the single particle scattering intensity to particle size is possible using Mie theory.

**Corey Dennis, Civil, Construction & Environmental Engineering**

Faculty Mentor: Pauline Johnson, Civil, Construction & Environmental Engineering

*Waste-Water in Blackbelt Alabama*

The Black Belt, a crescent strip of vertisol organic-rich soil that stretches from Maryland to Texas, transverses central Alabama through 18 counties. This once provided ample economic opportunities for the region, but has since left the area in poverty. The soil of the area is disruptive to conventional septic systems and many policies go unchecked, resulting in failing waste water systems in these counties,. This paper seeks to address the issues of failing onsite waste water management.

**Nichole Dennis, Criminal Justice**

Faculty Mentor: Adam Lankford, Criminal Justice

*Mass Shootings Then and Now : A Comparison of Attacks from 2011-2012 with Attacks from the Past*

This study compiled a list of the recent rampage shootings in 2011 and 2012, and then compared them to the 2010 NYPD report of active shooters from 1966-2010. The findings suggest that there is a significant increase in the average number of casualties per attack in 2011 and 2012, and several other differences as well. This research may be able to help scholars understand the reasons for these attacks and in turn help law enforcement prevent these shootings altogether.

**Davis Diamond, Biological Sciences**

**John Wyatt, Biological Sciences**

Faculty Mentor: Stephen Secor, Biological Sciences

*Is Digestion Cheaper if Bigger?*

Mandatory to feeding is the metabolic cost of meal digestion and assimilation, known as the specific dynamic action (SDA) of the meal. We examined whether postfeeding metabolic rates and SDA increase proportionally with larger body size if relative meal size is constant. Both standard metabolic rate and peak postfeeding metabolic rate scale allometrically with body size (i.e. they don't match an increase in body size). However, SDA does scale isometrically; digestion is not cheaper if bigger.

**Alexandria Dolan**, Curriculum & Instruction

Faculty Mentor: Diane Sekeres, Curriculum & Instruction

*Strategies for Reading Multimedia Materials*

In this study, researches examined how reading during research affects understanding. Elementary age students were asked to complete a pretest, online research, and a posttest in order to improve their knowledge of "green" toys, and then present a mock-pitch to a toy company. The students, as well as their screens, were video recorded and they were asked to vocalize their thought process. We hope to help educators and designers create student-friendly electronic educational materials.

**Allison Dougherty**, Chemical and Biological Engineering

**Olivia Roe**, Chemistry

Faculty Mentor: Stephen Woski, Chemistry

*Synthesis of an Electrical Charge Transport Structure*

Dye-sensitized solar cells use a robust light-absorbing molecule tethered to a semiconducting surface to convert sunlight into usable electrical current. This premise serves as an improvement to current solar energy harvesting technology. Current work is underway to synthesize a functioning and efficient electrical charge transport structure using a naturally occurring dye known as bixin attached to an amine and lipid structures to protect the molecule from the surrounding environment.

**Mitchell Dykstra**, Philosophy

Faculty Mentor: Chase Wrenn, Philosophy

*The Advantages of Deflationary Concepts of Truth*

This presentation demonstrates the advantages of deflationary theories of the concept of truth over more substantive accounts of truth's nature. Each theory is evaluated with respect to four criteria: the plausibility of the theory, the theory's consistency with the Equivalence Schema, its compatibility with realism and anti-realism, and how the theory makes sense of the value of truth.

**Marshall Everett**, Aerospace Engineering & Mechanics

Faculty Mentor: Dean Townsley, Physics & Astronomy

*Verification of Numerical Simulation of Landau-Darrieus Unstable Reaction Fronts*

The purpose of this project is to model the behavior of a Landau-Darrieus unstable thermonuclear flame front in a Type Ia supernova explosion. This instability leads to the formation of a cusp, whose growth rate is observed as a function of the initial perturbation amplitude, wavelength, and domain size. 2D numerical simulations of single-mode perturbations with a compressible hydrodynamics code are used. This project will provide insight on predicting the behavior of such high energy reactions.

**Clare Farrow**, Anthropology

Faculty Mentor: Ian Brown, Anthropology

*Gravestone Photo Portraits and the Military*

I wanted to know if it was popular for men who died in war to have their military photo on their grave. My hypothesis was that if a young man under the age of 30 died in battle and he had a photo on his gravestone or something in the inscription that indicated he had served in the military, his photo

portrait is of him in uniform. Also, if a man lived beyond 30, most likely he will not be in military uniform in his photo, even though his gravestone inscription indicates service to the country.

**Jacklyn Farrow**, Information Systems, Statistics & Management Science

Faculty Mentor: Uzma Raja, Information Systems, Statistics & Management Science

*User Effort Computations for Software Defects*

This project seeks to apply previous research to compute the amount of effort exerted on individual software fixes. In a study on the effects of experience on software development, a formula was developed to determine effort expended by a user. This study will analyze a software update database to determine the total effort expended for each defect update. This will be used in further research to create a predictive model determining how different qualities of the defect affect total effort.

**Caleb Felker**, Metallurgical & Materials Engineering

Faculty Mentor: Nitin Chopra, Metallurgical & Materials Engineering

*Designed CuO-Pt-SiO<sub>2</sub>-CeO<sub>2</sub> Hybrid Nanowires*

We have studied the synthesis of complex CuO-Pt-SiO<sub>2</sub>-CeO<sub>2</sub> hybrid nanowires by combining thermal annealing growth of CuO nanowires, direct nucleation of Pt nanoparticles, sputtering of SiO<sub>2</sub>, and thermal annealing growth of CeO<sub>2</sub> nanoparticles. The as-synthesized hybrid nanowires were characterized extensively using SEM, TEM, XRD, and Raman spectroscopy for understanding of the growth mechanisms and formation of interfaces. Such hybrid nanowires hold significant promise for nanocatalysis.

**Jacob Fondriest**, Physics & Astronomy

Faculty Mentor: Patrick Leclair, Physics & Astronomy

*Development of an inexpensive surface electromyograph.*

There are a variety of applications for a device that can read and interpret the electrical activity from skeletal muscles non-invasively. To name a few, it could aid in analysis of skeletal muscles, serve as a heart-rate monitor, or be a trigger mechanism for preprogrammed functions. However, in today's market, the cost of such a device can reach \$2500. This project aims to use inexpensive parts to create a device that performs the same function as modern surface EMGs.

**Anna Forrister**, Anthropology

Faculty Mentor: Philo Hutcheson, Educational Leadership, Technology, and Policy

*59 Years of "All Deliberate Speed"*

The desegregation of public schools took longer than expected after the second Brown decision declared that desegregation must occur with "all deliberate speed." There were many state and federal court cases that attempted to move along the process of desegregation after the Brown decisions. The process of desegregation in public schools has been very slow with many obstacles along the way. This research examines how several key cases slowly moved the process of desegregation along.

**Claiborne Fountain**, Economics, Finance & Legal Studies

Faculty Mentor: Shawn Mobbs, Economics, Finance & Legal Studies

*Role of Attractiveness of CEO in Stock Price*

We are trying to measure executive appearance objectively to determine whether or not shareholders take executive appearance into account when a new CEO is appointed. We are measuring attractiveness objectively by using the Golden Ratio, which is supposed to show the ideal facial layout and symmetry. This is opposed to a subjective approach which has already been studied.

**Sam Gerard, History**

Faculty Mentor: John Beeler, History

*How Naval Expansion Veiled The Decline of The British Empire*

*\*International focus*

In the last four decades of the nineteenth century, the British became increasingly worried about their naval and imperial security. Hawkish Members of Parliament and their allies in the press incessantly charged that the Royal Navy-the first line of defense-lacked the material resources to defend either the Home Islands or the Empire's far-flung colonies and self-governing dominions. This research project will survey the domestic factors driving British naval expansion from 1860 to 1900.

**Ashley Gilchrist, Biological Sciences**

Faculty Mentor: Laura Reed, Biological Sciences

*Genic Effects on Induced Egg Dumping in Female Drosophila melanogaster*

The normal state for *Drosophila melanogaster* adults is mated and the manipulation of this natural behavior has resulted in the exposure of genotypic abnormalities in females. Some females that are unmated lay unfertilized eggs(egg dumping)while others will reabsorb the unfertilized eggs. We believe that this genetic effect is caused by a genetic locus on the second chromosome. The analysis of mutations in four candidate genes that may affect egg dumping will aid in understanding this trade-off.

**Christopher Gilmartin, Biological Sciences**

Faculty Mentor: Guy Caldwell, Biological Sciences

*Analysis of an Alzheimer's Disease Model*

Alzheimer's disease (AD) is the most prevalent neurodegenerative disease in the world. The misfolding of the protein beta-amyloid 42 (A $\beta$ 42) has been implicated in AD. This research focuses on further elucidating the mechanism underlying the toxicity. Using *C. elegans* to model the expression of A $\beta$ 42 and RNA interference, we were able to identify several gene products that modulate the cellular clearance of A $\beta$ 42. These genes could serve as therapeutic targets for the treatment of AD.

**Maggie Goodman, Chemical and Biological Engineering**

Faculty Mentor: Julia Cherry, Biological Sciences

*Comparisons of Foliar Chemistry of Wetland Plant Communities in Different Stages of Succession*

Beaver-formed wetlands are dynamic components of the landscape and consist of patches comprised of different plant communities characteristic of various successional stages. These plants can have distinct foliar chemistries that influence organic inputs to the local ecosystem and change along with community composition. Our goal was to determine the chemistry of plant communities in different stages of succession and assess implications for wetland ecosystems.

**Jelani Grace, Biological Sciences**

Faculty Mentor: Ryan Earley, Biological Sciences

*Parasite Manipulation of Host Personality in California Killifish*

Parasites may be an important factor influencing host personality. We hypothesized that social behavior in infected California killifish is parasite density-dependent. We explored this question by measuring how much time a fish spent within 2 centimeters of a confined school of conspecifics, and then determined the number of *Euhaplorchis californiensis* and *Renicola buchani* trematode parasites present. Our results showed that sociability was not impacted by the density of either parasite.

**Katherine Green, Political Science**

Faculty Mentor: Robert Fording, Political Science

*Discrepancies and Similarities in Political Rhetoric of Tea Party and Non-Tea-Party Legislators in the Florida Congress*

This study aims to compare the rhetoric used by Democratic, Republican, and Tea Party legislators in Florida in order to determine differences in the language used by Tea Party Republicans, Non-Tea-Party Republicans, and Democrats. Data was collected from the campaign websites of state legislators and evaluated by software that analyzes the relative occurrence of words. There was very little difference in the types of words used by Tea Party and non-Tea Party Republican legislators.

**Angela Griffin**, Computer Science

Faculty Mentor: Marcus Brown, Computer Science

*Exploration of the Fandom's Response to a New Game Set in a Visual Novel Space*

*\*International focus*

Using computer-mediated communication and visual novel gaming, this project focuses on fans of Hiromu Arakawa's popular manga and anime series Fullmetal Alchemist. In response to the controversial fan-made Fullmetal Alchemist visual novel Bluebird's Illusion, this project will create a sequel game. This sequel will follow the Pride!Ed ending of Bluebird's Illusion. The goal of this project is to collect responses from Fullmetal Alchemist fans that show a positive change of opinion.

**David Gronstal**, Aerospace Engineering & Mechanics

Faculty Mentor: James Hubner, Aerospace Engineering & Mechanics

*The Effects of Vibration on Membranous Wings*

Membranous wings, comparable to bats' wings, may potentially be implemented in the design and manufacture of small flying craft, such as MAVs (micro air vehicles). The purpose of this research is to investigate the frequency scaling of a spanwise tensioned membrane at low Reynolds number conditions. In doing this research, we hope to attain a greater understanding of the effects of vibration on membranous wings so that their efficiency in flight may be optimized.

**Karli Guyther**, Communication Studies

Faculty Mentor: Karla Gower, Advertising and Public Relations

*The Corporate Defamation Plaintiff: Public or Private?*

Defamation is a recognition of the right of individuals to protect their reputations from wrongful injury. But what of corporations? A corporation has a reputation and can suffer damage as a result of defamatory statements made about it, but "the business corporation has no personality, no dignity that can be assailed, no feelings that can be touched. Since it cannot suffer physical pain, worry or distress, it cannot lie awake nights brooding about a defamatory article."

**Carson Haack**, Aerospace Engineering & Mechanics

Faculty Mentor: Amy Lang, Aerospace Engineering & Mechanics

*Generating a Vortex Ring in Viscous Silicone Oil*

Many modern designs for Micro Air Vehicles (MAVs) are shooting for bio-inspired features from birds and insects. This is because of natural formations on the wings of these creatures that resist air drag. A vortex generator will be designed to produce a ring of vortices in viscous silicone oil, which will be used to study the fluid flow over a butterfly's wing in future studies.

**Alexander Hale**, Biological Sciences

Faculty Mentor: Jeffrey Lozier, Biological Sciences

*Changes in body size and wing morphology with elevation in a montane bumble bee*

Montane bumble bee species experience large differences in temperature and air density throughout their ranges. To study adaptations for thermoregulation and flight, we measured body size and wing area in *Bombus vosnesenskii* from OR and CA at different elevations. We found correlations between both body size and wing area with elevation. Although bees get larger with elevation, possibly due to cold temperatures, wing area increases faster than body size, possibly helping flight in thin air.

**Jacob Harbin**, Chemical and Biological Engineering

Faculty Mentor: Jason Bara, Chemical and Biological Engineering

*The Large Scale Production of Imidazolium-Based Ionic Liquids*

Imidazolium-based ionic liquids have a wide variety of industrial applications and are synthesized in large quantities for commercial use. The extent to which these ionic liquids must be manufactured affects production costs, chemical process efficiency, and the amount of waste and potentially toxic materials that can result as by-products. The direct utilization of naturally occurring compounds to produce these ionic liquids presents itself as a very cost-effective alternative in industry.

**Weston Harris**, Information Systems, Statistics & Management Science

Faculty Mentor: David Hale, Information Systems, Statistics & Management Science

*ConnectingALABAMA*

ConnectingALABAMA is a multi-year initiative that aims to promote the adoption of broadband Internet access throughout the State of Alabama. Improved outcomes are expected primarily for Alabamians in the areas of Healthcare, Education, Public Safety, and Commerce. The purpose of this research is to develop a quantitative outline describing the value for implementing a broadband network infrastructure, which will be used to inform the recommendations to be included in the State's Broadband Plan.

**Trey Harrison**, Electrical and Computer Engineering

Faculty Mentor: Tim Haskew, Electrical and Computer Engineering

*Multi-Functionality of Absolute Encoders*

Neodymium magnets are a valuable resource in our current society, and almost all of the world's neodymium supply is controlled by China. The University of Alabama College of Engineering has developed a new material that could be a substitute for Neodymium. To test these magnets, they are being placed in motors. Gathering feedback from the motor requires a resolver for the motor drive, but an absolute encoder is the ideal device. For this, the encoder output must be converted to match a resolver.

**Aidan Hathaway**, Economics, Finance & Legal Studies

Faculty Mentor: Walter Enders, Economics, Finance & Legal Studies

*The Changing Nonlinear Relationship between Income and Terrorism*

*\*International focus*

In a novel study, Enders and Hoover (2012) examined how the concentration of terrorism in middle-income countries indicates a nonlinear income-terrorism relationship. This research reinvestigates this nexus over a longer time-period and with further data specifications. It devises a terrorism Lorenz curve to display the dispersion and applies robust measures to determine appropriate regressions. The results support nonlinear findings and offer key insights into the shifting nature of terrorism.

**Spenser Hayward**, Chemical and Biological Engineering

Faculty Mentor: Jason Bara, Chemical and Biological Engineering

*Solvation Characteristics of Polymerized Imidazolium-Based Ionic Liquids*

Due to their solvation abilities, polymerized imidazolium-based ionic liquids have shown promise in the capture of CO<sub>2</sub>. By altering the length of the alkyl side chain, the polymer's solvation properties can be manipulated. This study polymerized imidazoliums ranging from methylimidazolium to hexylimidazolium under ultraviolet radiation, and then placed samples of each in various organic and inorganic solvents. The degree to which each polymer absorbed its respective solvents was then compared.

**Rachel Henderson**, Aerospace Engineering & Mechanics

Faculty Mentor: Semih Olcmen, Aerospace Engineering & Mechanics

*Schlieren Technique*

The schlieren system is used to see how particles from a light source refract when they go through a density gradient. The experiment itself is very short, so most of the effort has gone in to configuring the optimal setup. We are still testing which light sources, lenses, and camera for capturing the process, will create the most accurate findings.

**Mary Heske**, Biological Sciences

Faculty Mentor: Ellen Spears, American Studies

*Historiography of Changing Scholarship in Race, Health, and Ethics Studies*

Until the 1960's, the United States' beliefs in race, health, and ethics were severely outdated. Following the 1960's, researchers looked differently at this field of study. My project was designed to study this change in scholarship since the mid-1960's. The field of study exploded, because research now had to re-discover the truth. This research showed how the voice of those studying our history and culture changes, which changes how information is recorded.

**Samantha Hill**, Biological Sciences

Faculty Mentor: Jane Rasco, Biological Sciences

*The Effects of Nanoparticles on CD-1 Mouse Fertility Examined using TEM*

In our lab, previous studies have shown that iron oxide nanoparticles can cross the placenta and potentially cause damage to the fetus. In our current study we are examining the offspring of the iron oxide treated dams. Side effects that have been seen include edematous uteri and reduced epithelium in the seminiferous tubules.

**Kevin Igoe**, Mechanical Engineering

Faculty Mentor: Paulius Puzinauskas, Mechanical Engineering

*Analysis of Tumble and Its Effects on EGR Tolerance for a Gasoline Engine Running at High Loads with a Modified Intake Port*

This research was done to test the possible combination of series hybrid electric vehicle structure engine with a modified intake port. Using a modified acrylic cylinder design, aluminum flow guide vanes were inserted into the intake to induce tumble. The flow was then examined through the use of particle image velocimetry (PIV). It was found that the flow guide vanes significantly increase the exhaust gas recirculation (EGR) tolerance as well as combustion.

**Emily Jaeger**, Management & Marketing

Faculty Mentor: Helenka Nolan, Management & Marketing

*Shared Values*

*\*International focus*

Stora is the oldest company in the world, having thrived for 700 years and its key to longevity is community engagement. Research by Michael Porter looks at how companies can create shared value



by incorporating community needs into their business models. Through our research, we have found many companies have an idea of CSR and stakeholder management. With our partnership in Brazil we hope to build a business model for engaging multinational corporations and their stakeholders in shared values.

**Zach Jarrell**, Electrical and Computer Engineering

Faculty Mentor: Qi Hao, Electrical and Computer Engineering

*Music: A Physical Experience*

The purpose of our research is to develop a system that allows for the user to compose his own music based on his body movements. Using pressure pads, lasers, and thermal sensors, we were able to read the person's body movements and use these readings to create music. We can take the readings and by using a program, we can convert body motions into music. By doing this, we have created a way for people without musical knowledge to make their own music by simply moving around.

**Matthew Jeans**, Biological Sciences

Faculty Mentor: Carol Duffy, Biological Sciences

*Cloning Strategies Designed to Generate Coiled-coil Fusion Proteins for Attachment to Iron Oxide Magnetic Nanoparticles*

Nanoparticles possess great potential for use in cancer therapy as drug delivery platforms. The attachment of different protein molecules to the particle surface will improve the safety and efficacy of nanoparticle-based therapies. Using the expression vector pMBP and mCherry as a model protein, we are developing a cloning strategy to generate full-length coiled-coil recombinant proteins during protein purification. Here we present the generation of N and C-terminal His-tagged DNA constructs.

**Corinne Jenkins**, Economics, Finance & Legal Studies

Faculty Mentor: Paan Jindapon, Economics, Finance & Legal Studies

*Vertical Integration*

Vertical Integration is a business model in which firms at different stages of production merge together for increased efficiency, decreased costs, and greater control over input variables. By examining vertical integration in a variety of industries, I will attempt to determine the factors which make vertical integration beneficial to firms. I will then apply that information to the advertising industry, specifically in regards to the operation and usage of digital billboards in advertising.

**Christopher Johnson**, Electrical and Computer Engineering

Faculty Mentor: Jaber Abu-Qahouq, Electrical and Computer Engineering

*Perturb and Observe Maximum Power Point Tracking*

Clean, sustainable, and renewable energy sources has been a major focus for engineers and researchers, especially in the past decade or two. Photovoltaic (PV) solar energy is one important energy source. In order to extract maximum power from a PV source under a given set of conditions (e.g. irradiance level), a power converter with maximum power point tracking (MPPT) is employed. This research project involves the design and implementation of an efficient MPPT power module.

**Megan Johnston**, Chemistry

Faculty Mentor: Kevin Shaughnessy, Chemistry

*Development of an Aqueous-Phase C-H Arylation Reaction*

Palladium-catalyzed direct arylations are useful methods of forming carbon-carbon bonds. Expensive and toxic organic solvents are necessary for these reactions. Water is an ideal solvent substitute because it is less expensive, less hazardous, and may be used for catalyst recycling in biphasic systems. We are

currently making starting materials that we intend to use in the development of direct arylations in water using water-soluble phosphine ligands such as triphenylphosphine trisulfonate.

**Kevin Jones, Art**

Faculty Mentor: Lucy Curzon, Art

*Examining Thai Art in the Paul R. Jones Collection*

*\*International focus*

The Paul Jones Collection of American Art contains at least 16 works of Thai art. Several of these do not have even a title or an artist ascribed to them, making it difficult to understand their artistic significance or their place within the collection. This study draws on primary sources to recover information on the origins and importance of the Thai works. The results indicate that they represent a broad range of the Thai artistic tradition, and range in value from souvenirs to masterpieces.

**Taylor Jones, Kinesiology**

Faculty Mentor: Jonathan Wingo, Kinesiology

*Effect of Acute Cooling on Aerobic Capacity During Heat Stress*

Aerobic exercise capacity is decreased in hot environments. Further research is needed to develop effective countermeasures. The purpose of this study was to determine if acute cooling mitigates decreases in aerobic exercise capacity in hot conditions. Aerobic capacity was assessed after exercise in a hot environment with and without fan cooling just prior to the assessment. Preliminary results suggest that acute cooling does not affect aerobic exercise capacity in the heat.

**Lin Kabachia, History**

Faculty Mentor: Avani Shah, Social Work

*Pain Management in Older Adults*

We are studying the usefulness of using psychotherapies for pain management in older adults. We conducted a search on psychinfo that yielded 2,168 articles. Of those, we reviewed 89 articles that met our criteria and were randomized controlled trials. The search yielded 29 articles that matched our search criteria. We were able to find a total of ten different psychotherapies that targeted pain in older adults. Results of evidence-based psychotherapies will be presented in a table.

**Nicole Kernahan, Biological Sciences**

Faculty Mentor: Ryan Earley, Biological Sciences

*Adaptive Implications of Vibrant Coloring for Aggression between Convict Cichlid Females*

Female convict cichlid fish possess a bright orange spot that may signal quality to males or other females. High-quality females might threaten the mating or territorial success of other females thus, we hypothesize that female cichlids will be more aggressive towards females possessing larger spots. We will expose cichlid females to model fish with three spot types (none, small, large) and quantify behavior. These data could illuminate the adaptive function of vibrant color in female animals.

**Matt Kieffer, Biological Sciences**

Faculty Mentor: Laura Reed, Biological Sciences

*The Effects of Diet on Pupal and Larval Survival Rate and Development Time in Drosophila melanogaster*

Metabolic syndrome (MetS) is a complex disease in humans that has increased in prevalence over the past 20 years. Recent research has indicated that MetS has a strong genetic influence. Using *Drosophila* as a model, I studied the effects of a fat diet compared to a normal diet, and its effects on development time and pupal and larval survival. Compared to those on a normal diet, flies on a high fat diet had a decrease in both pupal and larval survival and an increase in development time.

**Desiree Kiss**, Aerospace Engineering & Mechanics

Faculty Mentor: Amy Lang, Aerospace Engineering & Mechanics

*The Effects of Grooved Surfaces on Boundary Layer Separation around a Cylinder*

Marine bio-inspired surfaces have previously been studied as a possible method of delaying boundary layer separation. This experiment studied the effects of sinusoidal grooves, similar to those in dolphin skin, once applied to a cylinder. A grooved cylinder was tested in low Reynolds number flow using a water tunnel facility. The data collected will be compared to available data for a typical cylinder in order to determine if the grooves delayed boundary layer separation.

**Kelly Klevitsky**, Economics, Finance & Legal Studies

Faculty Mentor: Douglas Cook, Economics, Finance & Legal Studies

*Social Networks and the Transfer of Private Information*

The goal of the project is to examine the sharing of significant private information by members of boards of directors utilizing social connections formed among members. Methods used in the study include determining when private meetings might have occurred and whether unusual trading activity exists around such dates that is profitable upon the release of private information. Results have not yet been determined as the study is still in its beginning stages-identifying possible meeting dates.

**Grace Knowles**, Biological Sciences

Faculty Mentor: John Yoder, Biological Sciences

*The role of shavenbaby in trichome production in Drosophila Melanogaster*

Within the family Drosophilidae, which includes the model organism, *Drosophila melanogaster*, larval trichome patterns vary among closely related species. Previous analyses show trichome patterning is directly regulated by shavenbaby (*svb*) and is the result of cis-regulation. Our hypothesis is that the absence of trichomes will correlate with repression of *svb* expression. To test this hypothesis we are exploring *svb* expression and function through a combination of gene expression assays.

**Paul Kolotka**, Economics, Finance & Legal Studies

Faculty Mentor: James Cover, Economics, Finance & Legal Studies

*The Viability of the Fuel Tax: Funding the Transportation Ecosystem*

Federal and state fuel taxes are the primary mode of funding highway construction and maintenance in the United States. Because fuel taxes typically are not indexed to inflation, even the relatively low rate of inflation in the United States has gradually eroded the budgets of many highway departments. Hence the typical highway department has only a small budget for expanding and improving its roadways after necessary maintenance and repairs. This research explores possible funding solutions.

**Wesley Korfe**, Psychology

Faculty Mentor: Beverly Thorn, Psychology

*Cognitive Magnification as a Predictor of Pain Tolerance in College Students*

Studies show that people's thoughts about pain alter the amount of pain that they actually feel. Participants self-reported their pain experiences and underwent a cold-pressor task measuring pain intensity, unpleasantness, and tolerance. The magnification scale of the pain catastrophizing scale is anticipated to significantly predict pain tolerance more than intensity or unpleasantness. If supported, it can be concluded that pain catastrophizing plays a central role in the perception of pain.

**Scott Leary**, Biological Sciences

Faculty Mentor: Stuart Usdan, Human Environmental Sciences

*Stress Among Greek Pledges in the Context of Various Parameters of Mental Health*

Through this research, I investigated stress in the context of various parameters of mental health. Specifically, the research is focused on college students in their freshman year that are pledging a fraternity or sorority. The objective of this presentation is to examine any trends in stress and associated behaviors that these Greek pledges are experiencing. The data utilized in this investigation was collected through surveys administered to a sample of 1,431 undergraduate students.

**Alyson Lee, Nursing**

Faculty Mentor: Jason Scofield, Human Development & Family Studies

*Children's Multimodal Disambiguation: Learning Names for Objects Touched but Not Seen*

In word learning, children can disambiguate in one sense modality but struggle to do so across two. This study explores whether their desire to show they can identify the matching object explains poor performance on disambiguation tasks. To test this hypothesis, this study asks participants to indicate the object that is like the one they are touching before performing a disambiguation task. Results suggest that this question does improve their ability to disambiguate across multiple modalities.

**Amie Lemley, Biological Sciences**

Faculty Mentor: Jane Rasco, Biological Sciences

*Dose Response Study for the Potential Adverse Effect of Positive and Negative Iron Oxide Nanoparticles on the Offspring of CD-1 Mice*

To test the effects of iron oxide nanoparticles at 100 mg/kg, a developmental toxicology study was performed on pregnant CD-1 mice. Each mated dam was assigned to a dosage group, and received the control (0 mg/kg of DI water), positive nanoparticles (100 mg/kg), or negative nanoparticles (100 mg/kg) on gestation day (GD) 8, 9, or 10 of their pregnancy. Half of the dams were sacrificed and their fetuses were examined. The other half were allowed to litter and their offspring were examined.

**Craig LeNoir, Electrical and Computer Engineering**

Faculty Mentor: Tim Haskew, Electrical and Computer Engineering

*Electro-Mechanical Systems Laboratory*

The Electro-Mechanical Systems Laboratory at The University of Alabama focuses on high-power motion control system development and many topics that require electrical and mechanical engineering. My role, while working in this lab, was simply to assist Professor Haskew and his graduate students in their daily work in the lab.

**Jennifer Lester, Civil, Construction & Environmental Engineering**

Faculty Mentor: Jialai Wang, Civil, Construction & Environmental Engineering

*A Novel Green Binder Inspired by Chinese Concrete Technology*

*\*International focus*

Manufacture of Ordinary Portland Cement accounts for ~5% of man-made carbon dioxide emissions, which is a startling amount for the construction industry. This research strives to create a replacement binder modeled after Chinese lime-mortar concrete which contains sticky rice as an additive. Testing is still in its early stage and shows a negative correlation in strength; however, once optimal ratios and processing methods are obtained, the functionality of sticky rice can be better evaluated.

**Velmatsu Lewis, Political Science**

Faculty Mentor: Terry Royed, Political Science

*The Fulfillment of Political Party Pledges*

The purpose of this study is to determine whether or not pledges are fulfilled by the Democratic and Republican political parties in the United States. First, pledges were found from the 2004 party platforms. To determine whether a pledge was fulfilled, research was performed using the database, Congress and the Nation, and, THOMAS, the legislative database. Research is currently ongoing, but research from previous years found that average fulfillment rates were about sixty percent.

**Conner Lines**, Computer Science

Faculty Mentor: Jingyuan Zhang, Computer Science

*Zippit: An Interaction Technique for Communication Between Tablets*

A seamless method to transfer information between mobile devices is needed. Current transfer methods include Bump and email. The Zippit application connects two android devices without an active internet connection, and requires no external server support to utilize. Zippit is useful in a professional setting for easy transfer of notes and slideshows. It eliminates the need to log into email for document retrieval, and low quality internet connection is no longer a barrier.

**Clayton Link**, Psychology

Faculty Mentor: Lisa Hooper, Educational Studies in Psychology, Research Methodology, and Counseling  
*Research Methodology: Project ACTS, A Journey.*

The current presentation describes a one-year trajectory as a beginning student-researcher. The presentation details my first-hand experiences with the many aspects of conducting literature reviews, examining research methodology, and being involved in the recruitment and data collection process. Finally, I'll discuss the main take-away from my work in a transdisciplinary research lab: research is highly meticulous and revisionary.

**Debra Logan**, English

Faculty Mentor: Patti White, English

*Slash Pine Press: Community, Erudition, Experience*

Slash Pine Press provides a unique opportunity for undergraduates to research and critique various writing styles from authors nationwide while established writers serve as mentors that guide them through collaborative projects as well as creative and critical work. Interns read and analyze manuscripts, design and publish hand-stitched chapbooks, plan community events/exchanges, and cultivate aesthetic and technical abilities that will serve as tools for future art and literary endeavors.

**Kaitlyn Lyle**, Electrical and Computer Engineering

Faculty Mentor: Patrick Kung, Electrical and Computer Engineering

*Effects of Radiation on GaN HEMTs*

Due to the rising importance of space electronics for communication and defense, the effects of radiation on semiconductor devices, notably transistors, have been studied. Gallium Nitride (GaN) based High Electron Mobility Transistors (HEMTs) have been identified as a promising technology for radiation hard space electronics. The growing interest in such devices has led to a number of studies, including this one where we observe the effects of radiation on the performance of GaN based HEMTs.

**Alec Maglione**, Biological Sciences

**Yi Chen**, Biological Sciences

Faculty Mentor: Janis O'Donnell, Biological Sciences

*High-throughput Drug Screen Using Drosophila melanogaster Drug Model*

Neurodegenerative diseases, such as Parkinson's disease, have a dramatically increasing prevalence with age. Paraquat, a commonly-used herbicide, has been shown to cause neuron damage in many animal

models. Here, we use *Drosophila melanogaster* in a large-scale drug library to investigate chemicals able to counteract mortality caused by paraquat toxicity. This high-throughput drug screen will provide us with potential candidates to further study and identify drugs for therapeutic treatments.

**Melinda Mann**, Geography

Faculty Mentor: Luoheng Han, Geography

*Spectral Reflectance of Evergreen Tree Species in Tuscaloosa County, Alabama*

Remote sensing technology has been widely used to monitor and map terrestrial vegetation. In order to accurately differentiate species in satellite imagery, the individual spectral characteristics of each plant must be found. By collecting tree leaves of several evergreen species and scanning them with an ASD spectroradiometer, the researcher will better be able to determine from satellite imagery the species composition of forested areas in Tuscaloosa, AL, eliminating the need for field work.

**Alison Marsh**, Physics & Astronomy

Faculty Mentor: Conor Henderson, Physics & Astronomy

*Searching for Technicolor with the CMS Experiment at the Large Hadron Collider*

*\*International focus*

The Large Hadron Collider at the CERN laboratory in Geneva, Switzerland, is colliding protons at record high energies in the hope that these collisions will uncover physics beyond the Standard Model. The University of Alabama is a member of the Compact Muon Solenoid experiment at the LHC. This poster will present our search for a scenario known as Technicolor, focusing on events with multiple photons. In the future, we will compare theoretical predictions to observed data collected by CMS.

**Joshua Martinez**, Electrical and Computer Engineering

Faculty Mentor: Seongsin Kim, Electrical and Computer Engineering

*Femtosecond Micromachining of Opaque Solids*

As the technological needs of modern academia and industry increasingly advance and condense, scientists and manufacturers have become hard-pressed to construct devices of progressively finer resolution. The primary objective of this research project is to demonstrate the micromachining of materials by use of an ultrafast laser system as a competitive alternative to conventional submicron-processing techniques.

**Michael Maynard**, Mechanical Engineering

Faculty Mentor: Brian Fisher, Mechanical Engineering

*Development and Solid Modeling of Spray Test Chamber*

This project supported development of an experimental fuel-injection spray vessel, and involved three aspects: (1) development of SolidWorks and Pro-E models of the vessel, (2) development of LabVIEW programs for experiment control and data acquisition, and (3) design of a Matlab interface for post-processing of high-speed fuel-spray images. These activities have been integral in Dr. Brian Fisher's effort to develop a platform for important research on sprays of diesel and alternative fuels.

**Benjamin McCormick**, Chemistry

Faculty Mentor: David Nikles, Center for Materials for Information Technology

*Poly(caprolactone-urethane-ethylene glycol) Triblock Copolymers for a Magnetically Triggered, Targeted Drug Delivery System*

We seek to build a magnetically triggered, target drug delivery system based on polymer micelles in which the micelles would contain cancer chemotherapy drugs. Micelles made of poly(ethylene glycol-b-caprolactone) diblock copolymers prematurely leak the drugs at an unacceptable rate. We have

synthesized a triblock polymer consisting of poly(caprolactone-urethane-ethylene glycol). We expect the polyurethane block to provide physical cross-links, preventing the drug from leaking prematurely.

**Kathryn McCoy**, Civil, Construction & Environmental Engineering

Faculty Mentor: Derek Williamson, Civil, Construction & Environmental Engineering

*Is Basins Software Adequate for Investigating In-Land Flooding Potential*

Recent hurricanes illustrate the need to predict in-land river response flooding. Therefore, my research question was: Can water resource models, particularly BASINS 4, traditionally used for management decisions in "normal" conditions, be effective tools for prediction of extreme event river flows? A case study of the Warrior river with BASINS4 indicated normal flows can be represented but extreme flows require more specialized research models and site-specific data.

**Christa McCrorie**, Political Science

Faculty Mentor: Douglas Lightfoot, Modern Languages & Classics

*Resurrecting the Linguistic Term "Affixoid"*

*\*International focus*

In research on morphology, there is a disagreement on whether or not affixoids, or morphemes that are in between a word and an affix, are useful concepts. Some linguists feel that labeling affixoids is not useful, partly because the affixoid is in a transitional phase. But other linguists believe that labeling affixoids is useful because they are measurable phenomena and should be acknowledged. This study of German affixoids influenced by a cognitive viewpoint, favors the position that affixoids are useful.

**Rebecca McGuire**, Accounting

Faculty Mentor: Jase Ramsey, Management & Marketing

*The Mediating Affects of Adjustment on the Strain-Performance Relationship Among International Travelers*

International business travel demand is increasing. Yet with greater travel restraints, travelers face conditions that result in increased stress, negatively affecting job satisfaction and performance. This project's purpose is to understand how stress affects these outcomes. We asked participants at two airports to complete a two-part survey before and after their trips. We hypothesize that stress has a negative effect on job satisfaction and performance through adjustment.

**Mathew Mecoli**, Political Science

Faculty Mentor: Emily Ritter, Political Science

*Defining Civil War*

*\*International focus*

This research seeks to consolidate the current models for civil war determination in order to avoid disparate data sets created by relatively unimportant differences in accepted benchmarks. Varying criteria for the designation of a conflict as a civil war are examined and a standardized schema is purposed. The adoption of a common framework by an organization such as the International Committee of the Red Cross could provide a norm for research and application.

**Andriana Mickens**, Civil, Construction & Environmental Engineering

Faculty Mentor: Steven Jones, Civil, Construction & Environmental Engineering

*Localized Sustainability Score for Screening Urban Transport Projects in Developing Countries*

*\*International focus*

A model for urban transportation planning in developing countries was developed from a case study conducted in Accra, Ghana. This proposal is based on the poor physical accessibility in developing

countries, which seeds from poor roads and inadequate transport. The Localized Sustainability Score (LSS) framework was subsequently created from a Multi-Criteria Decision Making method and it can be used for project screening and delineating the needs of the community to ensure satisfaction.

**Bradley Midkiff**, Obstetrics & Gynecology

Faculty Mentor: Marilyn Handley, Obstetrics & Gynecology

*Smoking and Pregnancy*

In this experiment, a group of pregnant women from different backgrounds were given a survey to see if they smoked. They were asked questions to find out how far along they were and if it was their first pregnancy and what their support situation was like. The data that was collected was then organized to see if there was any sort of pattern as to who was more likely to smoke while pregnant. There were many factors that played into the women being smokers or nonsmokers, they were all connected.

**Luckie Milad**, Biological Sciences

Faculty Mentor: Jane Rasco, Biological Sciences

*The Effects of Chromium on Blood Glucose Levels in CD-1 Mice Maintained on Restricted or Ad Libitum Diets*

Chromium (III) in large doses improves insulin sensitivity and cholesterol levels in rodent models. In this experiment, the effects of Cr(III) as CrCl<sub>3</sub> and Cr<sup>3+</sup> given IP to male and female mice on ad libitum and restricted diets on blood glucose levels were examined. Blood glucose levels were measured before dosing and every 30 minutes for 6 hours after Cr(III) administration. No significant effects were observed from the Cr (III) treatments or the diets.

**Sean Miller**, Chemistry

Faculty Mentor: David Dixon, Chemistry

*Computational Studies of Phosphorylated Amino Acids*

The gas-phase acidities (GAs) of three phosphorylated amino acids have been calculated using the reliable correlated molecular orbital (MO) theory G3MP2 method to develop proteomics approaches. Extensive conformational sampling was performed using semi-empirical MO theory. The most stable anion resulted from deprotonation of the phosphate group. Multiple strong hydrogen bonds are present in phosphoserine and phosphothreonine. The GA of phosphoserine is ~ 15 kcal/mol more acidic than serine.

**Allison Montgomery**, Biological Sciences

Faculty Mentor: Lori Turner, Health Sciences

*Evaluation of Web-Based Osteoporosis Educational Materials*

Many women are uninformed about risk factors for and consequences of osteoporosis. For this reason, patient education is a crucial part of preventing and managing osteoporosis. In this study, we inspected the readability and quality of web-based educational materials on osteoporosis using the Suitability Assessment of Materials (SAM) and DISCERN instruments. We found that most web-based educational materials are written above the average reading ability of most adults and lack adequate quality.

**Christopher Moran**, Economics, Finance & Legal Studies

Faculty Mentor: James Cover, Economics, Finance & Legal Studies

*Researching New Methods to Become Less Dependent on Middle Eastern Oil*

After analyzing data and various papers, I have concluded that hydraulic fracturing (fracking) is the best way to go about reducing our dependence on OPEC countries. Fracking is a way to extract natural gas out from beneath the earth by pumping water deep into shale formations at incredibly high pressures



which cracks the foundation, releasing hydrocarbons (natural gas) towards a well that has been placed in the ground. This method has the potential to do extraordinary things.

**Alex Morris**, Music

Faculty Mentor: Lisa Hooper, Educational Studies in Psychology, Research Methodology, and Counseling  
*The Association between Perceived Cultural Competence and Treatment Adherence in Individuals Living with Diabetes Mellitus*

Diabetes mellitus is a condition that affects over 23 million Americans. Adherence to treatment and self-education are vital aspects for disease management. In today's diverse patient population, cultural competency is becoming a critical link for healthcare providers in increasing efficiency and effectiveness of patient care. The proposed study will examine the association between the provider's level of cultural competency and the patient's adherence to prescribed treatment.

**Duncan Murdock**, Biological Sciences

Faculty Mentor: Jennifer Howeth, Biological Sciences

*Relative Importance of Local and Regional Processes in Structuring Zooplankton Communities in a Wetland Metacommunity*

Community composition in a metacommunity is affected by local and regional processes, but the relative importance of these processes may vary by ecosystem type. Here, we tested whether local environmental factors or regional spatial factors had more of an effect on zooplankton community composition in wetlands. The results suggest that the environment may be more important in structuring communities, but the influence of hydrologic connectivity in shaping community composition varies by stream.

**Jason Nance**, Mathematics

Faculty Mentor: Jason Parton, Information Systems, Statistics & Management Science

*The Effect of Sleep Cycle Interruption on EMS Personnel Skill Performance*

Prior research suggests medical professionals perform at lower levels of measurable skills when sleep-deprived. Our study intends to answer the following question: How do interruptions of EMS personnel's sleep cycle affect performance of procedures related to a cardiac arrest patient? We will quantify and analyze intubation and CPR skills of EMS personnel during a simulated cardiac arrest in both the afternoon and middle of night to examine the effect of sleep on skill performance.

**Allison Nilsen**, Biological Sciences

Faculty Mentor: Philip Gable, Psychology

*Sadness Speeds and Slows the Sense of Time*

Time flies when you're having fun, but how does time pass in sad situations? This study investigated the impact of motivational tendency (approach or withdrawal) in sad states on time perception. Participants wrote about a sad state associated with approach (seeking others) or withdrawal (avoiding others) motivation. Then, they viewed a sad film and rated how long the film lasted. Results indicate that time passed faster in approach-motivated sadness than withdrawal-motivated sadness.

**Sara Noles**, Communication Studies

**Mallory Uekman**, Biological Sciences

**Jennifer Hodnett**, Human Development & Family Studies

**Kirsten Corless**, Human Development & Family Studies

**Cecile Komara**, Human Development & Family Studies

Faculty Mentor: Mary Elizabeth Curtner-Smith, Human Development & Family Studies

*Young children's sleep arrangements and how they vary with mothers' and fathers' reports of marital quality and parenting*

Ask any parent to describe their biggest parenting challenge and most will mention sleep. Parents ask, "Will my child sleep through the night?" "Is it okay if baby sleeps with me or should I make baby sleep alone in the crib?" There is conflicting information about the benefits/risks associated with various child sleep arrangements. This poster presents a proposal to study variations in children's sleep arrangements and how they relate to mothers' and fathers' marital quality and parenting.

**Joseph Nuss**, Chemical and Biological Engineering

Faculty Mentor: Robin Rogers, Chemistry

*Dehydration of Hydrated f-Element Complexes with 1,3-diethylimidazole-2-thione*

The study of f-elements (actinides and lanthanides) is important due to their high-tech applications. One challenge is that these metals readily bond to water, making it difficult to study their chemistry under water-sensitive conditions. Here we show the synthesis of anhydrous f-element complexes from hydrated precursors using 1,3-diethylimidazole-2-thione, a neutral ligand which removes water from f-element complexes by bonding to the f-element in place of water.

**Johanna Obenda**, History

Faculty Mentor: Jenny Shaw, History

*17th Century Barbados Slave Naming Practices: A Retention of African Heritage*

*\*International focus*

This presentation discusses West African naming practices that survived the forced relocation of Africans to Barbados. Looking at slave names in deeds from four 17th century Barbados plantations, I argue that many monikers had their roots in West African naming practices. I show that the actual meaning of slave monikers in Barbados was not as important as the bestowal. The retention of African naming practices in this slave society was a way that slaves kept their bonds to African ancestors.

**Kevin Pabst**, Communication Studies

Faculty Mentor: Jason Black, Communication Studies

*"Don't Worry 'Bout Losing Your Accent; A Southern Man Tells Better Jokes": Generationalism in the Southern-Based Lyrics of the Drive-By Truckers*

This research examines the discography of the Northern Alabamian band The Drive-By Truckers to identify a genre of generationalism in southern-based lyrics. Through use of genre criticism, we attempt to examine recurring substantive motifs and stylistic elements to highlight an overarching theme of generationalism in the southern rock music of DBT. Finally, we consider implications of the substantive and stylistic components examined as well as music as a method of communication.

**Austin Parrish**, Biological Sciences

Faculty Mentor: Daniel Goebbert, Chemistry

*Development and Characterization of a Glow Discharge Ionization-Reaction Source*

We constructed a custom ion source for mass spectrometry with the potential to carry out synthetic reactions in the ion source itself, rather than as a preparatory step. The source is a home-built discharge ionization reaction assembly attached to a commercial mass spectrometer. Multiple reactive gases can be added directly into the source for ion-molecule reactions. From this study we have found that we can selectively synthesize molecules of interest for advanced mass spectrometric analysis.

**Carson Patterson**, Anthropology

Faculty Mentor: Jason DeCaro, Anthropology

*Preschool Intervention: A Physiological Analysis*

To test and quantify the efficacy of preschool interventions for high-risk children, the anthropological portion of this study used RSA measurements, cortisol levels, and skin conductance taken during one-on-one interviews both before and after intervention. Statistical analysis of that data provides insight into how children respond to the improved learning conditions. Typically, those with low baseline RSA and high cortisol level showed improvement between the pre and post interventions.

**Danelle Pecht**, Chemistry

Faculty Mentor: Robin Rogers, Chemistry

*How can chemistry determine the former uses of Mississippian Culture pottery artifacts?*

The Moundville Archaeological Park in Hale County, AL has in storage samples of pottery that need analysis and classification. To assist, we are developing a technique that will allow us to chemically determine former contents of these pottery samples. In preparing to create this technique, we have searched the literature to determine what techniques currently exist and what their limitations are. The presentation will discuss the possible application of ionic liquid dissolution to the problem.

**Josh Pepperman**, Computer Science

Faculty Mentor: Jeff Gray, Computer Science

*Programming by Voice*

There is an emerging interest in teaching children to program computers using visual languages that are easier to learn than regular textual languages. These new efforts require a keyboard and mouse, which limits accessibility to children with physical disabilities. This project's goal is to support "Programming by Voice" so that visual languages can be used through voice only. We are researching ways to use voice interfaces so that children with special needs can learn to program.

**Danielle Peters**, Political Science

Faculty Mentor: Anne Williamson, Political Science

*Public Participation in Fair Housing Policy*

The right to fair housing is assured by the government with the passing of the Federal Fair Housing Act of 1968, amended in 1988, which makes it unlawful for anyone to discriminate in the insurance, financing, rental, or sale of housing. This study is an examination on the emphasis of public participation, input, and outreach in identifying housing barriers. This examination of housing impediments can help cities identify where outreach efforts need to be placed in order to limit discrimination.

**Holly Poole**, Civil, Construction & Environmental Engineering

Faculty Mentor: Pauline Johnson, Civil, Construction & Environmental Engineering

*Water Infrastructure Sustainability and Health in Alabama's Black Belt*

The purpose of this study is to evaluate the public's health risks and water quality associated with aging and rural water systems in Alabama. To satisfy this purpose a cohort of 900 households will be visited 3 times over a span of 18 months. At each visit water will be collected and tested for various qualities and health surveys will be analyzed. Though in early stages, key results from this study will include the ability to identify various strategies to protect the public health.

**Christopher Popovich**, Computer Science

Faculty Mentor: Lawrence Roberts, Mathematics

*Computing the Alexander Ideals of Links*

It is common practice in knot theory to create tables of knot and link invariants. This is important for studying knots, as the apparent properties of knots change for the many ways of representing them. The

goal of this research is to create a program to calculate and list the Alexander ideals of links. The Alexander ideals can be used to find a lower bound for the lowest genus surface that a link can be embedded on without crossings.

**Kathleen Powers**, English

Faculty Mentor: Mary Meares, Communication Studies

*Corporate Diversity Competence*

The purpose of the study was to analyze the diversity efforts of Coca-Cola Inc. after its 2001 racial discrimination lawsuit. We analyzed media stories and reports on their triumphs, failures, and general progress towards diversifying. Coca-Cola made exemplary strides in diversifying its workforce via a diversity task force, supplier and employee training, recruiting, and philanthropy. Future research will reveal what diversity efforts are necessary for corporate legitimacy and competence.

**Sydney Powers**, Biological Sciences

**Maggie Holland**, Psychology

**Madison Butz**, Psychology

Faculty Mentor: Phillip Gable, Psychology

*A reward in the hand is worth more than a potential reward: Assessment of reward sensitivity using the post-auricular reflex.*

Reflexive activation of the small muscle behind the ear-called the post-auricular reflex (PAR)-is a psychophysiological measure of positive emotion. In this experiment, participants played a game in which they could win rewards based on their performance in a reaction time game. Results showed that participants high in reward sensitivity showed greater PAR activity to cues associated with reward (vs. no reward), and greater activity to cues indicating a received reward (vs. a potential reward).

**Robert Ramsey**, Aerospace Engineering & Mechanics

Faculty Mentor: Weihua Su, Aerospace Engineering & Mechanics

*Automobile Exhaust System*

In this research, an automotive exhaust system with some topological constraints is designed. The CAD drawing of the design is then imported to the FEM pre-processing software for generating the FEM mesh and preparing the FEM model. The FEM analyses, including modal and transient analyses, will be performed to verify the feasibility of the design. Based on the results, information about the safety of the exhaust system will be provided. It will also provide guidance on improving the design.

**Angela Ray**, Psychology

**Amanda Nichols**, Communicative Disorders

**Katy Erstine**, Communicative Disorders

Faculty Mentor: Jason Scofield, Human Development & Family Studies

*Children's Selective Trust of Object Naming and Function*

Children selectively rely on others when learning new information. For example, children favor previously accurate speakers over inaccurate speakers when learning the names of objects. This study asked whether children assume that speakers who know the name of an object are more likely to know the object's function than speakers who do not. Contrary to our hypothesis, initial results suggest no correlation between the speakers' past accuracy and which speaker children favor.

**Elizabeth Ray**, Biological Sciences

Faculty Mentor: Ryan Earley, Biological Sciences

*Reproductive Responses of Hermaphrodites and Males to Synthetic Estrogen Exposure*

Synthetic estrogens can enter natural ecosystems and feminize male fish, alter sexual development, and elicit marked behavioral changes. We hypothesized that ethinyl estradiol exposure would disrupt reproductive processes in males and hermaphrodites of the mangrove rivulus fish. We dosed fish with ethinyl estradiol or control saltwater for 30 days, observed behavior and conducted gonad histology. From this experiment we stand to gain insights into humanity's impact on our ecosystems.

**Courtney Ricciardi**, Psychology

Faculty Mentor: Alexa Tullett, Psychology

*Effect of Emotional Contagion on Approach and Withdrawal Behaviors*

This study will focus on emotional contagion's effect on neural and behavioral measures of approach and withdrawal. Specifically, we expect that watching videos of people expressing excitement will increase approach tendencies, whereas watching videos of people expressing fear will increase withdrawal tendencies. Results from this study could provide insight on the role of emotional contagion in facilitating interactions within a shared environment.

**Patrick Rickert**, History

Faculty Mentor: Howard Jones, History

*Theodore Roosevelt and the Emergence of a Global American Foreign Policy*

This examination finds that Theodore Roosevelt revolutionized America's global role, setting foreign policy on a course it continues today. Roosevelt affirmed the President as the chief diplomat and worked for America to assert her interests abroad and act as a mediator in international affairs, examined in negotiations over the Panama Canal and in Portsmouth Peace Conference, despite strong sentiment against this role expressed in the Congressional Record and the New York Times.

**Kaitlyn Robinson**, Human Development & Family Studies

Faculty Mentor: Maria Hernandez-Reif, Human Development & Family Studies

*Family Interaction Project*

The Family Interaction project is a longitudinal study designed to find variables in early childhood that predict later development. Data collection via parent and teacher questionnaires, researcher-conducted habituation studies, and measurements of the children's physical attributes and cortisol levels in saliva samples is conducted every six months. Researchers hope to find links between the physical, cognitive, and socioemotional domains that attribute to children's overall development.

**Landen Ryder**, Electrical and Computer Engineering

Faculty Mentor: Patrick Kung, Electrical and Computer Engineering

*Semiconductor Photon Detectors*

One branch of electrical engineering is focused on the creation and optimization of electrical devices intended to respond to the presence of light. One method of creating these sensors is by relying on an intrinsic characteristic of the material to alter the conductivity of the material when exposed to light. The objective of this research is to identify the wavelength of light that creates the greatest change in conductivity of several different films of materials.

**Danielle Sahud**, Communicative Disorders

Faculty Mentor: Anthony Buhr, Communicative Disorders

*Longitudinal change in preschool-age stuttering*

The purpose of this study was to investigate longitudinal change in stuttering in a preschool-age child. Across a six-month period, parent perception of stuttering, parent success implementing treatment, and number of speech disfluencies were recorded. Results show that parent perception but not treatment

success was related to changes in disfluency, and stuttering type changed over time. Results suggest that parent perception of child stuttering is a good indicator of stuttering severity.

**Madison Santana**, Psychology

**Mary Beth Lewis**, Special Education & Multiple Abilities

**Bianca Bryant**, Biological Sciences

Faculty Mentor: Ansley Gilpin, Psychology

Caroline Boxmeyer, Psychology

Jason DeCaro, Anthropology

John Lochman, Psychology

*Power PATHS*

Successful preschool fosters socio-emotional and academic learning. Power PATHS combines two interventions, Coping Power and PATHS, to help at-risk children and families. Two preschools participated in Power PATHS. The experimental preschool showed gains in vocabulary, inhibition, emotion regulation, peer socialization, with reduced bullying, indicating that the Power PATHS intervention was beneficial to socio-emotional and academic development. Future research will examine long term benefits.

**Jason Schau**, Economics, Finance & Legal Studies

Faculty Mentor: Utz McKnight, Political Science

*University of Alabama Racial Climate: Race, and It's Impact on Campus Today*

The University of Alabama was desegregated in 1963 and a victory in the war of equality was won, but an opportunity was also presented. A survey was conducted gauging the racial climate of the university and its students. Nearly 50 years later we rebooted this study to again peer into the heart of race relations at the University of Alabama. This project gathered data on racial attitudes across campus in order to better understand the current state of race relations and how to improve them.

**Emily Schmidt**, Computer Science

Faculty Mentor: Kathryn Seigfried-Spellar, Criminal Justice

*Pirates, Hackers, Virus-Writers - Oh My!*

The present study examines the college majors that are most typical of hackers. Two hundred ninety-one students from a large Southern university completed an anonymous online survey assessing prior hacking behaviors, including virus writing, pirating, cyberbullying, and identity theft. They were then categorized by their reported areas of study. Results are expected to show which academic areas are most prone to hacking behaviors.

**Erica Schumann**, Anthropology

Faculty Mentor: Christopher Lynn, Anthropology

*Multi-Level Selection in Religious Communities: Assessing Sustainability in Unitarian Universalism*

This study examines the nature of multi-level selection within Unitarian Universalism. I hypothesize that members of the UU Congregation will display a high level of commitment on the group level as their religious principles are based in collective benefits rather than individual salvation. I am collecting this data through behavioral observation, gathering quantitative data of actions signaling commitment, and through interviewing members about their perspectives on religious behavior.

**Richard Seeber**, Biological Sciences

Faculty Mentor: Ryan Earley, Biological Sciences

*Gender Inequality: Sex Differences in Metabolic Rate in the Mangrove Rivulus, *Kryptolebias marmoratus**

Metabolism is the set of biochemical processes that allows an organism to adapt to its surroundings and ultimately to survive and reproduce. Mangrove rivulus fish are the only known self-fertilizing hermaphroditic vertebrate capable of producing isogenic lineages. Using a swim tunnel respirometer, we will measure metabolic rates of fish that are genetically identical but of different genders (male and hermaphrodite). We seek to elucidate metabolic differences derived solely by gender.

**Christian Shannon**, Chemical and Biological Engineering

Faculty Mentor: Patrick Frantom, Chemistry

*Observing Substrate Specificity Using Kinetic Studies of Isopropylmalate Synthase Within the Archae Methanococcus Jannashii*

Isopropylmalate synthase is a key enzyme for observing the allosteric mechanisms of the biosynthesis of l-leucine, a substance critical in feedback inhibition in many organisms. IPMS is one of three genes found in methanococcus jannashii, an organism that comes from the same phylogenetic tree as mycobacterium tuberculosis, the agent responsible for tuberculosis. By testing substrate specificity measuring the kinetics of reactions with IPMS, a better understanding of the origin can be reached.

**Abigail Shelton**, Biological Sciences

Faculty Mentor: Ryan Earley, Biological Sciences

*Temperature-dependent sex determination in the mangrove rivulus fish*

Temperature-dependent sex determination is an extreme form of phenotypic plasticity. We evaluated whether natural selection might shape temperature sensitivity in the mangrove rivulus fish, *Kryptolebias marmoratus*. We hypothesized that different temperature regimes would yield different sex ratios and that temperature sensitivity would vary among populations. We show that temperature has dramatic effects on sex determination but that these effects are relatively invariant across populations.

**Robert Sixto**, Psychology

Faculty Mentor: Mathew Jarret, Psychology

*Attention-Deficit/Hyperactivity Disorder (ADHD) and Substance Use*

The current study examined how symptoms of attention-deficit/hyperactivity disorder (ADHD) relate to substance use. 500 undergraduate students participated in the study. Participants were grouped into those meeting criteria for ADHD (n=55), those with significant clinical symptoms but not ADHD (n=55; Clinical Control), and those with no significant clinical symptoms (n = 55; Control). Analysis will examine the differences in substance use.

**Samantha Slater**, Communicative Disorders

Faculty Mentor: Anthony Buhr, Communicative Disorders

*Self-Monitoring and Effects on Physiological Arousal*

The purpose of this study was to investigate to what extent self-monitoring influences physiological arousal. Eight participants watched a video clip, completed a cognitive challenge task, and told a story. These tasks were performed with a video camera in full view or out of sight. Results showed that the sympathetic component of heart rate was greater with the camera out of sight than when the camera was in full view, indicating that self-monitoring did not elicit physiological arousal.

**Laura Smith**, Art

Faculty Mentor: Lucy Curzon, Art

*Paul R. Jones Collection of American Art*

This poster reflects my participation in a research project that has involved compiling a book of essays, remembrances and observations written by scholars and artists about the Paul R. Jones Collection of

American Art at the University of Alabama. The book is intended to show the Collection's commitment to education by including traditional object studies as well as academic approaches and reactions to using the Collection as a teaching device.

**Johnathan Snyder**, Computer Science

Faculty Mentor: Jeff Gray, Computer Science

*Analysis of Mutation Testing Tools*

The development and improvement of mutation testing tools will help lead to more industry adoption of mutation testing. The improvements of these tools can be built upon the technologies of current mutation testing tools. This research reports on a study that was made on mutation testing tools for Java programs. Each of the mutation testing tools was analyzed to see how efficiently they could generate mutants and what type of mutants were generated.

**Steven Spellmon**, Chemical and Biological Engineering

Faculty Mentor: David Dixon, Chemistry

*Bond Energies of Solvated Frustrated Lewis Pairs*

Frustrated Lewis pairs (FLPs) are Lewis acid/base pairs that cannot form bonds with each other to form Lewis acid base adduct because of steric hindrance and can serve as catalysts. The bond dissociation energies for FLPs with central atoms B and Al, and substituents Br, Cl, CH<sub>3</sub>, F, and H were calculated at the DFT B3LYP/DGDZVP2/COSMO and G3MP2 levels of theory to predict the amount of frustration in tetrahydrofuran solution. The binding energy of CO<sub>2</sub> in FLPs has been calculated.

**Caroline Spillane**, Theatre & Dance

Faculty Mentor: Gary Hodges, Kinesiology

*A Single Bout of Exercise Enhances Microvascular Endothelial Function*

We examined the effect of acute exercise on cutaneous endothelial function. We tested endothelial function before and after 45 min of exercise at 60% of max in 3 participants. We used laser-Doppler flowmetry to measure skin blood flow and a standard local skin warming protocol to test cutaneous endothelial function. We found endothelial function increased 12±3 % after exercise (P < 0.05). These data suggest that a single bout of exercise is important and alters endothelial function.

**Mitchell Spryn**, Electrical and Computer Engineering

Faculty Mentor: Bruce Kim, Electrical and Computer Engineering

*Development of Wireless Platform for Advanced Nanosensor Technology*

Advances in sensing technology mandates novel implementations of data acquisition and transmission electronics. This project proposes an integrated approach for collection, wireless transmission and graphical analysis of analog sensor data. The proposed system is energy efficient, cost effective and extremely adaptive for multitude of sensing technologies. This technology is useful for both military and homeland security applications.

**Meghan Steel**, Anthropology

Faculty Mentor: Christopher Lynn, Anthropology

*Fireside Meditation: the induction of a relaxation response by focused attention on a flickering light and novel sound phenomenon.*

This study investigates the relaxation response as it is induced by directing a participant's attention to a simulated fireside situation. During the study the participant watches-in random ordered five minute sessions, a blank control screen, a fire video with full sound, and a fire video with muted sound. The



physiological change on which this phase of the study focused includes point-changes in both systolic and diastolic blood pressure.

**Sarah Steele**, New College

Faculty Mentor: Fran Conners, Psychology

*Relation of Language Intervention History to Language Measures in Youth with Down Syndrome and Other Intellectual Disabilities*

Young people with Down syndrome (DS) have great difficulties with language. We compared youth with DS to youth with other intellectual disabilities (ID) in language and language intervention history intensity (LIHI). Youth with DS scored lower on language tests and similarly in LIHI. For youth with ID, lower language correlated with higher LIHI. However, for youth with DS, there was no correlation. Future research will examine whether LIHI relates to growth in language ability over 2 years.

**Daniel Stephenson**, Political Science

Faculty Mentor: Dana Patton, Political Science

*Shortage of Primary Care Physicians in the State of Alabama*

We focus on the shortage of primary care physicians in one state, Alabama. We present evidence displaying a shortage of primary care physicians and various health problems. We discuss University programs aimed at recruiting rural residents into medical school with the goal of returning to their underserved communities. We turn to an alternative policy solution to the problem of primary care physician shortages. We recommend state legislative change to expand the powers of nurse practitioners.

**Thomas Stringfellow**, Mechanical Engineering

Faculty Mentor: Marcus Ashford, Mechanical Engineering

*Alabama Variable Engine Cycle Simulator*

The Alabama Variable Engine Cycle Simulator uses an electric linear actuator to vary piston position, velocity and acceleration in a single cylinder of a mounted engine. In this project, the original concept is undergoing two major changes: (1) the new base will be a GM 2200 Vortec 4-cylinder engine; and (2) variable valve timing and lift will be added, allowing simulation of all four engine cycles of almost any engine. These changes will aid in further alternative fuel research.

**Elizabeth Studdard**, Human Environmental Sciences

Faculty Mentor: Gary Hodges, Kinesiology

*Does Neuropeptide Y affect blood flow in women?*

In female rats, it has been shown that Neuropeptide Y is not involved in basal control of blood flow. We examined cutaneous vascular function to determine whether or not human females use NPY. We used laser-Doppler flowmetry to compare females and males without and with NPY receptor antagonism and discovered that in males blood flow increased ( $P < 0.05$ ), while in females there was no change ( $P > 0.05$ ). These data suggest that NPY is not involved in the control of blood flow in female humans.

**Abbey Tadros**, Chemistry

Faculty Mentor: John Vincent, Chemistry

*Synthesis and Characterization of  $[Cr_3O(propionate)_6(4-aminopyridine)_3]^+$*

Synthesizing one- and two-dimensional arrays of these trinuclear chromium basic carboxylate complexes could give rise to new materials with interesting magnetic properties. As an avenue into this synthesis, complexes where a substituted pyridine ligand could be used to link the trinuclear complexes

together were investigated. Toward this end, the synthesis, structure, and properties of  $[\text{Cr3O}(\text{propionate})_6(4\text{-aminopyridine})_3]^+$  are presented.

**Wesley Taylor**, Chemical and Biological Engineering

Faculty Mentor: Anthony Arduengo, Chemistry

*The Use of Non-oxidizing, Organic Dyes as Photo-voltaic Components of Solar Cells*

Solar cell technology is an emerging field, limited by cost, energy storage, and efficiency. The purpose of our research is to determine if light reactive organic dyes, with a wide range of absorbances, can efficiently capture light while not oxidizing in air or the cell's buffer. Cells were made using organic dyes and measured for their photovoltaic output under sources of light. Thiophene rings and other structural components showed promise. Our data will be used to synthesize an optimal dye.

**Kelsey Terrill**, Chemical and Biological Engineering

Faculty Mentor: Jason Bara, Chemical and Biological Engineering

*Functionalized Imidazole-based Copolymer Membranes for Facilitated CO<sub>2</sub> Transport*

Poly(ethylene glycol)-methyl ether acrylate and 2-methylimidazolestyrene copolymer membranes were tested for ideal gas permeability and selectivity for CO<sub>2</sub> separation from light gases (i.e. CH<sub>4</sub>, N<sub>2</sub>). Water as a main component in post-combustion CO<sub>2</sub> capture, a bicarbonate facilitated transport mechanism is advantageous to surpass current membrane "upper-bound" technology. Physical properties of the copolymer materials (FTIR, SEM topography, T<sub>g</sub>, pervaporation) were measured for characterization.

**Whitney Thompson**, Biological Sciences

Faculty Mentor: Ryan Earley, Biological Sciences

*Risky business: The effects of oral contraceptives on fish behavior*

Wastewater treatment plants are responsible for removing chemicals from water but they lack the ability to remove ethinyl estradiol (EE2), the main synthetic estrogen in oral contraceptives. We aimed to determine the effects EE2 has on fish behavior by exposing fish to EE2 or water for 30 days. Behavior was recorded for 30 minutes to document levels of activity and risk-taking. These data could provide insights into how EE2 exposure affects behavior and the overall health of fish populations.

**Elizabeth Timm**, Biological Sciences

Faculty Mentor: Juan Lopez-Bautista, Biological Sciences

*Laurencia natalensis Kylin (Ceramiales): a new record for the Atlantic Ocean*

We report for the first time the species *Laurencia natalensis* Kylin (Ceramiales) for the Atlantic Ocean. Once thought to be restricted to the Indian Ocean, the presence of *Laurencia natalensis* Kylin in the Atlantic is confirmed in this study by molecular analysis of the plastid-encoded large subunit ribulose-bisphosphate carboxylase/oxygenase gene (rbcL). Samples were collected in the Paraguana Peninsula (Falcon), Venezuela in the intertidal zone during a collection made on January 2012. Specimens were preserved in formaldehyde for anatomical studies and in silica-gel desiccant for molecular analysis. After DNA extraction, rbcL sequence was obtained through PCR amplification using different primer combinations. An alignment (1,210 bp.) was made in MEGA 5 (Kumar et al. 2011) with the Venezuelan sequence in addition to 71 taxa (from the Tribe Laurenciae) publicly available in GenBank. Molecular phylogenetic analyses were performed using Bayesian Inference in MrBayes v3.1.2 (Huelsenbeck & Ronquist 2001) and Maximum Likelihood (ML) in MEGA 5 (Kumar et al. 2011). A well supported clade was recovered (100% posterior probability) unequivocally placing our specimen as conspecific (same species) of *L. natalensis* from Africa. Based on the results of the phylogenies, we discuss some insights about the molecular phylogeny of the *Laurencia* complex with emphasis on its generic circumscription. Further anatomical studies are required to contribute to a comprehensive description of *L. natalensis*.

This new record demonstrates that the Venezuelan coast is an important contributor to the overall species richness of the Caribbean Sea and the Atlantic Ocean with new discoveries expected in the near future.

**Katie Turgeon**, Chemistry

Faculty Mentor: Laura Busenlehner, Chemistry

*Proteins Interactions in the Neurodegenerative Disease Friedreich's Ataxia*

Friedreich's ataxia, a disorder that causes a degeneration of nerve tissue in children, is associated with low levels of frataxin, a protein that transports iron to a scaffold protein, IscU, on which iron-sulfur clusters are built. Through chemical cross-linking with EDC/Sulfo-NHS, we were able to covalently trap this interaction, digest the complex with trypsin, and identify the fragments via MALDI-TOF mass spectrometry. We are now working on identifying the regions these two proteins interact.

**Zachary Van Scoy**, Economics, Finance & Legal Studies

Faculty Mentor: Kevin Pflum, Economics, Finance & Legal Studies

*Competition and Quality Choice in Hospital Markets*

The available literature on the quality of health care markets focuses primarily on the relationship between competition and the quality of care, measured by variables like mortality rates. Our research hopes to expand on that particular area of health care economics by comparing variables generally overlooked in this field and building an economic model that explains our findings. New statistics help the project look promising, but there is a lot of work to be done in completing the model.

**Madeline Waggoner**, Advertising and Public Relations

**John Kamer**, History

Faculty Mentor: James Mixson, History

*Latin Influences in Ireland's Golden Age and How Ireland Shaped the World.*

*\*International focus*

Many realize the great impact the Romans and Latin culture have had upon Europe and the Near East. However, few consider their contributions to Irish culture and how, in turn, Ireland affected the world. Our project identifies how Ireland and its people were impacted by Latin influences during their Golden Age, the eighth century. Our project also attempts to determine how Irish culture spread to the other regions connected by the Romans.

**Ryan Walsh**, Biological Sciences

Faculty Mentor: Ryan Earley, Biological Sciences

*Effects of salinity on the development of complex phenotypes in mangrove rivulus fish*

Early life environments can profoundly alter the adult phenotype. We explored how salinity affects neuropeptide production, growth and behavior in mangrove rivulus fish. We raised genetically identical siblings, and fish from many genetically distinct lineages in various salinities to isolate environmental and genetic effects, respectively, on adult phenotype. We anticipate salinities at the extremes of the fish's normal range will drive concerted changes in an array of phenotypic traits.

**Karen Wang**, Psychology

Faculty Mentor: William Hart, Psychology

*Means to Goal Affective Transference: A Goal-Systems-Theory Approach to Goal Adoption*

Positive (vs. negative) experiences pursuing a goal may increase people's commitment to the goal. To address this idea, participants will be presented with positive and negative pictures while doing an

academic task. Participants shown positive (vs. negative) pictures should rate academic goals more favorably.

**Jacob Wildin**, Computer Science

Faculty Mentor: Edward Sazonov, Electrical and Computer Engineering

*The Diet Diary: Improvements made to Uploading*

The Diet Diary is an Android application designed to document the user's meals. This project aimed to fix the bugs that were present in the application and improve its overall functionality. Importantly, issues in uploading images to the server were resolved. In addition, a button was added that allows the user to upload meals to the server manually. Currently, work is being done to encrypt the upload from the Diet Diary to the server.

**Emily Williams**, Journalism

Faculty Mentor: Patti White, English

*Life in Early Demopolis: The French Settlement of West Alabama*

The purpose of this research was to get a sense of the everyday lives of the French exiles living in Demopolis, Alabama in 1817. The research was conducted using "Days of Exile" by Winston Smith, "Vine and Olive Colony" by Rafe Blaufarb. The result was a clearer understanding of the settlers' motivation for moving to the United States, the struggles they faced while in Alabama, details about their settlement and lifestyle, and their ultimate reasons for abandoning the town.

**Abbie Willingham**, Management and Marketing

Faculty Mentor: John Giggie, History

*The Role of Women in Civil War Reenacting Culture*

For generations, Civil War reenactments have attracted thousands of participants and even more spectators. Scholars have studied what draws Americans to devote countless hours and money to becoming reenacting, but almost always focus on men. This study seeks to understand why women reenact. Based on memoirs, newspapers accounts, and personal interviews with living female reenactors, it shows that ideas of nostalgia, romance, and family motivate women.

**Alexis Willman**, Human Nutrition & Hospitality Management

Faculty Mentor: Linda Knol, Human Nutrition & Hospitality Management

*Factors that Affect Menu Label Use in College Cafeterias*

This review assessed the use of nutrition labels in college cafeterias. Results of sixteen studies suggest that females typically looked at total calories and males looked at protein content. Students were more likely to use menu labels if the labels were present at the point of selection or had previous nutrition education. Thus, information on how to interpret the labels should be made available at point of selection.

**Jenna Witkowski**, Communicative Disorders

Faculty Mentor: Rachel Saffo, Communicative Disorders

*Impact of Bilingualism on the Field of Speech Pathology in the United States*

Per the 2010 census, the U.S. bilingual population is rising, which directly impacts speech-language pathologists (SLPs). An online survey was distributed to certified SLPs. Dependent variables included SLP's geographic location of practice, bilingualism, number of years practiced, and type of caseload. Anticipated results involve higher concentrations of bilingual SLPs and caseloads in linguistically diverse states. This data will indicate how SLPs are addressing this population's needs.

**Kelly Zaprzal**, Kinesiology

Faculty Mentor: Randy Salekin, Psychology

*Mental Set in Conduct Problem Youth with Interpersonal Callousness: Static versus Dynamic Theories of Intelligence*

This study examined conduct problem youths' mental set regarding intelligence upon task performance and mood. 40 juvenile offenders with psychopathic features were tested to see if providing them with two different messages regarding intelligence, static or dynamic, would affect their functioning on certain tasks. Results showed that youth who were given a message that intelligence was dynamic were more fluent and flexible than youth who were informed that intelligence is static.