Poster Presentation Abstracts

Symbols:
** = Graduate Student
* = Honors Project
^ = Undergraduate Research Grant Recipient
+ = Georgia Power Scholar

Poster Session 1
1. **Brenna Kane, **Shelby Settle, Delaying Onset of Dementia Symptoms: A Comparison of Preventative Measures. Mentor: April Garrity, Communication Science and Disorders

Dementia is a group of symptoms characterized by cognitive and functional decline due to a range of neurodegenerative diseases including Alzheimer’s disease, cerebrovascular disease, and Parkinson’s disease. Approximately five million Americans are currently diagnosed with Alzheimer’s disease. It has been estimated that this number will triple by the year 2050 if dementia risk cannot be reduced. This literature review was conducted in order to determine if preventative measures are successful in delaying the onset of dementia symptoms.

Three studies investigating the effects of physical activity, cognitive training, and nutritional health were compared to determine effective methods for preventing cognitive decline. Smith’s (2016) study indicates that increased physical activity can foster development of new brain cells, which is integral for learning and memory. Blondell et al. (2014) expands upon this finding by noting that increased physical activity is directly correlated with an 18% reduction in dementia risk. In relation to nutritional value, Ogawa (2014) suggests that specific dietary components and micronutrients have the potential to protect against cognitive decline. Cognitive training, which can include repetitive restorative “memory building” techniques or the utilization of external “memory compensation” aids (Smith, 2016), has received much attention in research; however, results indicating any prevention of dementia symptoms are not consistent. In conclusion, factors such as physical activity and proper nutrition can be implemented by individuals at risk for dementia to delay onset of cognitive decline. Theories such as cognitive training require further investigation.

References:


Veterans who suffer a traumatic brain injury during active duty are forced to abruptly transition back to civilian life. Wang et al. (2016) states “Each year approximately 1.7 million people in the United States sustain traumatic brain injuries (TBIs). Mild TBI is a high-frequency
injury among combat veterans.” TBI results in various deficits that make this unexpected return more challenging. One of the interventions that may be useful for individuals living with TBI is assistive technology for cognition. According to Gillespie et al. (2011), “assistive technologies for cognition (ATC) can be defined as any technology which assists cognitive function during task performance.” We asked the following clinical question concerning intervention: In war veterans with TBI, does the use of ATC in activities of daily living lead to a higher chance of adapting to civilian life rather than not using an ATC? In order to find this information, we reviewed a subset of the literature regarding traumatic brain injuries and the use of assistive technology for cognition.

The outcomes of these studies show that ATC is an effective support for individuals with TBI to increase levels of independence by assisting with cognitive activities such as memory, time management, and planning. These are common deficits for veterans who are adapting to civilian life post-TBI. After evaluation of the evidence, we concluded that the use of ATCs, such as smartphones and personal digital assistants (PDAs), are useful compensatory strategies.


This paper investigates the impact that global sporting events, such as the Olympics and World Cup, have on the degree on human trafficking. In countries where such global sporting events are hosted, the density of human trafficking is expected to increase. Other factors such as the legalization of prostitution, brothels, GDP per capita, tourism, and regions contribute to the increase in human trafficking as well. On average, countries that host such events can expect increases in human trafficking and should respond appropriately.


There has been a significant rise in the use of herbal products to eliminate bacteria in recent years. Although the move away from chemicals, such as antibiotics and harsh cleaning products can seem appealing, it begs the question regarding the effectiveness of these herbal products. In this study, several common herbal products were tested using the disk diffusion method. These products included: distilled, white vinegar; tea tree (Melaleuca) oil; Mrs. Myers Clean Day Multi-Surface concentrate; garlic oil; wintergreen oil; 50% isopropyl rubbing alcohol; and lemon juice. With this method, TSA plates were inoculated with bacteria commonly found in the home and filter paper discs saturated with each product were placed on the inoculated plates. The plates were set in the warm room to grow for 48 hours. The common household bacteria used included, *Staphylococcus aureus*, *Escherichia coli*, *Micrococcus luteus* and *Pseudomonas aeruginosa*. After a 48 hr incubation at 37°C, each plate was photographed and the zone of inhibition was measured in millimeters. In general, the herbal products were not very effective in inhibiting the growth of the microorganisms. Tea tree oil worked the best on all the pathogens overall, while distilled white vinegar was the least effective. Interestingly, garlic oil seemed to accelerate the rate of growth for *S. aureus* which is concerning because garlic oil is often recommended for ear infections and *S. aureus* is the most common causative organism.

5. ^+Brandon Campbell, Incorporation of Biologically Susceptible Disul de Linkages in the
Peptide nucleic acids (PNAs) were first discovered in the 1980s by Professor Ole Buchardt along with a fellow biochemist Peter Nielson, who together sought to create new nucleic acid sequence-specific reagents. PNAs are synthetic pseudopeptides that utilize the same nucleobases as DNA and RNA which allows them to participate in Watson-Crick base pairing to form homogenous and heterogeneous duplexes. For basic research applications and therapeutic value, an antisense PNA must reach the cytoplasm in order to interact with its target RNA which will ultimately effect protein translation. Unfortunately, PNA do not readily cross cell membranes thus requiring additional assistance reaching their target(s). Part of our research initiative is to facilitate this process using a temporary PNA that will “trick” a cell into taking up a duplex consisting of the temporary strand and the antisense PNA. Once in the cell, biologically susceptible linkages, known as disulfide bonds, within the temporary strand will be cleaved which will destabilize the duplex and ultimately lead to the release of the pristine antisense PNA. To begin this project we need to synthesize a temporary strand that will contain one or more disulfide bonds using solid phase peptide synthesis (SPPS). While there are standard protocols and procedures for SPPS for making peptides and peptide bonds, there is lack of information in the literature detailing the creation of disulfide bonds. This research project aims to develop these protocols and procedures for synthesizing disulfide bonds using SPPS.

6. ^Michael Kelly, Preparation of 7-Oxanorbornene Derivatives as Monomer for ROMP. Mentor: Sarah Zingales, Chemistry and Physics

The preparation of a 7-oxanorbornene derivative can be accomplished through a Diels-Alder reaction of furan and maleic anhydride followed by ring opening of the cyclic anhydride through a Fischer Esterification with methanol and acid to form the endo-dimethyl norbornene dicarboxylate. Unfortunately, the reported procedures require long reaction periods and high temperatures. We have modified this reaction sequence using a novel microwave synthetic approach to lessen the reaction time. In addition, we have begun the synthesis of a collection of sterically-diverse dienophiles via modified Fischer Esterification reactions of the maleic anhydride-norborene intermediate with various alcohols. These compounds will be future used as monomers in ROMP (ring-opening metathesis polymerization) reactions.

7. **Victoria Hearn, **Sarah Wagner, Evidence-Based Review to Support More Rigorous Nationwide School Vaccination Mandates. Mentor: Sara Plaspohl, Health Sciences

Healthy People 2020 seeks to reduce, eliminate, or maintain elimination of cases of vaccine-preventable diseases with an overall vaccination rate of 80% or higher. Studies have shown, trends in nonmedical exemptions from school vaccination mandates correlate with the prevalence of vaccine-preventable diseases. For example, in 2015, the Center for Disease Control and Prevention (CDC) analyzed cases of measles reported during January 4–April 2, 2015. A total of 159 cases were reported during this time. The majority of the 159 patients with reported measles in the 2015 outbreaks were either unvaccinated (45%) or had unknown vaccination status (38%). Among the 68 U.S. residents who had measles and were unvaccinated, 43% cited philosophical or religious objections to vaccination (CDC, 2015). The purpose of this literary review is to apply the Healthy People 2020 Clinical Prevention Services Leading Health
Indicator IID-8, “children aged 19 to 35 months who receive the recommended doses of DTaP, polio, MMR, Hib, hepatitis B, varicella and PCV vaccines” as a foundation for presenting research that supports the elimination of nonmedical exemptions, which include philosophical and religious objections, in school vaccination requirements nationwide (Healthy People 2020, 2014).

8. ^Julia Broyles, Connecting the Past and Present: Mirrors Between “A Song of Ice and Fire” and Medieval Works. Mentor: Carol Jamison, Languages, Literature and Philosophy

Knights, kings and queens have been written into songs, books and plays for centuries. Noble men cross countries to save their father’s homeland, kings crush armies in biblical conquest, and women weave peace between warring tribes. These tales are usually guided by the chivalric code. Ramon Llull wrote these strict rules down in his book The Book of the Order of Chivalry. George R. R. Martin uses the chivalric code to not only draw parallels between medieval literature and modern literature, but to also breathe life into a popular genre. In his series, The Song of Ice and Fire, he uses the guidelines to bring a fantastical world to a modern audience; however, his characters don’t always follow the code. Often, the struggle between what should be done and what the characters’ want is highlighted, offering a reality to medieval times that is sometimes missed in epics such as Beowulf and Sir Gawain and the Green Knight. Martin brings perspective to a period that was gross and violent. Unlike in chivalric and heroic literature, Martin’s books don’t promise a happy ending where the hero conquers the villain. Under the supervision of Dr. Jamison, I researched connections between medieval works and Martin’s novels and helped edit her forthcoming book.

9. *Assata Griffin, Polling as a Supplement to Current Events Teaching. Mentor: Nedra Cossa, Childhood & Exceptional Student Education

This literature review gathers information on whether online polling services may influence and assist with teaching current events. Some researchers have found that current events are not incorporated into the classroom enough, and that students would be more stimulated and educated if these topics were integrated throughout their courses. Classroom Response Systems (CRSs) such as “Kahoot,” and “Poll Everywhere,” have provided some convenient tools to supplement classroom learning by providing anonymity, promoting student engagement, and encouraging inclusion. Our hypothesis is that if current events were included in the classroom environment, they would promote meaningful connections for students and bring certain topics into focus for discussion. Furthermore, the addition of an online polling system - such as the ones previously stated - would ease the transition of topic discussion. We found that current events teaching is a feasible addition to any classroom, and implementing CRSs with current events can only make teaching easier. Further research may be necessary to review the statistics on how well students do in class when polling systems are in play, versus when they are not. Additional studies are necessary to make more factual conclusions about the relationship between current events and polling systems.

10. *Brittany Elliott, Baseline Assessment of Microplastic Pollution at Beaches with Varying Levels of Human Traffic, Tybee Island, Georgia, USA. Mentor: Michele Guidone,
Biology

Microplastic pollution is a severe problem in marine and coastal habitats. When consumed by marine organisms, these particles can lead to intestinal obstruction, starvation, and/or death. Microplastics also sorb persistent organic pollutants that, when ingested by organisms, can cause toxic chemical effects. Furthermore, microplastics can also alter the physical attributes of marine habitats. In sand beaches, microplastics are known to increase water permeability and lower heat absorption, which can increase desiccation stresses and disturb temperature-dependent biological processes. To explore the extent of microplastic pollution in local Georgia habitats, we sampled sediments from three distinct areas of Tybee Island, Georgia, which represented zones of high, medium, and low visitor impacts to the beach. The samples were collected from the wrack line using a sediment corer. In the laboratory, microplastics were separated from the sand via suspension in high salinity salt water (concentration 120 g/L) and subsequent filtration through Whatman filter paper. Filter paper was examined under a dissecting microscope to characterize and quantify the microplastic particles. The most abundant microplastic particles found were small fibers, the majority being blue in color. Data analysis showed no significant difference in microplastic abundance among the three sites. This reveals that the microplastic pollution is likely not originating from tourist volume, but may instead be coming from sewage effluent or oceanic inputs.


This research examines the interrelatedness of biological elements in an aquaponics system. Aquaponics is a novel approach to food production that combines fish farming and crop production in a closed system. Aquaponic systems generally consist of tanks for fish production connected to grow beds where plants are grown hydroponically, providing a fertile aquatic environment in which macroinvertebrates, microorganisms, algae, fish, and plants can coexist. Among the limiting factors to a productive and self-sustaining aquaponics system is fish feed prices. This research investigates biological methods to reduce these costs through examination of the interrelatedness of the biological elements within an aquaponics system and utilization of naturally occurring self-sustaining biological systems. The objective was to test if aquaponics systems, specifically the grow beds, have the capacity to develop into self-sustaining systems. Four grow beds in the Sustainable Aquaponics Research Center on Armstrong State University campus were studied over an initial four-month period during which plants and fish were added to the system. Petri dishes were placed on the bottom of the grow beds to sample the aquatic environment, and visual evidence of the environment was collected by photographing and videotaping twice weekly. Over the four month period, the tanks became well colonized with naturally occurring macroinvertebrates, including bloodworms, that likely took advantage of nutrient rich water. These results suggest that various macroinvertebrates are available in aquaponics systems to support a thriving food chain that can potentially include juvenile fish.

Prior research has shown that note taking plays an integral role in information retention among students. This current study is an exploratory analysis to examine how much of the information shown to a student on PowerPoint slides during a presentation is copied down into their notes. Each word on the 18 PowerPoint slides from a lecture on ethology were counted and organized by the individual slides. We then counted the number of times each word from the individual slides appeared in the students’ notes on the lecture. After a third of the students’ notes were coded, an interrater reliability correlation was conducted and showed a significantly high interrater agreement. The correlations between the number of each word from the PowerPoint slides and the students’ notes were then analyzed. Preliminary results show a significantly low correlation between students’ notes and information presented on the PowerPoints. This suggests students write down only a small portion of information that is presented to them. A future direction of this research could be examining if the number of words students write in their notes from a PowerPoint presentation has an effect on quiz scores.


Zebrafish (Danio rerio) have emerged as the third most popular biomedical research model behind rats and mice. We have been studying zebrafish to identify biological markers needed for synaptic plasticity, which is the foundation for memory formation. Our protein of interest, Arc, has been established as a marker for learning and memory in rodents - its expression is known to increase in response to brain activity, exposure to a novel environment and synaptic plasticity. A novel Arc-immunoreactive protein was found to be widely expressed in adult zebrafish brains. To investigate if functional similarities exist between human Arc and the Arc-immunoreactive protein in zebrafish, adult fish were exposed to a novel environment or treated with a non-selective neural stimulant, their brains were dissected and homogenized and western blots were performed. Consistent with a role in memory formation, the Arc-immunoreactive protein was shown to increase in the telencephalon after exposure to a novel environment. However, expression also increased in the brain stem (medulla), which was not expected for a plasticity-related protein. Also, very high levels of brain activity induced a decrease in protein expression. These data indicate that the Arc-immunoreactive protein performs functions outside of synaptic plasticity in the zebrafish brain.


The search for new clean and renewable energy sources is an ongoing commitment for engineers and engineers to be alike. In order to find new sources of energy we must look to what we know and build upon that. We know that heat can provide us with energy and we know the sun is pretty much one giant heat source. However, solar panels, while becoming more efficient every day, don’t provide reliable instantaneous energy production. So how can we store solar energy efficiently? Is M4molten salt a feasible solution?
Scientists and engineers alike have found salt to have one of the highest and safest heat retention properties on Earth. This means that salt heated from solar power can be stored for longer periods of time than water or other substances and provide energy when needed even during long periods of reduced sunlight. Using large autonomously adjusting mirrors known as heliostats, companies such as SolarReserve have developed solar power plants that focus the sun’s heat onto a single receiver. The core of this receiver is essentially a heat exchanger that super heats the molten salt to extremely high temperature  toos which can be stored for steam production at a later time.

In order to better understand these new molten salt power plants, we take an approach derived of based on thermodynamics. The system is simple: a cycle of heat turning water into steam which is used to turn a turbine. We aim to find how efficient this cycle can be in order to further the expansion of renewable energy.


For the year of 2016, the Armstrong State of Small Business conducted a survey to learn more about small businesses in the Savannah area. First, categorical questions were asked in order to sort out the different types of businesses. Next there were a few dichotomous questions asked in order to understand the logistics of each business. Respondents were then allowed to answer a few multiple choice and open ended questions in order to share their opinions as a small business owner; this helped identify issues in this certain sector and offered insight as to what possible solutions could be done. As to general results, the most common type of small businesses was partnerships/limited liability companies. The issues the respondents voiced were the issue of taxes and poor sales as the most important problem, including authoritative, prohibitive regulations and policies. Finally, respondents offered reducing crime as the most effective solution that the city, county, development authorities, etc. could act upon. After sorting out the data, I created a newsletter for the small business sector and analyzed possible changes for the next years survey.


In this project, we designed and executed a stress paradigm in order to investigate the biochemical effects of stress using zebrafish (Danio rerio) as a model organism. Following experimental design, protocol and dissection training, and antibody testing, the stress protocols were designed. The stressor chosen for this project was disruption of circadian rhythms. Zebrafish tanks were enclosed within two light-sealed boxes, and LED lights connected to electrical timers were used to control the light cycles of the fish. In the experimental box, the light cycle was altered every 24 hours, according to a predetermined schedule, to induce sleep deprivation and chronic stress. Simultaneously, a normal light cycle (14-hour on/10-hour off) was maintained in the control box. After four days, the fish were removed from the boxes, anesthetized for euthanasia, and brain tissue was harvested. The order of dissections was altered with each round of testing. Telencephalon, optic tectum, and hindbrain were separately collected from each brain. These samples were homogenized and prepared for Western Blotting in order to obtain data on targeted biochemical effects of chronic sleep deprivation. Samples were probed for Hsp70 (Heat-shock
protein 70), of which expression was expected to increase with stress. We further anticipate probing for BDNF (Brain-derived neurotrophic factor), which should be negatively affected by chronic stress; and for Ox-B (Orexin-B) for which we anticipate an increase with chronic stress. This research was supported by a Teaching and Learning Grant to Keri Mans, and an Undergraduate Research Grant to Nicholas Moore.

Mentor: Kathryn Craven, Biology

The goal of this research was to identify specific morphometric traits that allow the sex of diamondback terrapins to be predicted at an earlier stage in development. Most of the animals in the study were collected from highway 80 during the summer of 2016 and hatched in incubators at Armstrong State University. All 19 animals (10 females and 9 males) were kept in a controlled environment at Armstrong. A total of 12 measurements were taken of each individual terrapin on a weekly basis during 2017. After all data is collected the goal was to find specific traits, relative to males and females, that will help determine the sex of young terrapins. Data are being compared to average data for yearling collected and kept under the same conditions at Armstrong during 2015-16.


Since the 1980’s, Human Immunodeficiency Virus (HIV) and Acquired Immunodeficiency Syndrome (AIDS) have ravished the American population. Currently, there are approximately 1.2 million people in the United States living with the virus, with an estimated 1 in 8 of them unaware of their infection. According to the Centers for Disease Control and Prevention, HIV/AIDS disproportionately affects racial minorities (mainly Blacks and Hispanics) over their White counterparts. In order to meet the goals of Healthy People 2020, it is imperative that functional and effective programs exist to prevent further infections, while testing for new ones. These programs are even more vital within those racial minority groups. This report will outline past and current initiatives and programs, designed for minority groups, that have had an impact on addressing the numerous barriers that effect the individual’s ability to be educated about, and be tested for HIV/AIDS. This information will serve as a potential guideline and resource for groups looking to establish a program in their area to aid the at-risk population.


I combine traditional fiber art techniques with modern technology to make interactive soft sculpture. These interactive pieces will use sound, sight, and touch to engage the audience. I will use arduino components and software along with sensors and actuators to bring my soft sculpture to life. This project is a continuation of the project from last year.

Recently, textiles have begun to incorporate electronics to realize something never seen before and bring more into our world than was thought to be there. For my research symposium poster, I will continue the project from last year by creating a series of interactive soft sculptures that combine modern technology with the techniques and traditions of fiber arts.
Featured will be a series of interactive creatures. These creatures will have features that are highlighted by Arduino components. One such featured creature will be a new version of the “Breadbug Prototype” from last year.

My intention is to progress the relationship between science and fiber art through interactive means. My intention is also to inform people of how traditional fibers techniques can be combined with modern technology. Making the pieces interactive compels the interest of the audience and makes it easier for them to understand how fibers and technology can come together to form an interactive piece. Interaction through the senses and the common Android OS uses familiarity to bridge the gap between the pieces and the audience, making the pieces more accessible and understandable.


*Spartina alterniflora* is the dominant plant species found in Georgia coastal salt marshes and estuarine marshes. In both coastal rivers and on the coastline, barnacle colonization has been observed on both the stems and leaves of the plants. This study was conducted to examine spatial and temporal patterns in colonization and determine if there was an effect of barnacle colonization on *S. alterniflora* growth and plant productivity. To examine spatial and temporal patterns in colonization, *S. alterniflora* individuals were randomly selected along a 10 meter transect at three different sites of varying marine influence. To assess the impact of colonization, plant growth and productivity was measured in the field for plants in one of three treatments: control (litter to no barnacle), removal (barnacles were removed at the beginning of the experiment), and barnacle (barnacles present on the plants); these results were quantified by measuring stem diameter, plant height, and FyFm. The results showed there was a significant increase in stem barnacles and a decrease in lead barnacles over the three-month period of the study. There were also significantly more barnacles at the site of greatest marine influence as compared to the other two study sites. Results from the field experiment showed no significant impact of barnacle colonization on plant growth or productivity. These results suggest that while barnacle colonization on *S. alterniflora* varies both temporally and spatially in Georgia marches, there was little effect on *S. alterniflora* growth or plant productivity.

22. **Kelly Westfield, *Anne Boleyn: A Lesson in Historical Interpretation*. Mentor: Allison Belzer, History

Anne Boleyn (c. 1501-1536) has been the focus of intense debate for close to 500 years. Through the centuries, historians have argued over the details of her life and there now stands a vast spectrum of varying interpretations. These interpretations are no doubt shaped by the lens through which individual historians have chosen to view Anne Boleyn, and by the their treatment of the primary sources that have been used to draw conclusions about her life. In 1994, Oxford historian Steven J. Gunn summarized this cacophony by describing the historiography of Anne Boleyn as “trench warfare.” One particular point of contention concerns the events which brought about Anne’s fall: a political coup, a deformed fetus that smacked of witchcraft, the cruel machinations of a King whose affections transferred elsewhere and who was in desperate need of a son, and, the Queen’s multiple adulteries have all been posed as explanations. In more
recent years, less extraordinary reasons for her tragic and precipitous fall have been posed, and perhaps are more plausible. While we many never uncover the truth about one of England’s most notorious and influential Queens, the debate over Anne Boleyn shows no signs of abating. Indeed, popular interest in her life has perhaps reached its apex in the 21st century with what seems to be a never-ending onslaught of books, movies, and series which depict her life and define her character. The historiography of Anne Boleyn illustrates an extreme case of the variance that can arise in historical interpretations, shaped by a historian’s individual lens and use of primary sources. Moreover, her life and fate are not just a lesson in the dangerous and fluctuating nature of the sixteenth century political arena, but in the ever-present need for the historian to ask questions, challenge the known ‘facts,’ and reassess primary sources.


For this project we investigated the water system of our local municipality and identified the primary devices and processes used. In order to better understand and represent the devices and the direction of flow, we created a diagram that traces the water from its original source to our water supply. From our research on the official Savannah website we found that the treatment breaks down into five stages and that the majority of its water is from the Savannah river. The first step the water takes is in a flash mix tank. The next two steps the water takes is flocculation and sedimentation, both of which allow particles to form and hence can be easily extracted. For the fourth step the water is filtered through sand and finally chlorine is added to disinfect the water. For wastewater treatment the first stage takes the wastewater and sewage into the lifting station that pumps the water into the treatment plant. Then it goes through separation tanks to separate any large waste and then it continues through settling basins to do the same. The water then goes through an effluent that breaks down the remaining bacteria. The fourth stage is where secondary clarifiers are pumped into the water to continue cleaning the water and then finally chlorine is added as it passes through a weir and into the water supply. The research of the water system will also include a thermodynamic analysis of these processes and the devices used.

24. George Durrell, Synthesis of Multi-Metallic Clusters of Lithium, Iron, and Zinc Supported by 2,6-bis(trimethylsilylamino)pyridine. Mentor: Gary Guillet, Chemistry and Physics

Multi-metallic cluster that support metal-metal bonding are a class of compounds in an intense field of research. Our interest lies in the unique interactions and reactivity that can be observed between bonded metal ions. Novel properties can range from unique magnetic interactions between the metal ions, a wide range of clusters with differing nuclearity, multiple bonds between metal ions, and redox reactivity. Compounds of this type require an appropriately designed supporting ligand and our group uses 2,6-bis-(trimethylsilylamino)pyridine. This ligand supports an array of Li, Fe, Cr, and Zn metal clusters with these novel properties observed. Coordinated to Li, we have observed that 2,6-bis-(trimethylsilylamino)pyridine can stabilize a range of clusters ranging from mononuclear to octanuclear. With iron this ligand can support a cluster of three ferrous ions which are arranged almost linearly (Fe2-Fe1-Fe2: 179.3°), the first example of a cluster like this with iron. A trimetallic Zn cluster that is nonlinear and, according to the bond lengths, may contain a very weak
Zn—Zn bond while the third Zn ion occupies essentially a monometallic site. The Chromium forms a di-metallic cluster with two ligands and, according to the Cr—Cr distance; no metal-metal bonding is suggested. We have begun investigations of the redox properties of the synthesized clusters. For example, the Fe cluster can be oxidized by ferrocenium hexafluorophosphate, resulting in a di-ferric cluster.


The purpose of this collaboration was to provide teacher education candidates enrolled in a "Critical and Contemporary Issues in Education" course with knowledge and practice related to authentic community-based literacy learning. By providing students with direct experience in working with middle school students around I am Malala: How One Girl Stood Up for Education and Changed the World- Young Reader’s Edition (2014) and the issues presented in the book, this project assisted the College of Education with its goal of providing transformative student learning experiences. College of Education students spent the semester exchanging pen pal letters with middle school student literacy leaders, sharing insights about school, reading, writing, college life and the Young Reader’s middle school edition of Armstrong's Common Read book I Am Malala. College students visited the middle school students in October. In November, middle school students visited the university, which provided an opportunity for College of Education students to lead a full course, with all activities designed by these future educators. Students in the “Living-Learning Community” were provided with a platform to apply their classroom discussion of theory into practice.


This current study expands on a previous line of research examining the impact feedback has on student ability to identify relevant information from PowerPoint slides. Previous studies suggest that participants have a more difficult time identifying relevant information on low relevant slides. The current study attempts to train participants to better identify relevant information on low relevant slides with feedback. Once given feedback students would be able to determine the relevant information/words from irrelevant, thereby making their notetaking more effective during the testing phase of the experiment. In this study, college students (N= 23) were first given a definition of both irrelevant and relevant words, then asked to complete a short multiple choice quiz to ensure their understanding of the definitions. Following the quiz they were asked to identify what they believed to be relevant information on two practice PowerPoint slides. Participants were given feedback, both vocally and visually, as they were allowed to see their scores on each of the practice slides, as well as the relevant words they identified correctly along with the missed relevant words. After the practice stage, participants were then given a package of four test slides and asked to identify the relevant words on each slide. Preliminary analysis showed that the participants who trained on low relevance slides performed better on low relevant test slides. This study suggests that when given correct feedback interventions,
students’ ability to identify relevant information during PowerPoint lectures can be improved. In turn, allowing their performance as note takers to improve.


Copper has been known for its antimicrobial properties since antiquity and recently there have been inquiries into copper(II) compounds as anti-cancer reagents. The ligand choice to support the copper(II) ions has been wide and varied for this purpose. In particular, flavone-copper(II) derivatives have shown the ability to damage plasmid DNA, where cytotoxic activity studies showed apoptosis at a higher rate than quercetin alone. Other researchers are also examining the implication of copper compounds as a delivery mechanism for therapeutic carbon monoxide in the treatment of sepsis and acute respiratory distress syndrome (ARDS), with high mortality rates. Herein, we present our investigation into copper-organic ligands (BPA and flavones) interaction to gain further knowledge into their structure and bonding. Three new flavone supported copper(II) complexes were successfully prepared by reaction of two equivalents of 3-hydroxyflavone with tetrakis(acetonitrile)copper(I) hexafluorophosphate. The products were crystallized and their structures were solved using single crystal x-ray crystallography. We extended this study to BPA (bis(pyrazolyl) acetate) and copper for structural comparison. Future studies will include full characterization and chemical property investigations. Moreover, new ligand variants will be used in future studies to examine the steric and electronic influence on the structure of these interesting compounds.


Our goal is to identify local strains of *Wolbachia* found in insects collected near the Armstrong campus. *Wolbachia* is a parasitic endosymbiont that resides in the reproductive cells of insects and other arthropods. In insects, *Wolbachia* manipulates reproduction to increase the number of infected females through four methods: feminization, male killing, cytoplasmic incompatibility, and parthenogenesis. The samples used in the experiment were selected from an archive of purified DNA generated by introductory biology students. The samples were extracted from insects collected in the local Savannah population and were subsequently confirmed to contain *Wolbachia’s 16s rRNA* gene via PCR. The purpose of this experiment is to increase our knowledge of the biodiversity of Wolbachia in our local population of insects. This information may be important in future efforts to control pest insect populations. To identify the different strains of *Wolbachia* previously collected, we amplified the relatively highly variable *wsp* (*Wolbachia* Surface Protein) gene. Amplified samples were confirmed by gel electrophoresis and will be sequenced in the future. The resulting *wsp* sequences will be used to identify the *Wolbachia* strains in the local insect populations.


Pharmaceuticals are complex compounds that have been traditionally formed through multi-step organic synthesis, however, there are several drawbacks to this such as harmful
byproducts, mixed stereoisomers, cost and time. Due to these drawbacks, the pharmaceutical industry has been investigating ways to use biocatalysis to efficiently produce precursors that would simplify the production of these pharmaceuticals. A precursor of interest is any compound that contains a chiral amine. The Feske lab has been collaborating with the Georgia Institute of Technology to produce these precursors with a bioengineered amine dehydrogenase. We have been synthesizing enamine resistant substrates such as beta-keto esters, oximes, and alkenes. Other ketone containing compounds are also being tested in addition to the synthesized compounds. We hope to see a conversion of the ketone substrate to chiral amine once it has been reacted with the enzyme.

30. **Amanda Plotner, Priya Patel, Emerging Adulthood and Homicide. Mentor: Sara Plaspolh, Health Sciences**

The Healthy People 2020 Midcourse Review Leading Health Indicator (LHI), Injury and Violence Prevention – Homicide (IVP-29), reported a reduction in homicides exceeding the target rate of 5.5 per 100,000 population by 150%; 6.1 in 2007 (baseline) to 5.2 in 2013. In contrast, recently published information from the Federal Bureau of Investigation (FBI) reported an overall increase in murder and non-negligent manslaughter from 2014 to 2015 in cities of all sizes. Preliminary violent crime data for the first six months of 2016 reflected a 5.3% increase compared to the same timeframe in 2015. FBI demographic data from 2015 indicated regardless of gender or known race, those in the 20-24 year age group committed the most murders. The purpose of this literature review was to identify the greatest contributing factors to this disparity. The majority of peer-reviewed literature cited the age range of interest as falling within a newly identified transition period of life termed “emerging adulthood.” Sociological perspectives were also cited as possible explanations. Previous and current studies have determined homicide is multifactorial. Common demographic, behavioral, and psychological variables have been associated with and predictive of violent behavior in all perspectives. A limitation to this research was the overlap of adolescent, young adult, and adult phases of life with the demographic of interest. Given the frequently citation of “emerging adulthood” and its association with the most common variables related to risk for violence and homicide, it can be suggested that future studies focus on the 20-24 year age group.


The main mathematical problem with allocating a representative body is that the number of representatives for any state that would give the most accurate representation is rarely an integer. Throughout American political history several methods for allocating the House of Representatives have been proposed. Though several methods have been used, there is still debate as to whether or not the method currently used is best. In order to investigate this question, I am examining various methods that have been considered in the past. My examination will mostly consist of making a program to simulate different conditions that these methods might face. Most of this programming work will be done through Python and Mathematica. These methods all have unique properties that I hope to further explore in order to find which will act the best in various situations. In particular, I will be examining the likelihood of the methods to run into a situation where they are unable to properly allocate the
representatives. I will also be examining how the size of the population will affect the ability of the method to give a fair distribution. If my data reveals a shortcoming that can be improved, I will work on designing a better method to alleviate these shortcomings. Ultimately the results have a much wider application than American politics. Whenever there is need of a representative body, or more generally, a fair allocation of resources, these methods are always some of the first to consider. A greater understanding of the properties of these methods will give information that will help people when they are making a representative system.

32. ^Alexia Charlot, ^Christina Miller, ^Victoria Henley, *Gratitude and Media Literacy Interventions for Buffering Media-Induced Body Dissatisfaction. Mentor: Wendy Wolfe, Psychology

Research on body dissatisfaction (BD) is important because BD has the potential to affect self-esteem, mood, and eating behavior. One study by Towhey, Charlot, and Wolfe (2016) found that a personal gratitude intervention was found to be more effective, such that participants who wrote about their most valued personal characteristic had an increase in body appreciation after viewing the media images. Halliwell, Easun, and Harcourt (2011) observed that viewing Dove’s Self-Esteem Fund Evolution video prevented negative body image effects when young female participants later viewed media images of thin idealized models. The purpose of this study is to compare the relative effectiveness of personal gratitude and media literacy interventions, as compared to a control task, at buffering against media-induced BD. We randomly assigned female participants into control, media literacy, and personal gratitude conditions. Control participants completed a neutral task, media-literacy participants watched the Dove Evolution video, and personal gratitude participants wrote about their most valued characteristic. All participants then watched a Guess Jeans commercial and completed measures of mood and BD. Our results did not support either of our hypotheses. However, results from overweight participants only suggest that inventions may be performing differently from each other, with the gratitude intervention having greater success. The small sample size of those participants limited the power we needed to effectively test our second hypothesis. Further data collection is needed.


β-Keto alkynes are an interesting class of molecules that could be used as synthons for a variety of natural products and pharmaceuticals. Unfortunately, a simple synthetic procedure to a variety of alkyl and aryl β-keto alkynes has not been developed. With 1-phenylbut-3-yn-1-one as our target, we first tried synthesis of 1-phenylbut-3-yn-1-ol via the Grignard reaction and then by acetylation with sodium acetylide; however, both methods were unsuccessful. We report herein the successful synthesis of 1-1-phenylbut-3-yn-1-ol formed by means of a Barbier-Grignard reaction. This two-step, one-pot reaction involves in situ formation of prop-2-yn-1-ylzinc(II) bromide as the Barbier-Grignard reagent by reacting HCl-activated zinc powder with propargyl bromide, followed by addition of benzaldehyde in THF/saturated ammonium chloride solution. Subsequent oxidation with Dess-Martin Periodinane afforded the β-keto alkyne; however, we are currently investigating alternative oxidation methods to improve scalability.
34. Ronald Carroll, Brittany Hereth, Sade Smalls, The Impact of University Mergers on National and International Student-Athletes. Mentor: Ho Huynh, Psychology

The impact of university mergers on student-athletes has not been a heavily researched topic due to the small number of mergers that have occurred within the United States. Therefore, we chose to analyze the impact of the merger of Armstrong State University and Georgia Southern University on student-athletes at Armstrong State University due to the risk that the athletic program is facing. Specifically, we have chosen to analyze the difference of affects between national student-athletes and international student-athletes. Furthermore, we subcategorize impact into the following: scholarship status, residential status, stress level, and optimism. We hypothesize that there will be a greater impact on international student-athletes compared to national student-athletes. The reasoning behind our hypotheses stems from the fact that international student-athletes are more “at risk” due to the fact that athletics is a large portion of what enabled these student-athletes to come to the United States. With this being said, the impact could be greater because their scholarships (what allows them to stay here) may be at risk if their athletic program is terminated. This research may suggest that university mergers can be an important factor in determining how student-athletes (national and international) can be affected mentally, financially, and within the means of their residential status.

35. Mary K. Moore, Feminine Influence and the Monty Hall Dilemma. Mentor: Rebecca Rayburn- Reeves, Psychology

In the early conformity studies conducted by Asch (1951), participants were found to subvert their own thinking and respond similarly to a group, even when those responses ran counterintuitive to their own logic, reasoning, and evidence presented. Conformity is often viewed as a negative aspect of the human experience, however, there are circumstances in which conforming to other’s suggestions is beneficial. For example, the Monty Hall Dilemma is a counterintuitive probability exercise that most people answer incorrectly based upon their own logic. The goal of the present study was to examine whether conformity would increase the number of correct responses to the MHD. We hypothesized that participants exposed to confederate influence would switch more often, increasing the likelihood of correct responses than those who were not exposed to influence. Preliminary results seem to support this hypothesis. Our experiment is an attempt to demonstrate the powerful effect of conformity on responses, even when this pressure flies in the face of their own logic.


House sparrows use DNA methylation for multiple mechanisms, and may methylate their genomes differently in various geographical locations to respond to local stressors. Bisulfite sequencing was used to analyze DNA methylation to characterize the methylation of the TLR-4 promoter sequence in house sparrows. PCR was used to amplify and target DNA sequence of interest on the House Sparrow’s bisulfite converted DNA. The methylated DNA was isolated to focus on the understanding of how methylation changes occur in the House Sparrow’s DNA over geographic gradients. Analytical sequencing and isolating of the methylated areas in their DNA
will contribute to the discovery of the exogenous and endogenous factors involved in the frequency of DNA methylation.


This study aims to replicate and extend the previous work on the relationship between handedness (Nalçacia, et al., 2001), speed, and accuracy in fine motor tasks. Fitt's law states that there is a speed and accuracy trade off. When performers attempt to do a movement quickly there is a decrease in accuracy of the movement. Research shows that the left hand is faster and more accurate when doing spatial working memory tasks. It is believed that the left hemisphere is specialized for fine resolution of stimuli in time, while the right hemisphere is specialized for grosser discriminations, which makes the left hand better able to handle gross motor movements while the right hand does the fine motor movements. Prior work suggests that the "right hemisphere specializes in sustained contractions", while the "left hemisphere specializes in rapid movements", which would translate in the right hand having a stronger ability to perform fine movements quickly. If this is the case, then right handed persons should have faster and more accurate right hands. In this study we will assess hand preference as well as speed and accuracy of right and left pointer finger movements across two speed and accuracy tasks. We predict that right hand dominant individuals will perform faster and more accurate with the right finger relative to the left (vice versa for left hand dominant). Results will be discussed in terms of capitalizing on these relationships in early learning of a musical instrument.

38. Tracy Le, *Should Restorative Justice Be Implemented to Resolve Campus Sexual Assault?: A Comparison of Restorative vs Punitive Justice*. Mentor: Alison Hatch, Liberal Studies

Many have argued that campus sexual assault is an epidemic in our nation’s colleges and universities. Research indicates that one in five women and one in sixteen men will suffer sexual assault while in college. Unfortunately, many perpetrators of campus sexual assault are either not held accountable, or given very lenient punishments. As a result, there is debate as to how colleges should best approach handling sexual assault cases. Typically, colleges and universities use a punitive justice system in handling sexual assault cases. This includes punishments such as: suspension, writing essays, expulsion, and paying fines. Punitive justice focuses on what crime or misconduct the offender committed, and then allows for hearing officials to determine or impose the punishments. Studies on punitive punishment have shown that such discipline practices are not effective in reducing problematic behaviors. While the punitive approach is the most common, some argue that a restorative justice model is better suited for campus sexual assault cases. A restorative justice model is based on the idea that harm has been done and that someone is responsible for repairing that harm. Restorative justice is a process by which all parties, victim and offender, come together to collectively resolve the aftermath of the crime committed and focuses more on empathy and engagement. Research on the use of restorative justice in the legal system indicates it is successful in reducing post-traumatic stress disorder symptoms and decreasing re-offenses. Additionally, research on the restorative justice process also indicates that it significantly achieves more success in fulfilling victim/offender satisfaction, and increases offender compliance with restitution.
The consideration of utilizing restorative justice by colleges and universities for sexual assault cases is relatively new. The infamous “Dear Colleague Letter” issued by the U.S Department of Education’s Office for Civil Rights permitted the use of restorative justice in student sexual misconduct cases in at least four ways: a resolution process, victim impact process, sanctioning process, and a reintegration process. Although many schools have implemented restorative justice for other student misconduct violations, there are currently no known schools that have implemented a purely restorative justice model to resolve cases of sexual misconduct on campus. By analyzing existing school disciplinary models, relevant statistics and research, and the arguments by scholars and activists, this research outlines the arguments for and against both the use of punitive justice and restorative justice for cases of campus sexual assault.

39. Lindsey Bussell, *Student Astronaut Challenge*. Mentor: Barbara Serianni, Childhood & Exceptional Student Education

Minority students, girls, and students with disabilities are historically underrepresented in science, technology, engineering, and mathematics (STEM) careers. In an effort to expose these students to the content and possibilities of STEM, public schools across the nation are adding STEM curricular and extra curricular programs to their schools. Isle of Hope K-8 school in Chatham County is one such school.

Last November 20 students from Isle of Hope’s Astronaut Club traveled to Bryan County to qualify for NASA’s Student Astronaut Challenge to be held at Cape Kennedy, Florida in February. The group qualified 10 students, which made them eligible to go to Florida to compete. The Astronaut Challenge consisted of four separate challenges, the Space Shuttle simulation, a landing simulation, a lab challenge, and an engineering challenge.

In preparation for the competition, students worked daily after school to hone their skills and conduct research for their lab challenge with support from Isle of Hope faculty along with Armstrong’s College of Education. In their very first effort to complete at this level, the Isle of Hope team took 2nd place in the Space Shuttle simulation category, and finished 4th in the Lab Challenge.

This presentation at the Student Scholar Symposium will be another way to highlight their incredible efforts and the contribution of Armstrong’s students and faculty to local programs. The students will come to Armstrong to present their lab presentation poster and shuttle simulation for attendees. All requirements of Armstrong’s Minors on Campus Policy will be met.

40. Kyara Mejia, *UNyDOS: Building The Latino Voice at Armstrong*. Mentor: Grant Gearhart, Languages, Literature, and Philosophy

The UNyDOS project aims to build and have the Latino voice heard at Armstrong State University. The project focuses on updating an online website with news articles, fiction stories, poems, op-eds, etc. that relate to the Latino community. UNyDOS authors and writers include Armstrong student, alumni, faculty, or staff. Each original piece is posted on the UNyDOS website and shared through social media to reach audience members at Armstrong.

41. Julius Rodillas, *Examination of Quality of Life in Individuals with Parkinson’s Disease*
Objective:
The purpose of the study is to compare the quality of life between caregivers and individuals with Parkinson’s disease. Participants who are attending a community based multi-modal exercise program for individuals with movement disorders and their caregivers were invited to participate in the study. Researchers expected to find a positive correlation in the quality of life of both the subjects. The assumed improvement in caregivers quality of life was expected due to anticipated improvements in individuals with Parkinson’s as a result of the exercise program.

Method
Assessments were used to determine the condition in the quality of life of participants. There were 42 participants, 24 individuals with Parkinson’s and 18 caregivers that participated in the first cohort. They were both given different tests to determine their quality of life. The caregivers who participated completed the SF-36 and the individuals with Parkinson’s took PDQ-39 to examine the changes in psychosocial functioning, while also taking the SCOPA-COG to examine the changes in quality of life, measured by psychosocial functioning.

Results and Conclusion
The presentation will discuss the results of the study and the implications for healthcare practitioners working with individuals with movement disorders.

42. **Tia Tessitore, Improving Anomia in Individuals with Aphasia: A Comparison of Semantic Feature Analysis and Phonological Components Analysis. Mentor: April Garrity, Communication Science and Disorders

   Word retrieval impairments are the hallmark of language difficulties in persons with aphasia (PWA). This impairment, referred to as anomia, is a major focus of language rehabilitation for PWA. Two treatments that are structured in similar formats but include different kinds of linguistic targets are semantic feature analysis (SFA) and phonological components analysis (PCA). SFA focuses on the meaning-based properties of nouns, such as category, use, and properties that allows PWA to describe each feature of a word in a systematic way. PCA is based on the same principles as SFA but focuses on analyzing the sounds in words using features such as the first sound in words and words that rhyme with it. The purpose of this study is to explore which of these two treatments heads the most significant results in the treatment of anomia in PWA. A literature review was conducted to identify relevant research. Of the four studies examined, Sophia van Hees et. al. and Naomi Hashimoto directly compared treatment effects of SFA and PCA in each individual, one assessed only SFA, and the other, only PCA. Both SFA and PCA treatments resulted in naming improvements characterized by small to large treatment effects. The varying improvements across all individuals may be indicative of a relationship between effect sizes and type and severity of aphasia and anomia. Therefore, it may be more appropriate to investigate what type of treatment best suits each aphasia type and anomia severity level.

43. *Ha Huynh, Epigenetic Variation Among Kenyan House Sparrows. Mentor: Aaron Schrey, Biology
Epigenetic phenomenon can change gene expression and genome function without changing DNA sequence. Epigenetic marks can be induced to change by the environment, thereby allowing organisms to fine tune their gene expression to the specific environment. House sparrows are one the world’s most successful introduced species. They can rapidly adapt to their new environments, suggesting a potential role for epigenetic mechanisms in their success. House sparrows were introduced into Kenya in the 1950s and reached the western border in the early 2000s. Thus, house sparrows in Kenya still show their response to the new environment. I used epiRADseq to measure epigenetic differences in DNA methylation among Kenyan house sparrows. I hypothesize that DNA methylation will differ among locations in Kenya based on time since introduction.

44. **Brooke Collins, *A Study of Three Literacy Assessments in Practice.* Mentor: Anne Katz, Childhood & Exceptional Student Education

Reading assessment tools are multi-faceted. They can serve as a means of understanding students’ thoughts regarding the reading process, help teachers analyze the process of how students decode words, provide an opportunity to examine students’ recognition of print, and offer a window into vocabulary and comprehension development. Kindergarten is a period when students begin to develop foundational reading skills. Literacy assessments were administered to students in three areas. The first assessment administered was the Burke Reading Inventory, designed to help teachers gain insights into what students think of the reading process, including their feelings towards different types of text and thoughts of reading as a problem-solving process. The second assessment administered was the Elementary Spelling Inventory, which provides an opportunity to analyze individual words to determine each student’s level of spelling development. The third assessment was Environmental Print Reading, which gives students the opportunity to recognize familiar print that exists in their everyday world. Results of these assessments yielded information regarding student reading levels and potential challenges, while an analysis of spelling words from the assessment revealed difficulty with inflected endings, among other findings. The reading practitioner found that administering and analyzing a range of literacy assessments was a meaningful way to help teachers understand student strengths and areas where additional support should be given as learners embark on the reading process.


“Human smuggling and trafficking have been among the fastest growing forms of transnational crime because current world conditions have created increased demand and supply.” (Shelley, Human Trafficking) Men, women and children alike, in many areas of the world, are being trafficked for many reasons. I would like discuss this growing crisis that is hitting many nations, particularly in the Golden Triangle. Supply and demand of human trafficking has created a massive business for human traffickers, but why and how do they get away with this and what can we collectively do in order to put an end to it?


46. Cornequa Reynolds, *The Effects of Action on Perception.* Mentor: Joshua Williams,
Psychology

The action-specific perception account states that people perceive the surrounding environment in terms of their abilities to act in it. Prior research shows that perception may affect how well we perform a certain task. Further, other studies show that performance may drive perception. In one particular study the participants practiced kicking field goals. After 3 to 5 minutes of practice, the participants estimated the amount of kicks they would make and to show the perceived size of the field goal using a mock field goal post. Next, the participants kicked 10 field goals and then used the mock field goal to record the perceived size of the field goal. In the end, it was suggested that there may be a causal link from performance to perception. In the current study, we will examine the relationships between perception and performance in a different sport setting: Basketball. Participants will estimate the perceived size of the basketball rim prior to, and after, shooting 10 free throws. This correlational study is designed in such a way as to reveal a potential direction of causality. We will look first at the relationship between perception and performance prior to shooting the free throws. Then, we will look at the relationship after shooting the free throws. We predict that the relationship between initial perception and performance will not be strongly related. However, after engaging in the basketball task, the perception-performance relationship will be strengthened, as indicated by an increased correlation between performance and perception.

47. Jared Yates, Ondre Nelson, Aaryn Rogers, Synthesis and Characterization of Group 8 Metal Complexes with a Novel 2,6-Bis-(triphenyliminophosphoromethyl)-1-bromobenzene Ligand: Steric Control of the Metal Coordination Sphere. Mentor: Gary Guillet, Chemistry and Physics

Our group’s interest lies in making low coordinate or activated complexes by designing ligands that sterically impact the coordination sphere by rational choice of peripheral alkyl groups. The ligand presented herein contains two triphenyliminophosphorane units tethered to an aryl bromide backbone (L). This ligand can easily be metallated using zero valent Group 8 metals by an oxidative addition mechanism. To date we have synthesized in high yield complexes with Ni, Pd, and Pt to form LNiBr, LPdBr, and LPtBr, respectively. The ligand and all metal complexes have been characterized by single crystal x-ray diffraction, $^1$H-NMR, $^{13}$C-NMR, and $^{31}$P-NMR. The activation of a metal center can be inferred by deviations of bond lengths and angles from optimal values and the solid state structure data indicates that the LNiBr coordination sphere is distorted compared to the Pd and Pt congeners. This is indicated by inflection of the M-Br bond out of the plane of the molecule which is maximum for Ni and almost ideal for Pd and Pt. This reactivity of the bromide ligand is exhibited by the metathesis reaction of the LNiBr and LPdBr with silver trifluoromethanesulfonate (AgOTf) to yield [LNi(MeCN)]OTf and [LPd(MeCN)]OTf. Both complexes reacted completely and were characterized by single crystal diffractometry. More detailed studies are required to quantify the actual difference in reactivity of the metal center in these complexes. Future work will also investigate the similarity in properties of LPtBr to the Ni and Pd complexes.

49. Eric Jordan, Stressors and Preterm Birth. Mentor: Sara Plaspohl, Health Sciences
According to the March of Dimes, 12% of infants in the U.S. are born preterm before the end of a normal 40-week gestation period. Contributing factors for preterm births include maternal breathing problems such as apnea, respiratory distress syndrome and genetic abnormalities (March of Dimes, 2015). In particular, African American preterm births have been associated with racial disparities such as stressors within the community, and limited resources. In 2014, African American infants were 50% more likely to be born premature when compared to their counterparts (CDC, 2015). Low income communities have commonalities of disadvantaged neighborhoods, unhealthy nutritional options, noise and pollution filled areas (Booker, 2011). The purpose of this study is to utilize credible evidence-based literature to identify and review the relationship between racial disparities and stressors as possible risk factors leading to preterm pregnancy births among African American women in the U.S. By understanding the impact of these risk factors on early deliveries, preventive measures may be identified to reduce the occurrence of these preterm births.


Over the past decade, advancements in solar power as well as the desire to utilize this clean energy have rapidly increased. These advancements in solar technology are what make the application of solar-powered cooling systems attainable and feasible. In Savannah, most homeowners spend an average of $1000 annually to keep their home comfortable. With the use of solar power, this cost could be cut in half. In this project, we will examine the thermodynamic cycle involved in the operation of a solar-powered cooling system. We will also analyze the financial benefits of using an active solar cooling unit over the traditional electrical-powered system. In the project, we will propose installing a thermal driven cooling system (absorption type) to be installed in an average-sized household in our area and examine the cycle and the potential benefits of the system. We will use local weather data and energy consumption data from our area to compare the two systems. We expect that the solar-powered HVAC system will be more energy efficient and cost effective in the long term than the standard HVAC systems. Using thermodynamics concepts, we will further examine the process of solar-powered cooling. Since the operation of HVAC units in a residential property contributes to over half of each household’s utility bill, converting to solar-powered units would significantly lower energy expenses. It will also provide a clean and renewable energy source to your home which has additional financial and other benefits.


Work has been done by other researchers to explore the antimicrobial activity of Lemongrass Essential Oil and Citronella Java. This project sought to establish the chemical compositions of these two essential oils. Literature review indicated that other *Cymbopogon* species oils would likely contain at least one or all of the following: citral (neral/geranial), geraniol, citronellol, and citronellal. Gas chromatography (GC) and gas chromatography-mass spectrometry (GC-MS) were used to identify the principal components of the two oils. Lemongrass Essential Oil was shown to contain citral (neral/geranial) while geraniol and citronellol were present in Citronella Java. Nuclear magnetic resonance (NMR) spectroscopy
supports the presence of citronellal in Citronella Java. These differences in chemical makeup may result in dissimilar antimicrobial activities.

51. Evan Ashe, Rachel Hines, Jasmine Lane, *Impact of Barnacle Colonization on Spartina Alterni ora in Georgia Salt Marshes*. Mentors: Michele Guidone and Heather Joesting, Biology

The smooth cordgrass *Spartina alterniflora* is used as a settlement substrate by barnacles in salt marsh ecosystems. Studies have documented this settlement along the southeastern coast of the U.S., however the effect on plant productivity has not been studied. Therefore, we quantified the spatial and temporal patterns in barnacle colonization on *S. alterniflora* to determine if barnacles inhibit *S. alterniflora* growth and/or reduce photosynthetic efficiency. Barnacle density, plant height, and photosynthetic efficiency were assessed for twenty randomly selected plants at three sites surveyed in June, July, and August 2016. We found that barnacle density varied with site and, between June and August, density decreased on plant leaves and increased on plant stems. However, barnacle density did not negatively impact plant height or photosynthetic efficiency. We conclude that marsh location and seasonality affected the susceptibility of *S. alterniflora* to barnacle colonization, but that colonization did not influence plant fitness. However, further study is needed, as our survey may have failed to detect an influence of barnacle presence due to the low number of randomly selected plants that possessed a high barnacle density.

52. Rachel Hines, Jasmine Lane, Evan Ashe, *Spatial Distribution of Barnacles on Spartina alterni ora Stems and Leaves*. Mentors: Michele Guidone and Heather Joesting, Biology

*Spartina alterniflora* is a foundation species in western Atlantic salt marshes. As such, salt marsh conservation efforts focus on preserving and supporting *S. alterniflora* development. In prior studies, barnacle colonization has been noted on stems and leaves of *S. alterniflora*, however there have been few examinations of the spatial distributions of barnacles during the growing season. The purpose of our study was to determine the relationship between barnacle location on the plant and: 1) barnacle size, 2) the distance between nearest barnacle neighbors, and 3) the percentage of the stem or leaf covered by barnacles. Five *S. alterniflora* plants were collected in July and August from a tidally impacted site along the Savannah River, Savannah, GA. Plants were photographed in the laboratory; measurements of all visible barnacles were subsequently estimated using ImageJ. Barnacles were significantly larger in August than in July. We did not observe a significant relationship between barnacle height on the plant or sampling month on the distance between nearest barnacle neighbors. However, height on the plant significantly impacted the percentage of the stem covered by barnacles, with the greatest percent cover occurring between 40 and 80 cm stem height.

Aphasia is an acquired communication disorder resulting from trauma to the brain, which can affect all language modalities (i.e., auditory comprehension, verbal expression, reading comprehension, and written expression). The underlying control processes that govern these modalities are noteworthy when considering bilingual aphasics. Cognitive control refers to the processes regulating goal-directed behavior, which involves planning, decision-making, and selecting relevant responses while inhibiting non-relevant responses. Language control refers to a bilingual individual’s ability to select a target response from the intended language while inhibiting utterances from the non-target language. In bilingual individuals, these control processes are strong in part due to the cognitive ability to quickly switch languages. However, due to the nature of aphasia, bilingual aphasics often demonstrate deficits in cognitive control and the ability to choose language, as they once were able to.

We reviewed three studies that examined the relationship between cognitive and language control in bilingual aphasics. Dash and Kar (2014) and Radman et al. (2016) published studies investigating the relationship between cognitive and language control processes and how factors related to bilingualism interact with each process in aphasic individuals. While these are two independent systems, they are highly interactive with each other. The results of these studies suggest that bilingual language recovery relies on the interconnectedness of these systems. Given the presence of individual differences, the performance of any two bilingual individuals with aphasia will not be the same. Thus, a comprehensive assessment of language and cognitive control processes is important in guiding treatment methods.

54. **Eva-Christine Hall, **Tiffany Slater, Pharmaco logical Intervention in Rehabilitating Word Retrieval Skills in Individuals with Aphasia. Mentor: April Garrity, Communication Science and Disorders

Within the scope of biomedical approaches to aphasia treatment lies the study of pharmacological intervention in rehabilitating word retrieval skills in individuals with non-fluent aphasia. While these therapeutic approaches remain in the experimental stage, small clinical trials have reported findings for specific pharmacotherapy interventions that may be of interest to speech-language pathologists (Cahana-Amitay, Albert, & Oveis, 2014). Dopaminergic and cholinergic therapies have yielded positive results for some individuals with aphasia. Pharmaceutical anti-depressants such as selective serotonin reuptake inhibitors (SSRIs) have been employed to combat psychiatric conditions that accompany aphasia and interfere with therapy. From our understanding of neural plasticity and the co-occurrence of psychiatric conditions with aphasia due to a lesion in the left hemisphere, we propose that certain pharmaceuticals may expedite the retrieval of word-finding skills in the rehabilitation process. This analysis provides an overview of these pharmaceuticals, evaluates their efficacy, gives rationale for appropriate implementation, and provides conclusions based on current research. After reviewing a number of studies, we concluded that pharmacotherapy may contribute to more progressive rehabilitation and improve word retrieval skills for some, but not all, individuals with mild-moderate aphasia. We also concluded that through the use of SSRIs to treat neuropsychiatric conditions that often interfere with language recovery, perseveration tendencies were reduced and word finding skills improved. Additionally, both approaches achieve greater outcomes when combined with speech-language intervention. Few studies are currently available, and further research is needed in order to examine the potentially positive effects of pharmaceuticals on aphasia symptoms.
55.  ^+Cicely Curtis, *The Pattern of Wolbachia Infection in Insect Populations Native to Savannah, GA.* Mentors: Melanie Link-Perez, Biology, Geneva DeMars, Biology

Wolbachia is the most common bacterial endosymbiont of insects. In the fall of 2013, Armstrong State University implemented a new curriculum wherein introductory biology students collect insect samples, identify to order using a dichotomous key, and extract genomic DNA for analysis through PCR and gel electrophoresis for Wolbachia infection. These Wolbachia-infected samples require verification: specifically the genomic DNA is re-analyzed for Wolbachia infection and additional PCR products are sequenced to verify the students’ insect identifications. To date, approximately 500 DNA samples have been verified. These data now populate a database that has been designed to clearly present the prevalence of Wolbachia infection in the local insect populations of Savannah, Georgia. Providing a reliable source of information to determine the local patterns of Wolbachia infection will allow future student researchers to analyze the underlying natural phenomena that have shaped the spread of Wolbachia infection in the area. This verification process has also provided evidence to support curricular changes that have improved student success, such as refinements to the dichotomous key.


Some plants of the same species can change their phenotypes in response to changes in the environment. This phenomenon is called phenotypic plasticity. For example, plants growing in sandy soil may have more water stored in leaves and stems compared to plants growing in silty soil, in which silty soil has a higher water-holding capacity than sandy soil. *Hydrocotyle bonariensis* (largeleaf pennywort) is an herbaceous and clonal perennial found in both the sand dune habitat and inland coastal habitats, which vary in several abiotic factors such as sunlight intensity and soil properties. The purpose of this study was to explore the potential phenotypic plastic responses to varying soil environment in *H. bonariensis* by comparing plant morphological characteristics between plants grown in soil collected from Tybee Island and soil collected from Armstrong State University. Plant fragments were collected from both Tybee Island, Georgia and Armstrong State University, Georgia; and randomly transplanted into trays of either Tybee Island sand or Armstrong campus soil and maintained in greenhouse conditions. Samples of the leaves and petioles were collected weekly for six weeks from each tray, weighed for both fresh and dry weight, and the length and thickness of the petiole and leaf area and thickness were measured. At the end of the six weeks, each plant was harvested, and the number of leaves, rhizome length, root length, and fresh and dry biomass were measured.

57.  **Lakeysha Mutcherson, **Elisabeth McConico,  *Evidence Based Review for Research on Childhood/Adolescent Obesity.* Mentor: Sara Plasphohl, Health Sciences
Obesity in children and adolescents poses as a major crisis in public health as its prevalence continues to increase. Since the 1970s in the United States, the percentage of children and adolescents categorized as obese has tripled, according to the U.S. Centers for Disease Control standards of growth (Yanovski, 2015). Using the guidelines laid out by Healthy People 2020, a national public health initiative focused on our nation’s health, this project will serve to inform people at risk for obesity about their current lifestyle and explain how small changes in everyday life can yield large improvements in their current/future health status, according to the literature. Numerous factors, such as behavior, predisposition, genetics, and environment, influence childhood and adolescent obesity. Chronic diseases related to obesity in children and adolescents include diabetes, dyslipidemia, and cardiovascular disease. These obesity rates of cause for an evaluation aimed at analyzing the source of weight gain and assessments of comorbidities that result from extreme weight. Interventions used to combat these health issues include family-based lifestyle interventions, play-based interventions, and childhood-obesity prevention interventions. The purpose of this evidence-based literature review is to examine the causes of obesity in children and adolescents, discuss comorbidities associated with obesity, analyze interventions for weight management, examine the at risk population to help determine what changes can be made to decrease the number cases with obesity, bring more attention to the growing obesity issue, and discuss what can be done in order to ensure more/better results.

58. Matthew Thomas, Determining Which Arginine Facilitate Binding of Noxo1-β to PI(4,5)P₂. Mentor: Nicole Davis, Chemistry and Physics

The Nox1 (NADPH Oxidase 1) enzyme complex is involved in many biochemical pathways and is important in many cellular functions by generating reactive oxygen species. Dysfunction of Nox1 causes inflammation involved with gastric cancer and Crohn’s disease. One protein in the Nox1 complex, Noxo1 (Nox Organizer 1), organizes the Nox1 complex and is necessary for Nox1 activation. There are four forms of Noxo1 but Noxo1β is the focus of this study. Noxo1β has 371 amino acids and a PX domain that binds Noxo1β to membrane lipids. The lipid binding of Noxo1β is characterized, but the specific binding interaction is unknown. The goal of this project is to characterize the specific binding within the PX domain of Noxo1β. Site directed mutagenesis is being used to create mutant sequences of specific binding sites on Noxo1β by changing the arginine residues in this specific area. The mutated proteins are then used to test if it affects lipid binding.


The purpose of our research project is to provide resources for Chatham County K-12 teachers to introduce their students to robotics programming by learning how to write code for “3pi” robots. The 3pi robots are programmed using the C language, and are designed to detect black lines on a white background. We have used this line-detecting capability to allow the 3pi robots to traverse a “grid world.” We have constructed navigation primitives which simplify the process of traversing the grid. This simplification will allow beginners to practice core programming principles while also physically seeing the fruits of their labor come to life as the robots move around. We have provided written tutorials which will accompany teacher’s
lectures, and allow the students to familiarize themselves with the 3pi, and our navigation primitives.

60.  ^Alex Avina, Hayden Osbourne, Kityara James, Sara Buddle, *Outcomes from Bad Delivery.* Mentor: Ho Huynh, Psychology

Previous research indicates that individuals may brace while waiting for news; that is people tend to make pessimistic predictions regarding future events to avoid unpleasant affect associated with unexpected negative outcomes (e.g., Shepperd et al, 2000). However, this phenomenon is typically examined as an intrapersonal process. In this study, we examine how people respond when other people help them brace. More specifically, we assess how the timing of feedback given from another individual can influence one’s responses to bad news. We are interested in the timing of feedback as it relates to interpersonal relationships such as coach and player or boss and employee. We hypothesize that being told bad news relatively close to an important event will cause higher aggression levels compared to if a person is given bad news in advance of an important event. Potential implications of this study revolve around when the best time to deliver news to an individual would be without receiving high levels of aggression.


Resurgence is the reoccurrence of previously reinforced behavior during extinction of another more recently reinforced behavior. A three-phase procedure is typically used to examine this phenomenon: (1) A target response is reinforced and maintained, (2) the target response is extinguished while reinforcing an alternative response, and (3) all responses are extinguished; if target responding reemerges, resurgence is obtained. In Experiment 1, rats were trained to press a lever for solid food or liquid, then such behavior was extinguished and, using another lever, rats that initially pressed for solid, learned to press for liquid and vice versa. In the third phase, both behaviors were under extinction. No noticeable effect of the quality of the reinforcer was observed. To address one methodological issue from Experiment 1, a second experiment was designed: the two behaviors (maintained by qualitatively different reinforcers) were trained in Phase A, in Phase B one was extinguished while the other was maintained, and in the third phase both behaviors were under extinction. Outside of the laboratory, behavior is maintained by qualitatively differing reinforcers such as attention, tangible items, escape from demands, opportunities to play, etc. Following a translational approach, the present laboratory study aims at providing a preliminary answer to this question generated in an applied setting. Resurgence is relevant in understanding socially relevant behaviors, such as relapse in substance abuse and recurrence of problem behavior after effective treatment.

62.  ^Amy Neely, *Introduction of Enzymatic Polymer Degradation to Enhance the Undergraduate Polymer Chemistry Curriculum.* Mentors: Mitch Weiland and Nicole Davis, Chemistry and Physics

Poly (aspartic acid) (PAA) is a biodegradable water-soluble synthetic polymer. The most common water soluble polymer used today is poly(acrylic acid). This polymer is not biodegradable and accumulates in the environment which can potentially cause environmental
damage. Research into biodegradable water soluble polymers is becoming more prominent in order to find a suitable replacement for non-biodegradable polymers. Synthesis of PAA (formed by a hydrolysis reaction of polysuccinimide, formed from thermal polymerization of L-aspartic acid) PAA is composed of β-amide (70%) and α-amide units (30%). Biodegradability of this polymer is due to natural microorganisms. Specifically, two enzymes named PAA hydrolase-1 (PAAH-1) and PAA hydrolase-2 (PAAH-2). These enzymes work in conjunction with one another to yield complete degradation of PAA. A proposed mechanism suggests that PAAH-1 hydrolyzes β-β amide linkages, resulting in oligo (aspartic acid). PAAH-2 is then thought to cleave the oligo (aspartic acid) units into aspartic acid. Expression and purification of these proteins... crystal structure... teaching lab?

63. Stephanie Miller, Bull fighting: More than a Tradition. Mentor: Grant Gearhart, Languages, Literature and Philosophy

Bullfighting has been a tradition of Spain dating back to 2000 BC, and has long been recognized as the symbol of Spain by fellow citizens and tourists. Unfortunately, bullfighting has created a large controversy between the country and one of its well-known, prosperous states: Catalonia. While Catalonia’s ban on bullfighting only lasted six years until the constitutional courts ruled bullfighting as a protected tradition, Catalonia’s opposition is not a recent fight against Spain. Catalonia’s history has proven their desire to secede from Spain, stemming from the oppression of their culture under Francisco Franco’s rule, the division created between them during the Olympic Games of 1992, and their inability to recognize the rights Spain granted them following their overturned ban in 2016.

64. **Megan Hudson, **Bresa Daise, Evidence-Based Review of Factors that Influence Vegetable Intake for U.S. Children and Adults. Sara Plaspohl, Health Sciences

The Centers for Disease Control and Prevention reports that in 2013, the United States national median intake of vegetables was 1.3 servings per day for adolescents and 1.6 servings per day for adults. Healthy People 2020 is a federal health promotion initiative that brings awareness to health behaviors and lifestyle disparities that our nation faces. One of its objectives is to increase the vegetable intake for children and adults because current intake falls short of the recommended standards. The purpose of this evidence-based literature review is to summarize socio-economic, geographical, and demographic factors that contribute to low vegetable intake for American children and adults. The results of this literature review may be used to more effectively promote vegetable intake among American children and adults.


_Wolbachia_ is a bacterial endosymbiont that resides in the reproductive cells of insects and other arthropods. The affect of this infection in insects is to increase the number of infected females through four reproductive manipulations: cytoplasmic incompatibility, parthenogenesis, feminization, and male killing. We are currently screening 14 local mosquito species for _Wolbachia_ infection. Several local mosquito species are vectors for the arboviruses West Nile, Zika, Dengue, Eastern Equine Encephalitis, and Chikungunya. Mosquitoes were collected in
Chatham County by the local Mosquito Control agency and identified to species. We were given ten individuals each from 14 different species for analysis. Using primers specific for Wolbachia sequences, we determined which collected individuals were positive for the Wolbachia parasite. The resulting information could be used in efforts to control local mosquito populations and in efforts to limit the spread of arboviruses.


Lung cancer is a detrimental disease that affects the lungs by forming malignant cells in the respiratory tissues. It is the leading cause of cancer death among both men and women, creating approximately 224,390 new cases annually. The illness is further classified into two major classes based on its biology, treatment, and prognosis: small cell lung cancer (SCLC) and non-small cell lung cancer (NSCLC), being the more prevalent type. Management and treatment of NSCLC remains one of the greatest challenges in radiotherapy, which has led researchers to explore further medical options for lung cancer patients. One of these alternative decisions is volumetric modulated arc therapy (VMAT), an innovative radiation technique, which can achieve conformal dose distributions with improved target accuracy and sparing of normal tissues compared to conventional radiotherapy. The following work of literature investigates the additional advantages and limitations of VMAT and how its technological progression could facilitate favorable patient ramifications in the future.


Analyzing emotions is one of the most effective ways to understand how museums and historic sites impact their visitors. Multiple studies show how researchers have successfully utilized guest books in order to better understand visitor reactions and emotions towards a site. This study will focus on an analysis of the guest books at the Old Slave Mart Museum in Charleston, SC. The Old Slave Mart was an antebellum slave auction gallery that has now been turned into a museum owned by the City of Charleston and is a counter narrative site. Based on my analysis of the March 2016 guest book, I have categorized the comments into the following categories: Cognitive, Aesthetic, Reflective, and Miscellaneous. In a climate where slavery is often marginalized or ignored at plantation homes, its important to understand the impact of sites on their visitors that are wholly devoted to understanding the historic and present-day impacts of slavery.

68. Nicole Redmond, Expression and Detection of a Soluble FAM5C Truncate. Mentor: Mitch Weiland, Chemistry and Physics

The membrane attack complex/perforin (MACPF) protein domain can be found in nearly all organisms. This domain contains a signature motif, Y/W-G-T/SH-F/Y-X_6-GG wherein X is any amino acid. Proteins containing MACPF domains play serve many functions to include development, toxins, membrane pore formation, and immunity. Family with Sequence Similarity 5, Member C (FAM5C) is a MACPF protein that has been associated with several diseases found
in humans, including aggressive periodontitis, tongue squamous cell carcinoma, acute myocardial infarction. Interestingly, FAM5C also contains a coiled-coil (CC) domain. Proteins containing CCs tend to either interact with other proteins or play a role in genetic regulation at the transcriptional level. Although implicated in a variety of diseases, the function of FAM5C is currently unknown. To begin elucidating function we created a FAM5C construct that could be expressed in E.coli and included the MACPF and CC domains. Results so far have shown that the truncate can be expressed in the soluble and detected on a western. Attempts to express and purify this construct will be discussed along with potential future studies once we have obtained significant amounts of purified protein.

69. Kiana Brown, Hafsa Junaid, Improving Student Statistical Knowledge and Skills Through Camtasia Video Technology. Mentor: Joshua Williams, Psychology

Different learning models yield a varying number of outcomes. Previous research suggests that active learning techniques, such as, learning by teaching others can lead to significantly better performance than teacher-centric models. To explore the effects of active learning, we engaged students who are enrolled in PSYC 4051 (Advanced Research Design & Analysis Lab) in a project regarding statistical concepts and SPSS procedures with the use of Camtasia technology. In order to assess students’ statistical understanding retained from engagement in the active learning activity, these students completed a pretest and posttest on descriptive statistics, bivariate correlations, t-tests, and One-Way ANOVA. We monitored their learning gains as well as the level of confidence over time. After taking the pretest, students had basic training on constructing college-level lectures and assigned readings in an SPSS instruction manual. Students created PowerPoint presentations (PPT) that involved explaining conceptual foundations and demonstrations of statistical concepts and procedures. Then, students used Camtasia Technology to record an oral-visual lecture before administering the post-test. We found that allowing students’ to explore active learning techniques had a positive impact on their overall test performance. Students’ also illustrated a significant increase in their overall level of confidence from pretest to posttest. Students’ reported, on average, a large gain in their level of knowledge from their initial level at the beginning of the project. Implications of this study may allow future students’ to become more involved with experimental research and apply this knowledge in the real-world.


"Motion Guidance" is a novel method for providing visual feedback on lumbar stabilization, though the effectiveness has not been well demonstrated. Training effects and carryover of the use of this device for feedback will be assessed using a custom-designed spinal inclination measurement system (SIMS). SIMS consists of a microcontroller board, inertial measurement unit, data logging shield, and various custom software and hardware components. The system temporally characterizes lumbar stabilization by measuring rotations using quaternions which are then converted to 3-dimensional Euler angles. The software component allows the rotation data to be plotted as a function of time as well as various statistical analysis of the data. A case for the SIMS components was designed and 3-D printed. Additionally, a
rotational measurement system was designed to evaluate the performance of SIMS. The successful development of SIMS has resulted in a device that is able to provide useful information to users in regards to lumbar movement of patients during rehabilitation exercises.

71. Timothy Walter, Kityara James, Whitney Davis, *The Effects of Consolidation on Various Universities*. Mentor: Ho Huynh, Psychology

**Poster Session 2**


Traumatic brain injuries (TBI) are injuries that permanently or temporarily damage the brain. Memory loss is common in TBI patients (Goldsmith, 2014). Two interventions for memory loss are errorless learning (EL) and errorful learning (EF). EL is an intervention whereby the task is manipulated to eliminate/reduce error (Fillingham et al., 2005). EF is an intervention whereby errors occur and learning happens through trial (Ueno et al., 2009). A literature review reveals that EL is an appropriate intervention for those with difficulty with event-based prospective memory tasks (EBPM) and severe memory impairments. EBPM tasks are triggered by an environmental cue that suggests an appropriate action needs to be performed (e.g. remembering to take medication with dinner). An anatomical explanation provides why those with TBI may respond better to EL. Individuals without brain injury have greater activation of precuneus and posterior cingulate gyrus during EF recognition task. In addition, individuals with a TBI also activate the bilateral posterior parietal cortices. These results suggest that greater activations of the precuneus and posterior cingulate gyrus are needed for EF; explaining the poor performance in EF and effectiveness of EL (Ueno et al., 2009). Although promising, EL has task limitations. The research suggests that EF benefits areas of generalization and time-based prospective memory tasks (TBPM). TBPM is performing an action based on a time-related cue (e.g. remembering to take medication every 2 hours). It is evident that both learning interventions are beneficial depending on the patient's severity and training outcomes (Fillingham et al., 2005).


Many media images exude the importance of a thin female figure and misrepresent the average female body type, creating unrealistic goals and expectations. It is no surprise that distorted body image and dissatisfaction can arise, particularly in women, from the portrayal of this thin body ideal. Research regarding body dissatisfaction (BD) interventions is imperative as BD can lead to serious health issues, both physically and mentally. The current study's purpose is to extend the research conducted by Wolfe and Towhey (2015), which examined personal and general gratitude interventions and how they differ in buffering against the effects of media exposure to the thin beauty ideal. Similar research has indicated that gratitude based interventions can decrease BD and increase body esteem, in addition to protecting against the negative mood states and dysfunctional eating behaviors that can
accompany BD (Wolfe & Patterson, 2017). The present study will use a Guess Jeans commercial that has been used in a recent investigation by our lab (Charlot, Wolfe, Miller, & Henley, 2016) as the media exposure component. Prior to viewing the commercial, randomly assigned participants will either write about their top valued characteristic (personal gratitude), write about everything they are grateful for (general gratitude), or be assigned to a neutral task (control). Based on previous research, we hypothesize that both gratitude conditions will buffer participants from adverse effects of media exposure, as compared to the control condition, but that the personal gratitude condition will be most effective, as evidenced through pre and post measures of BD.


As far back as 1960, students enrolled in Entomology classes at Armstrong State University have been collecting insects as an integral component of the course. Specimens were pinned, identified, labeled, and then incorporated into a teaching collection. Due to space constraints, these specimens were kept in a storeroom that also housed vertebrate and botanical specimens. In 2002, the Biology Department moved into Armstrong’s new Science Center building, which allowed for the expansion of the collection. Yet the specimens remained informally organized until this past year when a multi-membered student team took on the task of reconstructing the collection. The goals of this endeavor are to have Armstrong’s collection function as a repository for voucher specimens, to provide the tools for diagnostic identification purposes, and to have a teaching collection for student use and for public outreach. The members of the team were challenged with two major tasks. First, they were to organize and separate out specimens from Armstrong’s teaching and research collections. Second, they were to merge specimens that have been collected since 2002 with those from the original collection. Because many of the more recently collected insects were preserved in alcohol, a storage system for vials was developed. This storage system allowed for the collection to include immature and fragile specimens that do not withstand the pinning process. As a result of these efforts, Armstrong’s collection has grown to include well over 3,000 pinned specimens and nearly 1,100 insects preserved in alcohol.


Attachment theory and the development of the adult attachment scale gave way to numerous research studies that focused on interpersonal relationships of humans. While there is research investigating the correlation between a person’s attachment style and political orientation, there is little no research on voters’ attachment to political figures. This current study takes into account Adult Attachment and Brand Attachment in order to construct a new concept of Political Attachment. The goal of the scale is to predict a voter’s attachment style to a political figure, and determine if there is a correlation between a voter’s political attachment and political orientation. The study consists of two parts: Development and validation. Part one focuses on the development and testing of the scale with 45 items and a 10 item demographics survey. Part one showed a high reliability (Cronbach’s alpha = 0.986) and significant item correlation (Bartlett’s test of sphericity $\chi^2 (990) = 5843.621, p < .0001$), but did not completely support the original
hypothesis. In part two, the scale was reduced to 30 items, recruited 240 participants and is compared to the Adult Attachment scale and the Brand Attachment scale to determine construct validity.

5. **Amy Ford, *Diverse Literature Research Analysis*. Mentor: Anne Katz, Childhood & Exceptional Student Education

In honor of Hispanic Heritage Month, I completed a cultural perspective evaluation on several advanced picture books in the 3rd-5th grade Lexile level range. Children need to explore the communities and contributions of a variety of cultures through quality literature that depicts diversity, not in stereotypical or superficial ways, but through a lens that authentically reflects the culture. Children from all backgrounds need to see themselves and their peers in literature, and develop an appreciation for diversity. Students will be well-served by teachers, librarians, and families who assemble libraries that contain high-quality multicultural children’s literature.

The advanced picture book is a powerful storytelling medium because the authors/illustrators deliver a moral, lesson, or theme in an accessible manner. I chose to report on texts that genuinely resonated with me. These books provided a glimpse into the lives of individuals and families from Hispanic culture through humor, nostalgia, community, beauty, courage, and hope. Many of the books are a celebration of the customs of Hispanic culture, while others reflect the challenges faced by Hispanic and Latino Americans. The books include fiction, nonfiction, and memoirs that reflect the day-to-day lives of Hispanic Americans, as well as the inspirational stories of artists such as Frida Kahlo and Eric Valsquez. Analyzing these texts through a cultural perspective lens yields meaningful results that can be applied towards inclusion of diverse literature in schools and communities.


A popular pastime of the United States, baseball draws millions of spectators to its ballparks each season to watch teams compete; the idea of having a home team within one’s city understandably brings excitement to any community. Proponents of constructing stadiums with subsidized tax money promise that along with civic pride, these teams will provide major economic benefits to their host areas: new employment, increases in income, boosts in retail sales, new city developments, the list can go on. While these promises have previously enticed several citizens to finance such massive construction projects, economic research has developed to decide whether these cities receive the benefits promised to them. Are these subsidies provided by the community truly “worth it” to the public, as evidenced by economic growth? The cities funding these massive projects take on not only the initial costs of the stadiums themselves but also a significant portion of the financial responsibility of operations and maintenance: gas, electric, water, etc. Previous researchers are quick to point out that numerous peer-reviewed articles have found the exact opposite outcomes as promised by these stadium tycoons. In fact, it has been found that had money been spent elsewhere, more additional income could have been generated from these subsidies. This research seeks to determine if the same results are found at a more specific level in regards to Minor League baseball, which requires much less spending than Major League baseball.
7. **Emily Bressler, **Ernest Chisholm, *Evidence-Based Review to Explore Possible Correlation Between Mass Shooting and Mental Illness.* Mentor: Sara Plaspohl, Health Sciences

Although there is no exact definition of mass shootings, multiple sources and statistics suggest it can be categorized as a shooting event where several individuals are struck by gun fire, resulting in severe injuries and in some cases, fatalities. According to the Mass Shooting Tracker, there were over three hundred mass shootings across the fifty states in 2016. In the aftermath of every mass shooting, after the shock and mourning of victims has been addressed, the attention of law enforcement, politicians, media outlets, and everyday citizens is directed to the shooter. There is one question that is consistently the center of debate. What can cause someone to execute a mass shooting? Unfortunately, due to historical mass shootings such as Columbine High School and the recent Charleston church shooting, mental illness has been the pacified answer to this question. Therefore, the purpose of this literature review is to apply the Healthy People 2020 leading health indicator, “reduce firearm related deaths”, for a systematic assessment of peer-reviewed publications to explore whether there is any credible evidence that supports a correlation between mass shootings and mental illness.


An estimated 1.4 million people experience a traumatic brain injury (TBI) annually in the U.S. While TBI can affect nearly every aspect of a person’s life, social communication impairment is one of the most pervasive and persistent sequelae of this acquired injury. A range of treatment approaches to remediate the cognitive aspects of communication such as attention, self-monitoring and adherence to social rules and boundaries might be implemented from standard individual therapy to computer-based approaches to group interventions.

A literature review was conducted to determine if a more holistic approach incorporating group interventions can improve social communication skills in persons with TBI. Two studies (Braden, et al., 2010; Dahlberg, et al., 2007) found individuals with TBI demonstrated improvement in social communication skills and social competence through participation in group treatment. Lundqvist, et al. (2010) also found group therapy interventions increased self-awareness and coping skills that positively impacted interpersonal relationships. A systematic review of evidence-based cognitive rehabilitation interventions (Cicerone, et al., 2011) found that individuals who received comprehensive holistic neuropsychological rehabilitation which included both individual and group therapies made greater gains in community functioning, productivity, self-efficacy and life satisfaction than individuals receiving conventional rehabilitation or no treatment.

The results of these studies suggest a holistic approach to cognitive rehabilitation for persons with TBI that includes group interventions can greatly improve social communication skills in addition to overall life satisfaction.

Adenocarcinoma. Mentor: Pamela Cartright, Radiologic Sciences

Lung cancer is the leading cause of cancerous deaths for both men and women in the United States. Adenocarcinoma is a form of non-small cell lung cancer (NSCLC) and accounts for 41% of lung cancer cases. Adenocarcinoma presents more often in women who are 60 years of age or older. This paper identifies the anatomy, possible causes, and types of treatments of NSCLC. The lungs, which are located in the respiratory system, supply oxygen to the body and dispose of carbon dioxide. Exposure to carcinogens, such as smoking, and occupational exposure can play a role in the formation of lung cancer. Treatment for NSCLC depends on the stage of the disease. A positron emission tomography with a computed tomography (PET/CT) scan has significant value in the diagnosis and staging of NSCLC. For patients with early stage NSCLC, surgery, along with chemotherapy and radiation, is the treatment of choice. For patients with late stage NSCLC or for patients that are not a candidate for surgery, chemotherapy and radiation can be used as palliative therapy. Stereotactic ablative radiotherapy (SABR), intensity-modulated radiation therapy (IMRT) and interstitial implantation of iodine-125 are different types of radiation treatment options that have been proven to be beneficial for NSCLC patients. The chemotherapy agent cisplatin, when used in combination with other chemotherapy, show improved responses during treatment. For patients with NSCLC that have an epidermal growth factor (EGFR) mutations, EGFR tyrosine kinase inhibitors (EGFR TKIs) are more beneficial over the use of chemotherapy.


The Monty Hall Dilemma is a three-choice card game based on probability in which a participant is tasked with the job of finding a single prize card. During this game, although the probabilities do not change, many participants believe they do, due to heuristics of previous experience and a phenomenon called the endowment effect. Heuristically speaking, although the initial probability of 33% of winning the prize is understood by most people, once an incorrect choice is revealed and they are left with two cards, people misjudge the final probability as being 50%, when the probabilities don’t change. Combined with the endowment effect, which is the tendency to stick with one’s initial choice, most people end up staying with their initial choice even though switching is the most advantageous strategy. The goal of the current study was to see whether spatially manipulating one card away from the other two cards would influence the rate of switching across two experimental conditions. Preliminary results suggest that this spatial manipulation may not be strong enough to overshadow these powerful heuristic and endowment effects, as is further supported by qualitative data from participant comments. Future experiments using a between subject design as opposed to a within subject design and increasing the number of trials may result in participants recognizing advantage in switching.


In regards to children’s literature, it is salient that minority groups are not only fairly represented, but that these stories adequately and accurately reflect the lives, culture, and historical significance of these peoples. It is exceedingly crucial that the elements of diversity and language usage are represented in a manner that is authentic. Additionally, instances of
stereotyping, racism, and ethnocentrism must be avoided in order to prevent the spread of ignorance and misinformation about various racial and cultural groups. The information in these stories must be set in the appropriate context, and contents must be thoroughly researched, especially when composed by individuals outside of the represented culture.

Cultural stories are written to share unique perspectives and developments that are faced in societies throughout the world. These stories are shared with children of all ages in an effort to establish fair representation of cultures, and to create bridges among varying perspectives and differences. With relevance to this project, books tailored to middle grade audiences were examined with regards to the aforementioned criterion. Project data was gathered between September 15th and October 15th, 2016, which is celebrated annually as National Hispanic Heritage Month.

The books in review represent a multitude of Hispanic cultures and characters. The three stories explored in this project are as follows: Crossing the Wire, by Will Hobbs, Tropical Secrets Holocaust Refugees in Cuba, by Margarita Engle and Cesar Chavez: Crusader for Social Change, by Brenda Haugen.


According to the Reading Teacher journal article entitled Reading Pictures: Developing Visual Literacy for Greater Comprehension (O’Neil, 2011), illustrations are not meant to be merely aesthetic. They serve to develop and convey a deeper meaning/understanding to the reader. For early readers or those who struggle, “reading pictures” can be used as a form of context clues. “Just as writers use words to create texture and mood, illustrators also employ a set of techniques - a visual grammar, so to speak-with which they can evoke emotions and conjure atmospheres” (O’Neil, 2011, p. 215). The purpose of this presentation is to evaluate the impact of visual literacy on a child’s comprehension and decoding abilities throughout a text. How does choice of color, tone, line, shape, media, or style affect the reader? Furthermore, to what extent does visual literacy act to reinforce learned concepts, aid in verbal skills, or strengthen analysis and critical thinking skills? We will assess the above concepts with students by exploring picture/text interaction—such as reinforcing, description, reciprocal, and establishing strategies—throughout a series of storybooks. This will allow students to expand on preexisting comprehension strategies while helping us grow in our understanding of visual literacy as future educators.

13. Bethany Moore, Layna Thompson, The Effects of Electronic Misuse in the Classroom. Mentors: Joshua Williams and Nancy McCarley, Psychology

Use of electronics in the classroom as a learning tool is popular among college students. Research shows that when a student misuses their electronic device in a lecture, it may negatively impact others. We examined the distracting effect these behaviors have on others through observations and surveys. In a pilot study, we observed four different lectures to determine the frequency of distracting behaviors. We discovered that off-task behaviors occur on laptops, tablets, and cell phones. Also, they are more apparent among certain types of lectures and teaching styles. Further, we surveyed the same students and their professors to determine
their awareness of this issue. The professors completed a questionnaire about electronic use. In addition, the professors gave their students a questionnaire about their own use of electronics as well as their peers’ use. We predicted that professors would find cell phone use during lectures to be distracting, more so than laptop or tablet use. We felt that the students who reported that they do not, or rarely, use their electronics inappropriately would be more distracted by their peers who do. Additionally, those who use electronics inappropriately would be less aware of the distracting effects of this behavior on others. Preliminary analyses of surveys are underway. We hope to help students and professors become aware of the impact that off-task behavior has on surrounding classmates. These results may lead to revisions of course policies on electronic use in the classroom as well as development of new strategies to reduce such behaviors.


Most organisms experience ontogenescence (high and decreasing mortality from conception to the age of maturity) despite the clear evolutionary disadvantage of dying prior to reproducing. Despite its clear importance to the evolution of life, ontogenescence remains a largely understudied subject to which this study intends to contribute more information. One hypothesis that may help to explain the prevalence and persistence of ontogenescence is the Transitional Timing Hypothesis, which states that developmental transitions are dangerous and concentrated in the earliest phases of life (e.g. hatching or birth). This study's goal was to examine the transitional dangers of hatching in the model organism *Chthamalus fragilis*, an estuarine barnacle. Barnacles were collected from local saltmarsh grass and brought to the lab where egg sacs were dissected out and stored in well plates. Egg sacs were monitored for two weeks, and all hatching events were recorded along with whether each hatched larva was a successful swimmer or not. The total number of eggs that failed to hatch from each egg sac was also determined. Results indicated clear patterns in the timing of hatching events and the proportion of larvae that could swim well after hatching. The relatively high number of non-swimming hatchlings as well as the significant proportion of eggs that failed to hatch lend support to the Transitional Timing Hypothesis, suggesting that birth in barnacles (and probably many other organisms) is a potentially dangerous event that cannot be avoided.


A token economy is a behavior modification procedure where symbolic rewards, or “tokens”, are given out to strengthen a chosen behavior. The tokens can be exchanged for specific rewards. Boniecki and Moore (2003) examined the effects of a token economy on a college classroom to increase students’ directed participation (responding when the teacher asked a question), non-directed participation (asking relevant questions), and response latency (time from the offset of the professor’s question and the onset of the answer). They found that directed and nondirected participation increased, while response latency decreased with the implementation of the token economy. The purpose of the current study is to replicate and extend the findings of Boniecki and Moore. In addition to measuring participation, we will measure participation’s effect on test and cumulative performance. Similar to the previous research, we
hypothesize that participation will increase as a function of the token-based intervention and participation will positively correlate with performance. This study is ongoing and our poster presentation will encompass all available data at the time of the symposium.

16. **Ayla Wilson, Technology and Human Behavior. Mentor: Scott Scheidt, Cyber Education**

We depend on screens every day to translate the world around us. Smart phones reveal information about who is calling; GPS directs you to your next appointment and warns of traffic jams and potential delays in route. We no longer live our lives dependent upon our innate human senses to process and make sense of the world around us.

We now live in a world mediated through the screens we carry around in our pockets, wrists, desktop and other monitors found in our homes and throughout the community. Screens are fixtures in our daily lives that present information that is too often assumed to be an accurate representation of our world. Hackers can alter information delivered via screens to create false reports, disrupt medical devices, compromise internal car networks and evoke panic and alarm in the public. Society's increasing connectedness via "The Internet of Things" (IOT) positions individuals, organizations, and institutions as prime targets for well-organized cyber criminals and state supported hackers to attack in both the physical and virtual realm. Thus, cybersecurity and the technologies and processes that best protect networks, data and its users from attack is arguably one of the most emergent and critical problems of our time (Goodman, 2015). The purpose of this review is to provide an overview of the research demonstrating inherent vulnerabilities found among emerging technologies and how these vulnerabilities can be exploited to manipulate human behavior and carry out real-word cyber-attacks.

17. ^Sydney Andrzejak, Improvements to the Polymeization of L-Aspartic Acid for Organic Chemistry II. Mentor: Nathaniel Shank, Chemistry and Physics

Armstrong’s Chemistry department has been awarded the “Polymer Chemistry: Cross-linking the curriculum (PC3), NSF Award #1611988” to further develop their polymer curriculum. Part of this proposal includes the addition of a new exercise in the Organic Chemistry II lab. Starting from a literature precedent, we further developed the polymerization of L-Aspartic acid to polysuccinimide, and its subsequent conversion to polyaspartic acid. This new exercise serves to highlight various aspects of condensation polymerization while also reiterating Le Chatelier’s Principle, amide formation, and hydrolysis. In addition, the polymer products produced by the students will be utilized in other courses, such as General Chemistry, Biochemistry, and Instrumental Chemistry.


Life expectancy has doubled over the past century, due to improved nutrition the discovery of antibiotics. However, mortality rates are increasing in diseases caused by antimicrobial resistance (AMR). The Center for Disease Control and Prevention (CDC) estimates that each year more than 2 million people become infected with drug resistant bacteria and that greater than...
23,000 people per year die as a direct result of AMR. AMR can be attributed to a variety of causes, including over-prescription of antibiotics, misuse or incorrect use of antibiotics, and increased use of antibiotics in farming and agriculture. Current research has shown that chalcones, natural occurring products found in plants, have antimicrobial properties. Our aim is to create a library of chalcones from a variety of ketones and aldehydes via the Aldol Condensation reaction and to determine their antimicrobial characteristics. Initial testing showed that our chalcones do not act as antibiotics. As a result, our research has turned toward examining the chalcones as efflux pump inhibitors. Efflux pumps are defensive proteins that expel undesirable chemicals, such as antibiotics, from the cell. Inhibiting the pumps allows drugs to stay inside the cell. Microbroth dilution, fluorescent efflux, and checkerboard assays are being performed to ultimately verify the chalcones’ ability to inhibit efflux pumps, allowing antibiotics to stay inside the cell.


Savannah, Georgia averages more than 13 million visitors annually. Tourists who wander its streets and historic squares visit in an effort to better understand the history of this coastal city and many of the larger events (American Revolution, Civil War) that have shaped the development of the United States. Given the importance of Savannah as a tourist destination, this study examines how gender is represented on the cultural landscape of the city through an examination of its monuments (statues, placards, prominent restored homes, etc.). Focusing on the monuments in the historic district downtown, we will analyze the choices made in monument design, especially who and what was chosen to be represented in Savannah’s landscape. As other studies in cultural geography have shown, monuments are an important part of our history, identity, and the larger place-making process. They are not innocent and represent the values of those in power, in a sense naturalizing those stories/histories on the landscape. Savannah’s monuments are predominately male and are largely devoted to war heroes. Unfortunately, this presence has minimized the role and contributions of women in our city’s history and their overall representation on the landscape.

20. **Kathleen Reeves, **Kate Kellum, *Comparing the MacArthur Competence Tool for Treatment (Mac-CAT-T) and Mini Mental State Examination (MMSE) to Determine Cognitive Abilities for Informed Consent for Individuals with Dementia*. Mentor: April Garrity, Communication Science and Disorders

Individually diagnosed with dementia have a cognitive capacity similar to children. Many professionals face an ethical challenge by allowing caregivers to give informed consent and violating the patients’ rights of self-determination. Informed consent requires the ability to understand the purpose, procedures, potential risks, and benefits of participating in research and/or treatment. Informed consent is important because the patients have a right to choose their treatment. A literature review was conducted to determine the best measures for obtaining reliable informed consent in patients who present with dementia. There are several limitations to these approaches due to loss of memory, attention, and verbal retrieval as a consequence of dementia. Haberstroh (2014) examined patients’ ability to give informed consent to treatment as measured by the *MacArthur Competence Tool for Treatment* (Mac-CAT-T) and severity of cognitive impairment as measured by the *Mini Mental State Examination* (MMSE). Tsantali
(2011) explored the cognitive performance of dementia patients using the MMSE to determine mental status of the participants. Findings suggest that the MMSE isn’t a valid stand-alone assessment for determining cognitive status to provide informed consent. The Mac-CAT-T was found to be a beneficial standardized measure in combination with a clinical interview and clinical assessments. Healthcare providers should conduct a thorough assessment while reducing attention and memory demands to determine whether or not these individuals are cognitively capable of giving informed consent.


Reverse engineering is an excellent method to obtain knowledge and design information from something – be it a mechanical device or computer program – by analyzing its components and functions systematically. This method will be applied to a Genesis handheld heat gun in order to obtain a better understanding of how the device operates. The heat gun will be disassembled into its individual parts, each of which will be mounted onto a presentation board. Every part will be identified and labeled on the board. Additionally, each part’s purpose and fundamental operating principle will be identified and noted. A thermodynamic analysis will also be performed in order to determine mass and energy flows produced by the heat gun during operation. Visual traces of these flows will be labeled on the presentation board. By reverse engineering the heat gun, knowledge about how the device is designed and assembled, how it functions, what components are needed to operate, what each component’s fundamental operating principle is (where applicable), and the device’s thermodynamic interactions will be determined. This knowledge will provide valuable insight as to how similar systems operate, improvements that could be made to future systems, as well as reinforce the usefulness of reverse engineering and analyzing systems.


The prevalence of investigations into how students can become better note takers from PowerPoint slides has increased. During one investigation researchers randomly assigned participants to one of three feedback conditions. Participants in the General Feedback (GF) condition engaged in sessions during which they highlighted perceived relevant information. Participants were then told the percentage of relevant words they identified correctly. The Specific Feedback (SF) participants engaged the same process except that during the feedback sessions participants examined their slides. The No Feedback (NF) condition did not engage in any feedback session. Results showed that those in the SF condition identified more relevant information. However, here we asked whether or not the specific feedback worked consistently for all participants in the SF condition. Related research indicates that initial knowledge, skills, and abilities lead to differential effects of feedback when examining learning processes. We examined this with respect to initial relevant word discernment ability of participants in the SF condition of that original study. We predicted that students with a lower initial ability would benefit more from specific feedback but as ability increased, feedback efficacy would decrease. Analyses revealed a significant increase in detection of relevant words from the first to second
feedback session but only for those in the lowest ability group. Those in the highest ability condition did not show any gains as a function of feedback. These results support our hypothesis that feedback was more beneficial for those classified with a low initial ability to discern relevant from irrelevant information.


Professor evaluations are often used to assess the quality of the course, and teaching style of the professor. Students often use evaluations to indicate how proficient a professor is, and if they would like to take a course taught by the professor. We choose to analyze how the hotness rating of a professor on RateMyProfessor.com influences how students rate a professors teaching methods. RateMyProfessor.com uses a chili pepper to indicate that a professor was perceived as hot. In this study participants rate a randomly generated profile of a professor, and we will examine if there is a difference between how professors with the chili pepper are perceived when compared to professor profiles that did not receive a chili pepper. We hypothesize that professors with the chili pepper will be rated as more likable, have a lower level of difficulty, and more likely to be taken again.

24. **Akeya Sanders, *Barriers to Accessing Reproductive Health Services for Sexually Active Women Age 15-44.* Mentor: Sara Plaspohl, Health Sciences

Women’s health is an important part of most nation’s health status. Within the last decade, Healthy People reported that almost 80% of women received health services. Despite these reports, many women still face challenges accessing reproductive health services. The purpose of this research is to explore the barriers to accessing reproductive health services for sexually active women age 15-44. By exploring the Healthy People 2020 leading health indicator “sexually active females aged 15-44 years who received health services”, an evidence-based literature review was compiled based on the various barriers women face to obtain or while obtaining reproductive health services. Research produced various barriers ranging from cost and legislation to racism and personal perceptions. With the new administration and the possible repeal of the Affordable Care Act, a new study should be conducted to analyze what new barriers women may face soon.


Previous research showed that failed loggerhead eggs collected from Jekyll Island, GA commonly contained three subtypes of the opportunistic fungal pathogen *Fusarium solani*. Two of these subtypes have been detected in diseased loggerhead embryos examined in other studies. Preliminary characterization of failed loggerhead eggs collected from Wassaw Island, GA have also detected *F. solani*. Since loggerhead eggs incubate in the sand for ~60 days prior to hatching, we hypothesize that the source of the fungus is nesting sand. To address our hypothesis, sand samples were collected during the 2013-2016 nesting seasons on Wassaw Island. DNA was extracted from each sand sample and then quantified. DNA extracts were then
subjected to PCR using primers that specifically detect the fungal ITS region. Subsequent sequencing of the amplified genes would then allow determination of the types of fungi present in the sand samples. In order to obtain small PCR products appropriate for next generation sequencing, two new fungal primer sets (set #1: ITS1-F_KY02F/ITS2_KY02Rev and set #2: ITS86F/ITS4Rev) were tested to determine which was more effective at detecting fungi in our samples. We also tested which PCR annealing temperature and cycle number was optimal for product formation. The results show that highest product yields occurred using primer set #1 with an annealing temperature of 54°C. Collectively, these conditions are being used to screen nesting sand samples for fungal composition.


Muscarinic acetylcholine receptors (mACHRs), a family of G-protein-coupled receptors, have been identified as possible targets for treatment of Alzheimer’s Disease. BQCA (benzyl quinolone carboxylic acid) has been shown to act as a positive allosteric modulator that is highly selective for the M1 mACHR, which is a subtype whose enhancement is likely to benefit cognitive deficits. Our goal is to synthesize novel BQCA analogs and have their effects on zebrafish brains analyzed by Dr. Robert Mans in ASU’s Biology Department.


The six-lined race runner prefers recently burned habitats. It is known that an individual’s DNA methylation can be changed by a stressful environment. For instance, if a six-lined race runner had to live in a habitat that was burned more than ten years ago, it may experience stress by the change in environment. Knowing the habitat that the six-lined racerunner prefers, and knowing variables that alter DNA methylation, time since fire may affect epigenetic characteristics of the six-lined racerunner. We will test this hypothesis using ion torrent next-generation sequencer to conduct epirADSeq. This study will help us understand how changes in the environment affect gene expression and ultimately how individuals adapt.


Previous research has shown that providing external motivators (e.g., money, or points) for performing a task can decrease, or undermine, internal interest and motivation to continue participating in that task (Deci et al., 1999). Research exploring student motivation has shown that external rewards also undermine motivation for performing learning tasks (Wehe et al., 2015) and internally motivated students tend to persist in tasks longer, seeking increasingly challenging tasks (Elliot & Dweck, 1988). The purpose of the current study was to further investigate the differential impact of extrinsic rewards on internal motivation to learn. Subjects were assigned to either a reward or non-reward condition, they completed a word-learning task followed by a test over the information. We predict that subjects offered a reward will study for longer before a test but decrease their study behavior after the test is complete compared to the non-reward subjects.
Prostate carcinoma is the most common malignancy and the second leading cause of death among males in the United States. About 1 in 55 men between the ages of 40 and 60 are at risk to develop prostate carcinoma. The exact cause of prostate carcinoma is still unclear, but it is believed that diet, age, race, and environment factors play significant role in development. Signs of prostate cancer include hematuria, dysuria, pain in the back and pelvis, weight loss, loss of appetite, and overall weakness. Diagnostic workup for prostate carcinoma is variable and can be achieved through several examinations, including diverse imaging methods, biopsies, histological examinations, digital rectal examinations (DRE), and prostate specific-antigen serum testing. Prostate carcinoma is staged through the TNM system, which considers the clinical and pathological state of the tumor. Grading of prostate carcinoma is achieved through the Gleason system and is fundamental towards the prognosis development. Prostate carcinoma has the ability to metastasize through the lymphatic system to the rest of the body including to the lungs, liver, and brain. Management of prostate carcinoma varies depending on individual treatment. When treating the prostate, it is imperative to carefully define critical structures. Defining critical structures and avoiding their unnecessary irradiation leads to the prevention of damage to healthy tissue.

Is there a difference between trying to win versus trying not to lose? Previous studies have shown that students who go into a learning environment with a winning mindset (e.g., trying to pass) end up learning more and take greater risks as compared with students who come in with a losing mindset (e.g., trying not to fail). The Monty Hall Dilemma is a probability puzzle based on three choices in which one choice is correct and the other two are incorrect. Participants are given the option to choose one of the three cards they think is the winning card. Then an incorrect card is revealed and they are given a final option of staying with their initial choice or switching to the other available option. Most people incorrectly assume that the probabilities have changed from 33% to 50% when in fact the probability of winning by staying remains 33%. The goal of the present study was to assess whether candy lost versus candy gained over trials affected the rate of switching across participants. Participants were either allowed to win a piece of candy for each correct trial (out of six) or given six pieces of candy where a piece was taken away for each incorrect choice. Preliminary evidence suggests that this manipulation did not produce significant changes in switch rates, but reasons for why a null effect may exist will be explained.

Hammad Almohileb, Necrotizing Fascitis. Mentor: Douglas Masini, Respiratory Therapy

There is a real need to develop new anti-cancer therapeutics that are highly effective against cancer cells, yet non-toxic to normal tissues. By targeting a specific pathway that is only activated in cancer cells, the HIF (hypoxia-inducible factor) pathway, we can selectively target malignant tumor cells, while leaving healthy cells unharmed. Curcumin is the main ingredient of the Indian spice turmeric, and is used in Ayurvedic (traditional Indian) medicine for its anti-inflammatory and anticancer properties. Curcumin and synthetic analogs of curcumin, such as EF-24 have been investigated by research groups worldwide as anti-cancer agents. Our goal is to synthesis novel EF-24 analogs and investigate their potential as anti-cancer therapeutics and their ability to inhibit HIF.


This research project’s goal was to examine whether improving students’ ability to identify irrelevant information on PowerPoint slides would in turn help them to better identify and ignore it when attempting to identify relevant information later. Participants in all conditions highlighted what they believed to be irrelevant information on two practice slides with three forms of feedback General, Specific, and No Feedback. Participants in the General Feedback condition only received the percentage of correctly-identified irrelevant words. The Specific Feedback condition allowed the participant to view the graded slide in addition to receiving the percentage of correctly-identified irrelevant words. After the two practice slides participants identified what they believed to be relevant information on a final testing packet of slides. We found that the specific feedback outperformed both the general and no feedback on feedback slides and final testing slides to the level of statistical significance. The only exception was on test slides with a low relevancy index there was not a statistically significant difference between the no feedback and specific feedback.

34. **Tahpenes Bradley, **Tia Taylor, Evidence-Based Review of Adult Obesity: Long Work Hours and Sleep Deprivation. Mentor: Sara Plaspohl, Health Sciences

Recent statistics from Healthy People 2020 state that 1 in 3 adults in the U.S. are obese, ranking obesity as a top priority disease. As more people have joined the work force, and as nine to five jobs have become more prevalent, physical activity, adequate sleep, and healthy diet choices have declined. Healthy People 2020 is an influential national health initiative that is focused on health promotion and disease prevention of the American people, including the identification of health improvement priorities. One of twelve leading health indicator topics identified by Healthy People 2020 is Nutrition, Physical Activity, and Obesity. The purpose of this evidenced-based review is to examine a subtopic of this leading healthy indicator, “Adults who are obese”, with a specific focus on long work hours and associated sleep deprivation as potential determinants of adult obesity. The results of this study will be used to offer suggestions on potential opportunities to impact these determinants in order to decrease adult obesity in the U.S., thus improving our health status.

35. ^Daniel Crafton, ^Monica Munden, ^Alex Avina, Acceptance of Refugees as a Function
A popular pastime of the United States, baseball draws millions of spectators to its ballparks each season to watch teams compete; the idea of having a home team within one’s city understandably brings excitement to any community. Proponents of constructing stadiums with subsidized tax money promise that along with civic pride, these teams will provide major economic benefits to their host areas: new employment, increases in income, boosts in retail sales, new city developments, the list can go on. While these promises have previously enticed several citizens to finance such massive construction projects, economic research has developed to decide whether these cities receive the benefits promised to them. Are these subsidies provided by the community truly “worth it” to the public, as evidenced by economic growth? The cities funding these massive projects take on not only the initial costs of the stadiums themselves but also a significant portion of the financial responsibility of operations and maintenance: gas, electric, water, etc. Previous researchers are quick to point out that numerous peer-reviewed articles have found the exact opposite outcomes as promised by these stadium tycoons. In fact, it has been found that had money been spent elsewhere, more additional income could have been generated from these subsidies. This research seeks to determine if the same results are found at a more specific level in regards to Minor League baseball, which requires much less spending than Major League baseball.


Aspergillus nidulans is a filamentous fungus that relies on the growth of their cells to expand into their environment in search of nutrients. To do this, the Golgi apparatus constantly sends materials for growth to the plasma membrane via vesicles. The Conserved Oligomeric Golgi (COG) complex is a tethering complex involved in retrograde transport of vesicles. Retrograde transport is the backwards movement of vesicles through the Golgi which helps to replenish the Golgi membrane. Using the two mutants “swoP”, with a mutation in COG4, and “podB”, with a mutation in COG2, we are trying to answer the question “Does Tip20 interact with the mutated COG4 in swoP and/or the mutated COG2 in podB and correct for the mutations?” This is done by overexpressing Tip20, a vesicle tethering protein complex that participates in retrograde transport within the Golgi, in our two mutant strains.


Molecular epigenetics mechanisms allow individuals to modify their genome in response to their environment, which generates fine-scale adaptations to phenotypes and ultimately affects fitness. The most commonly studied molecular epigenetic mechanism is DNA methylation. DNA methylation is known to affect gene expression and phenotypes in response to environmental stress. An excellent system in which to study DNA methylation changes in response to stress is found in fish that live in power plant-cooling lakes. These lakes have increased temperatures and affect fish growth, survival, and gene expression. We are comparing DNA methylation in bass that have been grown in common conditions to the F2 generation. Parentals were collected from replicate power plant-cooling and ambient temperature lakes. Previous research demonstrates a
difference in growth rate persists to the F2 generation at increased water temperature, which can be attributed to exposure of parentals to increased temperature water. We conducted epiRADseq with an Ion Torrent PGM. We will identify sites that are differently methylated among cohorts.


A synthesis of ethyl 2-chloro-2-methylacetoacetate has been developed by reacting ethyl 2-methylacetoacetate with N-chlorosuccimide.

The reagents were stirred for three days at 25 °C. A liquid-liquid extraction was performed to isolate the organic layer containing the product formed from the reaction. Gas chromatography with mass spectrometry was used to identify the presence of the product and the percent conversion for this reaction. Further purification of the substrate requires column flash chromatography and yield has yet to be determined.

It was found that the reaction of N-chlorosuccimide with ethyl 2-methylacetoacetate to synthesize ethyl 2-chloro-2-methylacetoacetate was a success. The conversion of the reagents to the chlorinated product was confirmed by a gas chromatography and mass spectrometry test. The purification took place by means of flash chromatography. Further identification is required.


**PURPOSE:** To evaluate the acute effects of lower extremity self-myofascial release (SMR) using vibrating foam roller, foam rolling, and no foam rolling as a control on triceps surae passive stiffness and active range of motion (AROM) of ankle dorsiflexion (DF) following a 2-minute rolling protocol. **METHODS:** Thirty-four recreationally active and healthy men between 18-30 years (age 22 ± 3 years; height 178.9 ± 6.8 cm; mass 82.5 ± 12 kg) participated in this study. Each subject completed a familiarization session and three data collection sessions with each session consisting of one of the following: vibrating foam rolling, foam rolling and no foam rolling. Subjects foam rolled for 2 sets of 60 seconds with 30 seconds rest. Resistive torque to passively moving the ankle into dorsiflexion (5 °/s) was collected and used to compute passive ankle muscle-joint complex stiffness before and after each intervention. Additionally, DF AROM were collected. Separate condition by time repeated measures analyses of variance (ANOVA) were conducted for passive ankle stiffness and DF AROM. **RESULTS:** No significant difference (p>0.05) in passive stiffness between the conditions was identified by the interaction (F<sub>2,66</sub> = .046, P = .937) and the condition main effect (F<sub>2,66</sub> = .285, P = .683). There was a main effect in stiffness for position of the ankle (F<sub>2,66</sub> = 109.7, P < .000, 95% CI <diff: .46 to .69 degrees). No significant difference was found in AROM between the conditions (F<sub>2,66</sub> = .076, P = .932). **CONCLUSIONS:** This study failed to provide evidence supporting rolling or rolling with vibration to decrease muscle stiffness or increase DF AROM.

40. ^Jasmine Ferguson, ^Nathaniel Tarbell, *Characterization of the Nitrogen Fixing Microbial Community Associated with the Dune Plant Oenothera (Evening Primrose).* Mentors: Heather Joesting and Jennifer Broff Bailey, Biology
The necessity of nitrogen for living things is critical. We hypothesize that because sand is nutrient poor, dune plants compensate by associations with nitrogen fixing bacteria and/or archaea. These microbes may be found associated with the plants’ roots. Nitrogen fixers produce the enzyme nitrogenase (encoded by the nifH gene) which catalyzes the reduction of N₂ to ammonia, a form of nitrogen plants can use for biosynthesis. To test whether dune plant roots associate with nitrogen fixers, four dune plants common to coastal Georgia (Hydrocotyle bonariensis, Ipomoea pes-caprae, Croton punctatus and Oenothera humifisa) were sampled during summer 2015. These samples were collected from Sapleo Island, GA, a barrier island located in central coastal Georgia. DNA was extracted from 2 root subsamples of 5 individuals for each plant type. DNA extracts were screened for the presence of nitrogen fixers using a nifH-specific PCR assay. nifH PCR products were consistently amplified from Oenothera humifisa specimens and sequence analysis confirmed that the amplicons represent nifH sequences. To test whether the Oenothera dune plants consistently associate with nitrogen fixers over a geographical range, 2 root subsamples of 5 Oenothera individuals were then collected during fall 2016 from Tybee Island, GA (a barrier island located to the north of Sapelo Island, GA) and PCR screened. nifH PCR products were produced from each individual. Sapelo and Tybee nifH products are in the process of being cloned and sequenced to test whether different Oenothera individuals associate with a specific nitrogen-fixing microbe.

41. **Madison McLendon, **Ashley Cromley, *The Effects of Intensive versus Distributed Speech and Language Services in Aphasics.* Mentor: April Garrity, Communication Science and Disorders

Aphasia is a communication disorder resulting from a stroke, TBI, tumor, or other neurological disorders. An individual with aphasia may present with difficulties in reading, writing, listening, and speaking. Aphasia is a severely disabling condition occurring in 20-25% of stroke patients according to Nouwens et al. (2013), and many of these individuals receive speech/language pathology SLP services. A literature review was conducted to determine the effects of frequency and intensity variables as related to SLP services for individuals with aphasia. Specifically, we reviewed studies of intensive services versus distributed services to determine which is more effective for improving functional communication skills. Intensive services consist of a high number of hours per week over an extended period of time. Distributed services are considered to be “regular” therapy, with patients receiving a lesser amount of therapy per week over a short or extended period of time.

Martins et al. (2013) and Nouwens et al. (2013) suggest intensive services are more beneficial for regaining functional communication skills. Dignam et al. (2015) suggests that distributed services resulted in more improvements on different standardized tasks, as well as improvements in communication effectiveness, communication confidence, and communication related quality of life. Additional research is needed to determine if one of these approaches is definitely superior to the other for contributing to improved functional communication skills among those with aphasia.

42. *Teresa Durham, Saiore.* Mentors: Robert Terry and Lisa Dusenberry, Languages, Literature and Philosophy

Saiore is an interactive fiction story about a father and mother being magically absorbed into a mystical book. They get to make choices that influence what happens inside the book’s realm,
whether the result that affects the outcome be negligible or substantial. I was assigned this project last semester in a prototype class, Writing Strategies for Game Design instructed by Professors Dusenberry and Terry. Our textbook was Writing Interactive Fiction with Twine by Melissa Ford. Since submitting my game, Saoire, for my class final, I have improved the narration and coding to enhance the player’s experience.

The process was lengthy. Originally, I had a very basic storyline beginning and ending in just the book’s realm. My characters lived only in the book realm. The characters did not have an existence as an actual father and mother in the “real” world or, in other words, before they were absorbed into the magical book. I went through several drafts involving coding, narration, or editing. I had a multitude of issues with printing the name typed into the game using a macro called “(print: Sname).” It allows the player to type in whatever name the player wants. Another difficult process was an array macro that lets the player have a smaller and immediate amount of agency. There were only two brackets missing in my code but it caused a failure to appear. I am satisfied with the outcome on both the text of the story and the fixed coding.

   Mentor: Sarah Gray, Chemistry and Physics

Since the industrial revolution anthropogenic carbon dioxide (CO₂) emissions have risen exponentially. Atmospheric CO₂ can dissolve in the ocean and when this occurs there are two main negative effects: acidification, and competition of shell-growing organisms for carbonate ions. The Savannah salt water marshes provide for human and biological consumers by functioning as nursery habitats and breeding grounds, flood, storm, and shoreline protection, filters for heavy metals and other toxins, and as areas of recreation. The research conducted by undergraduate chemistry student Caitlynn King, under the advisement of assistant professor Dr. Sarah Gray, aimed to collect data in order to determine the anthropological, seasonal, and regional impact on the concentration of dissolved CO₂. Sensors were used to collect readings on salinity, water pressure, temperature, and dissolved oxygen. Each sensor was calibrated in the lab before being deployed in the field. Sensor housings were engineered to protect sensors when they were to be deployed in harsh environments or for prolonged periods of time. These housings were tested for sensor disruptions or interference off a floating dock at the Rodney J. Boat Ramp in Savannah, GA. All housing test data collected confirmed that the housings could be used in the future to continue to collect data. This research and project start up is to be presented via a poster at the Armstrong State University student scholar symposium. This project is ongoing and is meant to be continued by future research students in close collaboration with Dr. Gray.

44. Anthony Canga, *Determining if Noxo 1 Binds to TRADD and RIP1.* Mentor: Nicole Davis, Chemistry and Physics

NADPH oxidase (NOX) enzymes are important intracellular sources of reactive oxygen species (ROS), which take part in basic cellular functions such as cell signaling, immune responses, and apoptotic and necrotic cell death. There are seven forms of NOX enzymes that have been identified. One form, the NOX 1 enzyme complex, located on the cellular membrane of epithelial cells in the gastrointestinal (GI) tract, has been of interest due to its involvement in aggressive cancers of the GI tract. The NOX 1 enzyme is activated through the formation of a complex with the p22phox, Noxo 1 (NOX organizer 1), and Noxa 1 (NOX activator 1) proteins to
produce ROS. NOX 1 has been shown to have a relationship with tumor necrosis factor (TNF), an important signaling protein that induces several important cellular responses, e.g., apoptosis and necrosis. The relationship between TNF and the NOX 1 complex involves the TNF receptor 1 (TNF-R1) complex. TNF-R1 is activated through the formation of a separate complex that includes TNF-R1-associated death domain protein (TRADD), receptor interacting protein 1 (RIP1), and Rac1 protein. Not much is known about the interaction of the NOX 1 complex with the TNF-R1 complex, but it is thought to involve the Noxo 1 protein in some way. The purpose of this research is to determine if the Noxo 1 protein binds to proteins, specifically TRADD and RIP1, in the TNF-R1 complex.

45. ^Taylor Standard, *Determining DNA Methylation of Channel Catfish Across Geographic Barriers and Distance*. Mentors: Jay Hodgson and Aaron Schrey, Biology

I researched the effects of the environment on the epigenetic states of channel catfish. Epigenetics is the regulation of gene expression by other means than manipulating the genetic sequence. One of these methods of gene regulation is through DNA methylation. Variations in DNA methylation can cause differential gene expression in organisms. The research investigated changes to the epigenetic states by DNA methylation between the northern and southern channel catfish as well as above and below dams along rivers. In part of this research, I used several techniques dealing with DNA sequencing and identifying different patterns of DNA methylation. I hypothesized that DNA methylation will vary based on environmental conditions; namely, latitudinal climate differences and the presence of dams. The catfish will be screened for variation in DNA methylation using epiRADseq on an Ion Torrent PGM next-generation sequencer. I found DNA methylation differences among individuals from northern and southern locations and among individuals from above and below the dam. Given that the environment constantly changes, this study may provide information about the role DNA methylation plays in an organism’s response to the environment.

46. ^*Elias Frazier, “Sticking It to The Man”: Aggression and Retaliation Against Authority Figures*. Mentor: Ho Huynh, Psychology

Prior research has demonstrated that people’s aggression levels can be manipulated by setting their expectations at different levels. In the work world, it is well documented that when someone gets fired they may react in a very negative and aggressive way. The common questions to deal with this problem is figuring out how to inform the person and when to tell them they are being fired. A study done by Huynh (in prep) found that there was no difference in aggression when it came to being told they had a 90% chance of being “fired” versus being told they had a 50% chance being “fired”. Our current study attempts to extend these findings using a different aggression measure. We hypothesized that people will be the most aggressive when their expectations are met (i.e., expect to get fired and got fired) compared to when outcomes fall short of their expectations (expect to be retained, but get fired). We found that people tended to feel worse when their expectations were set high. This supports the notion that bracing individuals for the worse seems to be the best way in helping them deal with negative news.

47. Rachel Thompson, *The Effects of Dams on DNA Methylation of Channel Cat sh*. Mentor:
Aaron Schrey, Biology

Epigenetic phenomenon are modifications on the genome, including histone modification and DNA methylation, that affect gene expression. One area where epigenetic mechanisms may play an important role is an organisms response to stress. We are studying channel catfish and how they are affected by a stressful environment caused by anthropogenic habitat modification. Specifically, we are interested in epigenetic differences between channel catfish upstream and downstream of a dam. Dams disrupt channel catfish habitat and may act as environmental stressors. If we can understand how stressful environments affect catfish, we will gain a better understanding of organismal response to stress in general, and more specifically the role epigenetic mechanisms play in the response to stress. We are using epiRADseq to measure DNA methylation among samples of catfish collected above and below dams.


The goal of this research project was to explore biochemical outcomes that occur due to stress using the model organism zebrafish (Danio rerio). Fish were subjected to vibration stress as follows. One set of subjects, following handling acclimation for 4 days, was exposed to a 60 Hz vibration for one 5-minute session per day for four days, using a percussion apparatus. A second set was placed in the vibration chamber but not exposed to vibration (control), and a third set (internal control) remained in the housing unit as a home-tank, non-stressed control.

Following the experiment, fish were anesthetized and brains were dissected out. Using Western blot analysis, expression of Heat Shock Protein 70 (HSP70) and actin was investigated. HSP70 is a postulated stress protein in zebrafish, and we hypothesized that HSP70 would increase in response to stress. Actin was used as a protein loading control for Western Blot.

In the future, we plan to explore behavioral effects of stress by utilizing the Novel Object Recognition Test. We anticipate that stressed fish will not explore a novel object as much as a non-stressed fish would. This research was supported by a Teaching and Learning Grant to Keri Mans, and an Undergraduate Research Grant to Henning Schein.

49. **Stephanie Hooper, **Mande’-kan Mendes, Adolescent Suicide and Cyberbullying. Mentor: Sara Plaspolh, Health Sciences

Suicide is a serious concern both in the United States (US) and globally, with the World Health Organization (WHO) estimating that more than 800,000 lives are lost annually in this fashion. Due to their prevalence, mental health concerns like suicide are among the leading health indicators of Healthy People 2020. Certain age demographics, like adolescents, may be at greater risk of suicide ideation or attempt. In 2013 the Centers for Disease Control (CDC) reported suicide as the third leading cause of death for individuals between 10-24 years of age, highlighted by a country-wide survey showing that 17% of US high school students reported having seriously considered suicide, 13% admitted to having a concrete self-harm plan, and 8% stated that they attempted suicide. Many factors have been correlated with suicide ideation among adolescents including depression, gender, social isolation, internet use, and peer-victimization. One newly emerging research area that is gaining attention is the association between cyberbullying, or the use of electronics and the internet for peer-victimization, and self-
harm in young adults. The purpose of this research was to conduct a literature review of numerous peer-reviewed publications to examine the relationship between cyberbullying and suicidal tendencies in adolescents. The research showed that suicide ideation in young adult populations seems to be influenced by multiple factors, one of which is peer-victimization through cyberbullying. However, the perceived connection between cyberbullying and suicidal tendencies in adolescents warrants further studies with different methodologies to better understand the full impact of this specific relationship.


Aphasia is a disorder that results from damage to parts of the brain that control language production and comprehension. Anomia, a difficulty in retrieving words, is one of the most common and pervasive difficulties in individuals with aphasia. Recently, treatment studies have examined remediation of these word-finding difficulties. Treatment in these studies often focuses on two types of intervention: semantic and phonological. Semantic Feature Analysis (SFA) is thought to improve naming by strengthening semantic representations (i.e., word meaning) to facilitate word-retrieval. Phonological Components Analysis (PCA) aims to strengthen representations at the level of the word form (i.e., sounds in the word).

A literature review was conducted to determine which of these approaches is more effective. We reviewed three studies that examined the effects of SFA and PCA on individuals with anomia as a result of aphasia. Van Hees, et. al (2013) explored the two therapies to determine which one is most effective for improving word-finding abilities. A similar study by Hashimoto (2012) utilized both semantic and phonological cues to assess naming accuracy. Leonard, et. al (2008) incorporated PCA treatment to assess naming ability in individuals with anomia. The results of these studies, taken together suggest that the individual’s place of breakdown in word retrieval has bearing on which treatment will produce optimal results. With regards to the clinical question, both therapies were proven to be effective in treating individuals with naming impairments.

51. Elizabeth Wright, Strep Throat to Septic Shock. Mentor: Rhonda Bhevis, Respiratory

This presentation is case study on a patient diagnosed with community acquired strep throat. The patient failed to take the antibiotics prescribed and the disease process spiraled downward. This case study focuses on the hemodynamic problem associated with presenting illness and complications. Furthermore, I explain the biochemistry related to why the medications being used to treat the patient are causing the patient’s critical lab values to be outside of normal ranges.

52. ^Diego Garcia Akiyama, PLA/HA Internal Fixation System for Long Bone Fracture Repair. Mentor: Cameron Coates, Engineering Studies

Metallic alloy implants have been the conventional method used for long bone fracture repair, even with the adverse complications that trail its use. This research focuses on determining the material properties of a 3D printed biocompatible and partially biodegradable
composite. This material has shown promising properties as an effective internal fixation system for long bone fracture repair. The composite is comprised of Polylactic acid (PLA), a biodegradable polymer, and Hydroxyapatite (HA), a biocompatible ceramic. The addition of HA reinforces the PLA as well as providing the characteristic of osseointegration which encourages the bone to grow into the implant once the fixation has been placed. PLA/HA has thus far been typically processed by injection molding. The long-term goal is to compare the material properties of 3D printed PLA/HA with those of conventional manufactured PLA/HA. If the 3D printed material properties are comparable to or better than conventionally manufactured HA/PLA material properties, there is potential for significant cost savings within the medical industry. After the synthesis of the composite, the next step is to 3D print a specimen to the geometries and tolerances specified by the American Society of Testing and Materials (ASTM) standard 1345 for the experimental determination of yield strength, tensile strength and Young’s modulus (modulus of elasticity). Samples will then be mechanically tested under standard environmental conditions.


Our objective is to research how energy is converted from water flow through turbines into electric power through hydroelectric dams. With this objective, we are observing the benefits and weaknesses that occur in these hydroelectric systems. Dams have been used throughout history and the world to translate hydrokinetic energy into environmentally friendly, renewable energy. This energy through various techniques can be harnessed and utilized to the benefit of human-beings. The most common and conventional means of translating and converting the energy is through some type of turbine system. This normally takes circular, rotational motion and translates it to a perpendicular direction. There are approximately 80,000 dams in the U.S., but only three percent of them currently generate electricity. [1] Most dams are built on rivers and are used to collect and release water. Often the dams are located where there is a drop-in elevation, where the potential energy can be used to produce clean renewable energy. Once dams are constructed and are up and running, they can be utilized for decades, but most dams are very expensive to build and still require scheduled maintenance over time to prevent failure. Failure of dams still happen in modern day. We are going to observe the Hoover Dam in the U.S. and the Three Rivers Gorge Dam in China. Overall, the goal of this project is to observe how the hydroelectric system within a dam operates and determine if the system is beneficial enough to consider as a primary power source.

References

54. **Jason Ziegler, *Lenses on Literacy: Case Study of a Struggling Elementary Reader*.**
   Mentor: Anne Katz, Childhood & Exceptional Student Education

The purpose of this research was to analyze data and determine strategies that work best to support a struggling reader at the elementary level. This case study represented a combination of both qualitative and quantitative data collection and analysis in order to determine the
students’ current reading and spelling levels, his specific skills and reading strategies, and his needs to progress as a literacy learner. From a qualitative lens, the study examined the students’ family background, developmental milestones, early language and literacy development, school history, and personal interests through the use of in-depth interviews with the student and family members. The quantitative data collection consisted of administration of a running record, spelling inventory, and sight word lists to monitor and assess the students’ progress and to determine a baseline for initial instruction. Once the data was collected and analyzed, results indicated the students’ strengths and future reading needs. The assessments reflect an improvement in building reading strategies and word recognition skills. The mastery word lists from the running record display strengths in sight word recognition, comprehension, and fluency. The spelling inventory shows growth in his phonemic awareness and decoding abilities. By administering and analyzing a range of reading assessments, the literacy practitioner can apply data and insights, creating a research-based plan for instruction to transform a struggling reader into a confident, successful reader.


Perforin (PRF) is an immune pore-forming protein secreted by cytotoxic T lymphocytes and natural killer cells. The crystal structure of mouse PRF was recently determined and shows structural homology with a family of bacterial pore-forming proteins known as cholesterol-dependent cytolysins (CDCs). Perfringolysin O (PFO) is a member of the CDC family that has been used to determine the pore forming mechanism. The mechanism involves a vertical collapse of the protein that brings two transmembrane β-hairpins (TMHs) to the membrane surface so the oligomer can form a β-barrel pore that is capable of penetrating membranes. The structural similarities between PRF and PFO suggest that the helical bundles in PRF may collapse and refold in a way similar to PFO. To identify these regions are functional, we have constructed chimeras composed of PFO with one TMH region replaced with the putative TMH region of PRF. The chimeras retained significant activity when compared to PFO. These results strongly suggest the putative TMH region of PRF functions in a manner similar to the TMH region of PFO, indicating this region is responsible for membrane insertion.


Epigenetics mechanisms allow organisms to modify their genome function without changing the DNA sequence of the genome. Epigenetic modifications can be induced to change by the environment. Once induced to change, epigenetic modifications can alter phenotypes, which allow an organism to adjust to the immediate environmental stressors. An excellent biological system in which to study the effects of epigenetic mechanisms on phenotypes is the house sparrow. House sparrows are one of the world’s most broadly distributed species. They have successfully adapted to multiple different habitats. We performed epiRADseq with an Ion Torrent PGM to measure differences in DNA methylation from house sparrows sampled across the world. Our objective is to see if DNA methylation was changed based on the environment where the house sparrows were collected.
57. **Thomas Ewing, Does Fire History Change DNA Methylation for the Florida Sand Skink and Six-Lined Racerunner?** Mentor: Aaron Schrey, Biology

Florida scrub is a highly threatened habitat. This habitat has been fragmented and greatly reduced in size since 1960. Further, Florida scrub is fire dependent, requiring intense fires on a 5-100 year timeframe. These fires alter the habitat and different habitats may be stressful to lizards. For example, the Florida Sand Skink prefers long unburned habitat, while the Six-lined Racerunner prefers recently burned habitats. Epigenetic mechanisms may impact an organism’s ability to respond to stressful environments. Thus, we hypothesize that there will be greater epigenetic variation in DNA methylation in the non-preferred habitat for these species. To test this hypothesis, we will use epiRADseq to measure DNA methylation among samples of each species from sites with different fire histories.

58. **Tressia Quattlebaum, Guernica: An Artistic Narrative of the Spanish Civil War.** Mentor: Grant Gearhart, Languages, Literature and Philosophy

Throughout history many mediums have been used to narrate a specific event or time period. Guernica, a painting by Pablo Picasso, accomplishes this impeccably. The elements of this painting are in accordance with the narrative theory as presented by Luis Gerardo Chavez Godinez. The narrative theory is the idea that human beings have the need to tell a story in order to express themselves during certain experiences or events in their lives. The means by which they do so are not limited to an actual story that is written, but can include song, dance, and art. The painting Guernica contains the elements that make up a narrative including a narrator, a plot and characters. With his work Guernica, Pablo Picasso, in accordance with the narrative theory, tells the story and personifies the pains of the Spanish Civil War. The research on this topic paints a clear picture of not only the disturbing nature of the Spanish Civil War, but even the manner in which Pablo Picasso found out about this attack on a little town called Guernica. The purpose of this project is to highlight the elements and clues that Pablo Picasso left in the painting for the viewer to make their own complete narrative.

59. **Ariana Cheas, Biochemical Effects of Withdrawal-Induced Stress in Danio Rerio.** Mentor: Keri Mans, Physical Therapy

Nicotine has been shown to have anxiolytic effects on the nervous system. However, among other risks that accompany nicotine usage, it is known to be a highly addictive substance associated with increased stress upon withdrawal. In this project, adult zebrafish (Danio rerio) were exposed to 15uM nicotine twice a day for two days, followed by twice a day administration of 20uM nicotine for two days (to account for tolerance mechanisms). This dosage of nicotine administered over a four-day period of time is shown to be enough to elicit the desired addictive effect of nicotine on the zebrafish nervous system. Following treatments, fish were withdrawn from the drug for 2 days. Experimental control fish were vehicle-treated, and a home-tank untreated control was also used as an internal control for each cohort. To investigate induced stress, expression of stress-related protein heat shock protein-70 (HSP70) was examined via Western Blot. We hypothesized that HSP70 expression would increase in the stressed fish compared to control fish. The behavioral effects of this stressor will later be observed via the Novel Object Recognition Test. We hypothesize that stressed fish will be less exploratory of new objects. This
research was supported by a Teaching and Learning Grant to Keri Mans and an Undergraduate Research Grant to Ariana Cheas.


Bitcoin was introduced in 2009, and by 2015 had surpassed 5 billion US dollars in transactions. In economics, currency is understood to have three major functions: serve as a medium of exchange, store of value and unit of account. Bitcoin is considered as several different classifications of currency depending on the country regarding it. Some call it a private currency, others- a commodity, and most are waiting to see where the virtual coins go in the coming years. Bitcoin is known for its low transaction prices and anonymous nature. The coins have flexibility that physical currency does not- automatic divisibility and no inflationary pressure. This system also saves on production costs, transportation, and costs incurred by banking. Working against that is the coin’s rarity, lack of regulation, volatility, and security issues.

According to Ciaian, Rajcaniova, and Kancs, there are three assumed drivers of Bitcoin prices: market forces of the coin’s supply and demand, the attraction aspect, and global financial developments. It was determined that the attractiveness variable was most detrimental to the price when econometrically calculated with daily time series data. The positive and negative media has proven to change the price of the coins. In conclusion, Bitcoin is believed to fall victim to price changes generated by speculative investing, which will make it a less attractive and volatile form of payment… too volatile for daily use. We have set out to alter CRK’s experiment to see if we get the same results.


*Hematodinium perezi* is a dinoflagellate parasite that can infect several crab species, notably the Atlantic blue crab (*Callinectes spadious*). Past declines (1998-2003) in blue crab populations along coastal Georgia have been attributed to *Hematodinium* infection and were correlated with drought. This decline impacted local commercial fisheries. In an effort to initiate new studies regarding *Hematodinium*-blue crab interactions, we sought to determine the current incidence of the parasite in local blue crab populations. Blue crabs were collected from the Wilmington River at Priest Landing Marine Facility in Savannah, GA during November 2016. Small aliquots (10μl) of the crabs’ hemolymph were collected prior to their release. DNA was extracted from the hemolymph and quantified using a Qubit fluorometer. The DNA samples were subjected to PCR using primers designated to specifically amplify the 18S rRNA gene of the *Hematodinium* parasite. Each PCR run contained a positive and negative control to test for identification and contamination. Gel electrophoresis was utilized to determine if the corresponding ~187 bp *Hematodinium* PCR product was amplified from a given crab. Results of the gel electrophoresis determined that 18.5% of the 27 screened crabs contained *Hematodinium*. For comparison, at the same sampling site, ~ 40% of blue crabs were infected with *Hematodinium* in November 1999 (Frischer et al., 2006). Additional crabs will be screened for *Hematodinium* to determine the current incidence of the parasite.

Huynh, Psychology

For the past decade, America, has been subject to a firm and biased belief that the worshipers of the Islamic religion are bad people. In this study, we examine whether people’s religious practices (frequency of prayer) affects how Americans would interact with people from the Middle East. Participants read a vignette about a family from Aleppo, Syria. We randomly assigned participants to one of two passages: 1) a family who prays every day or 2) a family who prays every week or so. We measured participants’ desire to socialize with the family using Bogardus social distance scale. We hypothesize that participants will want to socialize more with the family who prays less frequently, especially if participants identify as a Christian or Republican. These results will shed light on people’s beliefs about religiosity.

63. Amanda Alai, What Students Miss When Books Are Banned. Mentor: Anne Katz, Childhood & Exceptional Student Education

Every day, parents, teachers, administrators, school board members, and other individuals in the community try to challenge or ban a book from libraries and/or the curriculum. Books are singled out for a variety of reasons, such as the use of offensive language, racism, sexual content, or political viewpoints. While these topics may be considered “taboo” for schools and community libraries, the content and topics contained in these texts can include valuable life lessons that students need the opportunity to learn about and reflect upon. The world is a diverse place, with different types of people, cultures, and places; books are a valuable tool that allows students to explore issues and decide on their stance. If a book is taken away from a school, or removed from a library, how will our students learn about the world outside of those walls? This poster presentation will explore how parents, teachers, and students can learn through the lenses of banned books, and the problems posed when that book is removed. This poster will display examples of banned books across the years, and provide viewers with a rationale for why they were banned. Attendees will be able to view some books to arrive at their own conclusion, and determine how individuals can take action to change the way some books are perceived in schools and libraries.

64. Nick Brodak, Ansley Osborne, Erin Berube, Using a Controllable Promoter to Evaluate Proteins Involved in Vesicle Transport in Fungal Cells. Mentor: Sara Gremillion, Biology

Filamentous fungi expand their cells into new environments in search of food and mates. On a cellular level, new growth is maintained by the continuous delivery of cell wall and plasma membrane materials from the Golgi apparatus via vesicles. In order to maintain proper Golgi function, this organelle must continually recycle membrane and proteins lost by departing vesicles. The Conserved Oligomeric Golgi (COG) complex is a tethering complex involved in the retrograde transport, or recycling, of vesicles within the Golgi. Using a controllable promoter called AlcA, we evaluated subunits of the COG complex to determine their role in supporting fungal growth. Through molecular techniques, COG subunits 3, and 8 were determined to be essential for cell function, while subunits 5 and 6 were not.

**Background:** Squat exercises serve as a functional movement used in daily activities, such as cleaning, dressing, and toileting. The activation and coordination of various muscle groups ensures that every day activities can be completed efficiently and without pain. This literature review examines the evidence regarding the muscle activation of the front, back, and overhead squat to determine which squat type best activates and strengthens the quadriceps muscles. Ideally, the squat exercise should maximize safety, while minimizing stress on the knees and lower back, and be easy for all age groups to perform.

**Hypothesis:** The author thinks the front squat exercise will be the most effective at activating the quadriceps muscles compared to the other squat techniques.

**Methods:** Key search terms, such as “squats,” “muscle activation,” and “electromyography,” were typed into PubMed, Medline, and Google Scholar. The articles which best met the inclusion and exclusion criteria were selected for this literature review.

**Results:** The literature demonstrated front squats to be the most effective in activating quadriceps muscles, while the load of back squats placed the most stress on the lower back and hips. Additionally, overhead squats were shown to be effective for developing shoulder strength and hip, knee, and ankle mobility.

**Conclusion:** Overall, one should perform front squats to strengthen the quadriceps muscles in the thigh and around the knee for better execution of daily activities.


The design of any rocket engine poses difficult problems for engineers, largely with respect to thermodynamics. We will explore how thermodynamics fits within the broad range of requirements a rocket has such as power, efficiency, and reliability. Mass flow and heat transfer, for example, are central to an engine’s function. The Merlin Engine, developed by SpaceX, uses a gas-generator power cycle to develop thousands of pounds of thrust. In the Falcon 9, tens of thousands of gallons enter and exit the engine assembly in the first 5 minutes alone. Where does the Merlin Engine waste energy, and how does this compare to other rocket engines? What changes has SpaceX made, and why have those changes improved the performance of the engine? For over a decade, the engine has served as the powerhouse of the retired Falcon 1, currently operational Falcon 9, and proposed Falcon Heavy. SpaceX has developed and refined the Merlin Rocket Engine to lift their launch vehicles. From the Merlin 1A to the Merlin 1D, SpaceX has increased thrust to achieve more efficient launches, reduced unnecessary weight of the engine, and recently begun using unprecedentedly cold propellant. Our research will focus on how the engine functions and how thermodynamic concepts are used within function and design up to the current iteration of the engine- the Merlin 1D.

There are two primary types of cervical carcinomas, squamous cell carcinoma and adenocarcinoma (Wesola & Jelen, 2015). Squamous cell carcinomas make up about 70% of all cervical cancers. Solely in women, cervical cancer affects a wide age range. (Castillo et al., 2016). Though the cause of cervical cancer is unknown, researchers have found correlations between cervical cancer, sexual behaviors (Rideaux, 2016), the Human Papillomavirus (Cheah, Koh, Nazarina, Teoh, & Looi, 2016), and atypical glandular cells (Wang et al., 2016). Pap smears are a recommended screening device (Castillo et al., 2016) which can detect cervical cancer, dysplasia, preinvasive cancers, and intraepithelial lesions (Cheah et al., 2016; Wang et al., 2016). In later stages, cervical cancer can metastasize, or spread, to organs and lymph nodes. The tolerance doses of critical structures must be identified and considered during treatment planning to provide the patient with the best quality of life (Rideaux, 2016). Treatment options mentioned in this literary review include but are not limited to surgery (Rideaux, 2016), IMRT (Marnitz et al., 2015), chemotherapy combined with radiation therapy and brachytherapy (Rose et al., 2011), chemoradiation followed by brachytherapy (Viswanathan et al., 2012), photon radiation therapy (Wakatsuki et al., 2016), and external extended field radiation therapy (Yoon et al., 2015).

68. ^Maria Huynh, Site-Directed Mutagenesis of Green Fluorescent Protein. Mentor: Nicole Davis, Chemistry and Physics

Green Fluorescent Protein (GFP) is a bioluminescent protein that is found in the jellyfish Aequorea victoria. GFP is useful for the visualization of proteins that allow scientists to have a better look at the inner workings of a living cell. When GFP is exposed to ultraviolet light, it emits a bright green light. This fluorescent light is due to an internal chromophore, which is formed within the protein upon cyclization and oxidation of amino acids Serine 65 (S65), Tyrosine 66 (Y66) and Glycine 67 (G67). It has been previously determined that changing one or sometimes two amino acids, especially those present in the chromophore, can change the color that GFP fluoresces. The goal of this project is to mutate GFP so that it fluoresces different colors. The planned mutations include: Y66H, which will emit a blue fluorescence, Y66W a cyan fluorescence, and the combination of S65G and T203F a yellow fluorescence. Once the mutations have been created, their biophysical properties will be characterized. This project is in collaboration with the teaching lab BCHM 3811, Introduction to Biochemical Techniques. The mutant GFP proteins created from this project will be added to an existing lab exercise in BCHM 3811, which will help serve the new Biochemistry major.


Right hemisphere damage (RHD) is a cognitive impairment that is a direct result of neurological injuries such as, cardiovascular accident (CVA) or stroke, traumatic brain injury (TBI), and brain tumors. Many areas of language and communication can be affected by RHD. For the purpose of this project, the focus will be on deficits related to prosody (Blake, Frymark, & Venedictov, 2013, p. 155). Prosody can be defined as, “the overall tone of voice one uses to express emotions and attitudes” (Myers, 1999, p. 221-222). A comparison will be made between the effects of cognitive-linguistic versus motoric-imitative therapy on individuals with RHD with
regards to emotional prosody. Cognitive-linguistic therapy involves the usage of verbal and visual modalities, whereas motoric-imitative therapy focuses on the use of verbal prompts to facilitate prosody. The purpose of this comparison is to determine which intervention approach is more effective for increasing comprehension and production of emotional prosody.

A literature review was conducted to find relevant studies of these intervention approaches. Studies suggest that both cognitive-linguistic and motoric-imitative therapy have mixed results regarding treatment of aprosodia (deficits in emotional prosody). While some research articles mentioned the effectiveness of both cognitive-linguistic and motoric-imitative treatment methods, others reported little to no generalization of both methods of treatment. One central idea was common in all reported outcomes of cognitive-linguistic and motoric-imitative treatment: that one treatment was no more effective than the other. Clinicians must consider the population that they are treating and whether verbal modalities, visual modalities, or a combination of the two would be most appropriate for that particular client.

70. **Khatiga Nasir, Disparities Faced by Minority Women in the U.S. While Obtaining Services for Sexual Health. Mentor: Sara Plaspohl, Health Sciences

Healthy People 2020 is a well-established national initiative to improve the health and quality of life for Americans. One of the goals of Healthy People 2020 is to eliminate racial disparities. There are many reasons to why minority women face disparities compared to white women when getting access to health services for their sexual health. According to a review of evidence-based literature, some of these reasons may include lack of insurance coverage, lower income, and lesser education. Minority women receive less reproductive medical assistance. The rate of which white heterosexual women seek out medical help is almost double than those of any other group. Also, heterosexual women get coverage through their marriage but a lot of same-sex couple women do not. Social support networks can have a great influence on health as well. Such networks can be limited in minorities such as same sex couple who are Hispanic. Thus access to medical care is not equal across all races and all sexual orientations of women.

71. Angie Lowe, Adenocarcinoma of the Pancreas. Mentor: Laurie Adams, Radiologic Sciences

Pancreatic cancer is a deleterious disease in which individual cancer cells grow uncontrollably and aggressively through local invasion from the pancreas to nearby structures. Hematogenous spread is common due to the close proximity of the superior mesenteric artery and portal vein. Ductal adenocarcinoma of the head of the pancreas is the primary histology and accounts for 85% of all cases. Pancreatic cancer is the fourth leading cause of cancer death among both men and women in the United States and is one of the deadliest malignancies worldwide. Despite advancements in treatment techniques, the 5-year survival rates are less than 8% across all stages. Nonspecific symptoms leading to a later diagnosis contribute to the poor prognosis. Total resection is the treatment of choice with the most common curative surgical procedure a pancreateicoduodenectomy, or Whipple procedure. Analysis of the literature reviewed indicates that a multidisciplinary treatment approach is warranted to combat this deadly disease. This research elaborates on the aspects of pancreatic cancer including clinical presentation, detection and diagnosis, and treatment planning with an emphasis on radiation therapy.
**Tevin Duncan, *Obesity means having too much body fat...or money?* Mentor: Sara Plasohl, Health Sciences