Georgia Undergraduate Research Conference

ABSTRACTS

Learning Through ***Research***

Symposium on undergraduate research

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Student union Ballroom & Theatre

URC
VALDOSTA STATE UNIVERSITY
UNDERGRADUATE RESEARCH COUNCIL

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Georgia Undergraduate Research Conference

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Oral Presentations

Abandoning Ariadne: Visual Variations of Myth in Art

Marybelle Caldwell
Sponsor: Dr. Glenda Swan
Valdosta State University

Ariadne, the daughter of the King of Crete, is known for giving Theseus, an Athenian hero, a ball of thread to navigate the maze that King Minos used to contain the Minotaur. After successfully defeating this monster, Theseus leaves Crete with Ariadne by boat. However, before returning to Athens, most myths record that Theseus abandons Ariadne on the island of Naxos. Various interpretations and impacts of this act are found in ancient Greek texts and, most vividly, in art. An Athenian vase by the Syleus Painter, made during the Early Classical period of ancient Greece, alters the myth to soften the image of this Athenian hero by portraying Theseus' abandonment of Ariadne as reflecting the will of the gods. The painter depicts Athena, the patron goddess of Athens, forcing Theseus to abandon Ariadne while Dionysos, the god of wine, guides Ariadne away to soothe her sorrows by becoming her new lover. Another much later reinterpretation of the myth is evident in Eugene Delacroix's 1863 painting from the Romantic art movement titled The Autumn – Bacchus and Ariadne. This depiction portrays Theseus's abandonment of Ariadne on the island of Naxos while transitioning into her cordial rescue by Dionysos, who is also known as Bacchus. Delacroix's palette, brushwork, and composition conveys both the pain and loss that Ariadne suffered by Theseus' abandonment as well as the promise of a new life with the god. While the Romantic emphasis on feeling is clear in the work, the myth is also employed as an allegory for the season of fall. Both works show how artists during and after the time of ancient Greece effectively and creatively reimagined these myths to speak more effectively with their own time and place.

A Co-Culture Between Genetically Modified C. minutissima and E. coli for Efficient Biofuel Production

Devadutta Balaji, Aliyah Bujung, Elizabeth Plumart, Chloe Benjamin, Pierre Manuel, and Bita Ongolo
Sponsor: Dr. Matthew Brewer
Georgia State University

Climate change is largely driven by the combustion of fossil fuels that increase the amount of carbon in the atmosphere, but recent studies show that biofuels offer a carbon-neutral solution. Microalgae can be used to produce biofuels while consuming harmful environmental agents, such as carbon dioxide and wastewater (Li, et all, 2008). The main disadvantage to using microalgae is the low biomass concentration (Pienkos, Laurens, Aden). According to a study performed by Higgins and VanderGheynst in 2014, mixotrophic cultures of the algae Chlorella minutissima in wastewater, simulated using E. coli, can improve microalgae biomass and lipid production. Our goal is to create a synthetic biology system that will increase lipid production from microalgae to serve as an intermediate in chemical reactions needed to create biofuels. Specifically, we will create a co-culture between C. minutissima microalgae and E. coli to increase the cell density of C. minutissima. To increase C. minutissima's growth rate, E. coli will be genetically modified to produce indole-3-acetic acid (IAA). C. minutissima will be genetically modified to express glycerol-3-phosphate acyltransferase (GPAT), lysophosphatidic acid acyltransferase (LPAAT), and diglyceride acyltransferase (DGAT) to increase lipid production. We hypothesize that these factors will create a dense algae population with high lipid content, providing ideal parameters for biofuel production.

Affection and Encouragement of Independence from Italian Parents to Children

Regan Mitchell
Sponsor: Dr. Tsu-Ming Chiang
Georgia College and State University

Fathers and mothers often show differing levels of physical affection or promotion of their child's independence. Studies show that fathers tend to promote more independence and give less physical affection. It was also found that the older the child gets, the less physical affection they receive, especially from fathers; however, mothers tend to have more physical affection towards their child, even as the child ages. For couples who are in unhappy relationships, less physical affection is given to their children (Bean, 2005; Best et al., 1994; Grych, 2002; Sorokowska et al., 2021). Thus, the researchers predicted the following: (1) fathers would show less physical affection and more encouragement of independence toward their child compared to mothers; (2) the older the child, the less physical affection they will receive; (3) families with 'good marital status' will give more physical affection to their children.

In a study abroad program, the authors of the present study sought to explore the difference in a mother's versus father's expression of physical affection and independence promotion in Italian culture. Perceived marital status and the child's age were also recorded to examine any correlations among these factors. The data consisted of 19 families (16 fathers, 14 mothers, 14 daughters, and 16 sons) from 8 Italian cities who were observationally studied. Observed levels of physical affection and promotion of one's child's independence were rated on a scale of 0 (none observed) to 4 (highest amount observed). Results show that fathers gave more of both physical affection and independence promotion, and neither the child's age nor marital status had a significant impact on these variables. Detailed results and implications will be further discussed at the conference.

Analysis of Copper-Catalyzed Reaction Mechanisms in Nanoreactor by Accelerated MD

Walker Hayes
Sponsors: Dr. Shafat Mubin and Dr. Todd Martinez
Valdosta State University

Catalysts accelerate chemical reactions by allowing more energetically accessible reaction pathways to occur. These pathways are associated with stages or steps, otherwise known as reaction intermediates. Understanding these intermediates would expand knowledge of catalysis mechanisms.

The type of reaction we researched is copper-catalyzed click reactions which are characterized by their relatively simple reaction requirements. Understanding these reactions in particular would not only advance our knowledge of catalysis mechanisms but also assist the fields of biochemistry and syntheses. Simulating click chemical reactions, however, takes an extremely long time. Because of this, most experiments to study these reactions make assumptions of what the intermediates would be and find the circumstances that fit the assumptions. As such, many sources on click chemistry do not agree on what the intermediate states are.

We use two methods to reduce the time it takes to simulate click chemical reactions. This allows more research to be done on the process in a purely unbiased way. The first method is using Nanoreactor, a state-of-the-art software developed by our host laboratory co-investigator, Dr. Todd Martinez. Through this method, we were able to run multiple simulations in order to determine if the results we achieved were consistent. The second method is to accelerate the Nanoreactor simulations by using Adaptive Hyperdynamics (AHD). AHD was determined to be the best acceleration method to create and break types of bonds we were examining.

Through these strategies, we have found evidence of previously accepted reaction pathways as well as pathways that have not been recorded or hypothesized yet. Through more research, we will be able to determine which pathway is the most energetically accessible and can therefore be generally accepted.

A Novel Approach to the Treatment of Cancer: Accelerate Its Growth

Capri Persaud and Akshil Patel
Sponsor: Dr. Thomas Manning
Valdosta State University

Cancer is a term that includes at least one hundred different diseases, from lung cancer to leukemia. There are two features that most, if not all, cancers share; one of them is the need for energy and the other is the need for molecular-level building blocks. Our drug designs have been focused on providing one or both of these essential ingredients in order to accelerate the cancer's growth rate and, in turn, uptake the drug more efficiently and more selectively. In this presentation, we will discuss two pharmaceutical agents from our group that have entered pre-clinical trials at the National Cancer Institute. The specifics are different in terms of the building blocks and the nutrients but the results are similar. The pharmaceutical agents are more effective against the nine types of cancer tested.

A Novel Complex for Treating Melanomas in Horses

Hannah Sorrow
Sponsor: Dr. Thomas Manning
Valdosta State University

Melanomas in some animals, such as dogs and horses, are not uncommon. For example, up to eighty percent of grey horses will contract melanoma during their life. Many of these melanomas may be benign, but not all (1). We developed a complex that combines the cancer drug Taxol with hydroxychloroquine (an immunosuppressant) that are connected by copper (Cu(II)) ions. This complex was developed in our lab and went through pre-clinical trials at the National Cancer Institute against nine types of cancer, including melanoma. We are testing a spray-on delivery method that includes a special matrix that hardens and allows the drug to penetrate the cancer. The spray-on approach dramatically minimizes the amount of drug given to the animal, which lowers side effects. The direct application also allows for a higher concentration to be applied to the melanoma. The novel drug and its application potential will be discussed.

A Phrenological Reading of Whitman's "Song of Myself"

Ryan Bohn
Sponsor: Dr. Cody Marrs
University of Georgia

American poet Walt Whitman's magnum opus, "Song of Myself," in his expansive collection *Leaves of Grass*, was first published and distributed in 1855 by a phrenology shop. Phrenology is the pseudo-scientific belief that the contour and shape of the skull could determine personality, character, and other traits such as intelligence. Whitman himself had phrenological examinations and believed in the practice devoutly until the end of his life. While there have been scholars who have written on the influence of phrenology on Whitman's oeuvre as a whole, there has been less attention to the specific context of the publication history of the 1855 version of "Song of Myself." Given the inward theme of the poem, as well as Whitman's apparent interest in phrenology, it seems apt to analyze the poem as a phrenologist. By reading the poem through this lens, a greater understanding of Whitman's psyche and intentionality for creating the poem may be illuminated. As Whitman was heavily influenced by his own phrenological chart, it is safe to assume that his writing emphasizing selfhood would reflect the same predisposition. Also, from this viewpoint, the relationship between scientific thought of an era and literature can be better established to emphasize the connection between advancements and art, especially regarding the slippery nature of what is considered scientific veracity.

A Quantitative Analysis of Blood Lead Levels and Associated Risk Factors in U.S. Children

Alivia Johnson and Yudan Wei
Sponsor: Dr. Jianmin Zhu
Fort Valley State University

This study was to identify risk factors associated with increased blood lead levels (BLLs) in U.S. children. Data was obtained from the National Health and Nutrition Examination Survey (NHANES). The sample included 1238 U.S. children aged between 3 and 11 years old in the year of 2015-2016. High BLLs are defined as a lead level in one's blood that is equal to or greater than 97.5 percentile of the study population. Multivariate logistic regression was used to analyze the risk factors associated with high BLLs. The risk factors analyzed included age, gender, race/ethnicity, family income, body mass index as well as second/third-hand smoking, and housing status. The analysis results showed that the older children aged 9-11 years had statistically significant associations with decreased BLLs and second/third-hand smoking was significantly associated with increased BLLs in U.S. children. This study identified significant risk factors associated with increased BLLs in U.S. children, which should be targeted for interventions to improve the health of the population.

A Quantitative Investigation of the Effectiveness of 3D-Printed Plastic Natural Convective Heatsinks Using Computational Fluid Dynamics

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Electronic devices employ heat sinks, which provide cooling of key components, thus improving the reliability and life of these devices. The heat sinks often rely on natural convection, which simplifies the design by not relying on a fan. This maintains a lower air velocity which helps reduce noise. This thermal management solution is cost-effective in comparison to forced convection because there are no additional components, such as a fan to promote heat dissipation. Natural convection heat sinks made of aluminum are typically used for these devices because of the material's high thermal conductivity, which can effectively transfer heat without assistance. Traditional manufacturing methods limit the possible geometries to optimize heat transfer. The objective of this research is to design optimized geometries made of plastic rather than aluminum, so we can take advantage of advances in 3D printing technology because they are lightweight, low cost, and resist corrosion. We use computational fluid dynamics software to create simulations that will predict the heat transfer performances of the heat sink geometries. The generated models compare the overall heat transfer and velocity of the traveling air. Multiple characteristics of the simulations can be refined, including ambient temperatures for a representative electric device and heat flux on the heatsink surface. By developing computational models of geometries with plastic materials we can create shapes that are not possible with conventional manufacturing methods through 3D printing techniques. A quantitative investigation of the effectiveness of 3D-printed plastic natural convective heatsinks using Computational Fluid Dynamics.

Are Eyewitnesses to Crime Reliable?

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As humans, we like to believe that our memory is meticulous. Eyewitness testimonies are often thought to be the most crucial characteristic of a criminal trial. However, eyewitness testimonies are often erroneous. This may lead, especially in jury trials, to the accused being convicted of a crime they did not commit. There are a number of reasons that eyewitness testimony may not be accurate. The reasons may be as simple as poor eyesight, stress, and, most importantly, memory contamination. This paper will examine some of those variables and their effect on eyewitness credibility.

A Study on the Unemployment Rates in the U.S. during the COVID-19 Pandemic by Using Topological Data Analysis and Persistence Theory

Callie N. Reid
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We use tools from Topological Data Analysis (TDA) and Persistence Theory (PT), such as persistence diagrams, persistence landscapes, and bottleneck distances, to analyze data obtained from the U.S. Bureau of Labor Statistics concerning unemployment rates in all the states in the US during the year 2021. We use the package TDA in the statistical computing software R to obtain our conclusions. We are particularly interested in comparing the topological features of the unemployment rates between the state of Georgia and its neighboring states.

Battle of the Sexes: Gender Differences in Achievement and Social-Emotional Functioning

Tammy Byrd
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Researchers have estimated that up to 50 percent of gifted and talented students may underachieve at some point in their school career (Siegle, 2018). Based on previous research (Desmet et al., 2019), we hypothesize that social-emotional functioning, operationalized as motivation, self-perception, and well-being contribute to the underachievement of gifted and talented students. Additionally, research shows that boys may be more at risk of underachieving than girls (Desmet & Pereira, 2021; OECD, 2015). Therefore, we looked at gender differences in achievement patterns. We collected data from 284 students (145 boys), ranging in age from 11 to 13, in the Netherlands. Data were collected through a series of cognitive assessments and self-report surveys. Underachievement was operationalized via discrepancy scores, where students with a predicted achievement (based on cognitive ability) more than one standard deviation below the actual achievement were identified as underachieving. We used analysis of variance (ANOVA) to examine social-emotional functioning among achievers and underachievers and determine if there were any gender differences. First, we found a two-to-one ratio with boys underachieving at higher rates than girls. Second, underachievers ($M = 61.69$, $SE = .37$) reported lower social-emotional functioning than achievers ($M = 65.44$, $SE = .89$). A one-way ANOVA demonstrated that these results are statistically significant ($F(1, 265) = 15.224$, $MSE = 30.743$, $p < .001$). Lastly, when comparing motivation, self-perception, and well-being our findings showed that motivation had the largest effect. Underachievers ($M = 59.610$, $SE = .766$) reported lower motivation than achievers ($M = 61.755$, $SE .841$). A one-way ANOVA demonstrated that the results were statistically significant ($F(1, 265) = 13.775$, $MSE = 71.443$, $p < .001$). In conclusion, our findings demonstrated the continued need to focus onsocial-emotionall functioning, particularly in boys.

Bellowing and Sound Recognition in American Alligators (*Alligator mississippiensis*)

Ciara A. Rowe, Karla Lumbard and Daniel Holt
Sponsor: Dr. Michael W. Dentzau
Columbus State University

Bellowing in American alligators is one of two conspicuous signals used by both males and females to convey health, body size, territorial claims, ability to mate, and other important information to individuals in the population. Bellows are periodic vocalizations with a relatively low fundamental frequency (~50 Hz), with individual body size being encoded not in formant spacing. Our present study describes a phenomenon in which an Emergency Warning System (EWS) initiated a bellowing chorus from captive American alligators at Oxbow Meadows Environmental Learning Center in Columbus, GA. The EWS consists of three sound components broadcasted from loudspeakers around the city; a tone showing frequency modulation, a recorded human voice, and lastly several long bursts of a non-sinusoidal complex tone with a fundamental frequency of ~250 Hz, but with harmonic intervals of ~50Hz. We found that the third sound initiated bellowing from at least one alligator 92% of the time. This was interesting because although the EWS stimulus showed little frequency overlap with alligator bellows, the harmonic structure was nearly a perfect match, and was sufficient to induce bellowing. Additionally, the acoustic structure of the EWS stimulus mimicked what would likely be an extremely large alligator. Furthermore, there was a positive correlation between head size and bellow recurrence. Our data suggest that harmonic spacing may be an important parameter in signal perception in the American alligator. Future research could provide insight into how frequency modulation and harmonic spacing impact perception. Understanding how crocodilians perceive these signals may increase our understanding of their population biology and better inform management strategies.

Bioluminescent Bacteria and Its Correlation with Virulence in Wax Worms

Miranda Mensah
Sponsor: Dr. Colin Wong, USDA ARS
Fort Valley State University

The research conducted focused on determining if there was a correlation between the virulence of our nematode-bacteria complex and the bioluminescence of our bacteria. This is important in finding out why our bacteria are bioluminescent. The nematodes used in the research are entomopathogenic nematodes (entomo- meaning insect dwelling and pathogenic meaning disease-causing). Nematodes are roundworms closely related to heartworms that can be found in dogs. There are two main genera of nematodes, and the one used to test virulence is Heterorhabditis sp. We expected to see a correlation between our nematode's virulence and the bioluminescence of our bacteria. To test our hypothesis, we challenged *Galleria mellonella* (Wax Worms) to the nematodes Heterorhabditis sp. Recorded were our 17 different strains of nematodes, the time of death post-inoculation, and luminescence readings over a course of 9 days. We found the correlation of virulence to bioluminescence to be low. The results were not entirely consistent with our hypothesis, possibly due to certain random errors or the fact that virulence does not play a role in the bioluminescence of the bacteria. Further research would allow us to test other factors of our nematode to the bioluminescence of our bacteria.

Bryostatin: A Natural Marine Product that Treats Cancer, HIV, MS, and ALZ

Beth Sharpe and Sandra Arellano
Sponsor: Dr. Thomas Manning
Valdosta State University

Bryostatin is a molecule of both medical and historical significance, with roots tracing back to the works of John Steinbeck (i.e. Cannery Row, Sea of Cortez and Sweet Tuesday). Bryostatin resulted from a large-scale project initiated by the National Cancer Institute from their surveying of marine ecosystems for new cancer drugs. Our project conceptualizes a novel economical synthesis centered around a technologically green approach. Bryostatin is globally known for proven efficacy against Alzheimer's disease, multiple sclerosis, HIV, multiple categories of cancer, and FDA orphan drug designated for fragile X. However, the caveat is the extreme cost of approximately 20 million USD/gram, limiting availability for application. We have developed a technique called pharmaceutical aquaculture, cognomen for sea-farming for molecules of interest. This project progresses through chemical examinations in a research laboratory, implementing field work in the Gulf of Mexico, advancing to final stages of national business competitions, developing, and analyzing conclusive business plans, and publishing significant findings.

Carabelli's Trait in Apes and Old-World Monkeys

Victoria Hogans
Sponsor: Dr. Frank L'Engle Williams
Georgia State University

Carabelli's trait is an extension of enamel at the base of the molars on the tongue sides of the upper jaws. Because Carabelli's trait is neutral with respect to evolutionary selection, it is important to study the ways in which it relates to the similarity of various primate species. Carabelli's trait helps us to understand the evolutionary development and diversification of fossil apes and monkeys evolved from a common ancestor in the Miocene, around 23-5 million years ago. The expression of Carabelli's trait varies across species. This variation comes from the molar dental structure, primarily relating to the diet and size of the primate. Since molar size is positively correlated with the degree of trait expression, it is hypothesized that the second and third molars will exhibit a higher frequency of Carabelli's trait. It has also been found that primates of larger size will express the trait with a more distinct expression of the trait than their smaller counterparts. This research was conducted using the Great Ape Dental Scoring System; images of maxillary jaws; and casts from Olive Baboons, Agile Mangabeys, and Angolan Colobus Monkeys. This project is an extension of research conducted on Carabelli's trait using the molars of Chimpanzees and Gorillas, which yielded similar results: larger molars present a more distinct expression of Carabelli's trait. Currently, this project has found that Olive Baboons, Agile Mangabeys, and Angolan Colobus Monkeys express Carabelli's trait. Even based on the hypothesis that certain primates would not have an expression of the trait, it was found to be untrue as Colobus Monkeys have been found to have a slight expression of the trait.

Characterization of Combustion of F-24, IPK and S-8 Blends in a Constant Volume Combustion

Aidan Rowell
Sponsor: Dr. Valentin Soloiu
Georgia Southern University

Chamber Current global energy trends are pushing for green and sustainable energy sources for the mitigation of climate change. This has meant a move towards lower emissions (greenhouse gases, NOx, etc…) fuels throughout the aviation sector. Many synthetic fuels, such as IPK (IsoParaffinic Kerosene) and S-8, created from various feedstocks; have been investigated for this purpose. Further research into these fuels and their various blends aims to understand relevant combustion characteristics to determine their viability as replacement fuels. F-24, IPK and S-8 will be tested first unblended as baselines, then in 50/50 blends with F24 as the common fuel in each, and finally in a 50/25/25 blend, where F-24 is 50% of the blend. A PAC-Herzog CID 510 Constant Volume Combustion Chamber (CVCC) will be used to characterize combustion and determine derived cetane number (DCN). DCN describes a fuel's autoignition quality and is thus important for the understanding of combustion in some cases. For jet fuels DCN sometimes correlates to lean blowout, a condition in which the flame in a turbine is extinguished because of fuel-air ratio limits, in gas turbines; making it a useful metric. The combustion of the fuel blends will also be characterized by observation of the low temperature heat release (LTHR) and negative temperature coefficient (NTC) regions of combustion. LTHR is correlated with lower NOx emissions because of lower temperatures during that phase of combustion. NOx forms more readily at higher temperatures. Results will be used in future research projects.

Chicana/o Mourning in Viramontes' "The Moths"

Julia Grace Jones
Sponsor: Dr. Ian Afflerbach
University of North Georgia

This essay analyzes Helena Maria Viramontes' short story "The Moths" using a historicist approach to examine how it contributes to the Chicano literary movement. In the story, Viramontes explores a yearning for pre-conquest identity through her narrator's grief for her dying Abuela, Mama Luna. The essay investigates how Viramontes uses imagery from Mesoamerican mythology to connect Mama Luna with the Aztec lunar goddesses Teteoinnan-Toci and Itzpapalotl. By uncovering these symbolic connections, the essay reveals how the ancient, feminine, Aztec spirituality offers the narrator an alternative to her father's patriarchal Catholicism. Through Viramontes' symbolism, Abuelita's death echoes Aztec rebirth sacrifices and becomes an avenue for the narrator's rebirth and reconnection with her mother. This essay's reading of the text shows how the narrator's grief for Abuela mirrors her grief for balancing multiple identities. Her mourning reconnects with her deepest cultural roots, untouched by colonization. Like the sacrifice of Mama Luna/the lunar goddesses, the grief of Mexican emigrants will lead to a rebirth of their culture: an emergence of Chicana/o culture from Azteca. Viramontes illustrates how Chicana/o culture becomes a point of connection for emigrants, and a source of identity to be embraced.

Cinematizing Immunity: The Rhetorical Effects of Science Fiction in the Public Communication of Science

Yizhuo Yang
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Oxford College/Emory University

Rapid developments in computer-generated imaging (CGI) technology have enabled humans to create increasingly realistic visuals of both "science" and "fiction." Drawing inspiration from and emulating the science fiction genre, producers of science documentaries can now harness the power of CGI and bring to the screen what was previously unseeable, communicating scientific facts in an engaging way. While an appealing trend on the surface, these increasingly science-fictionalized documentaries can be ethically problematic for public audiences, who are outsiders to actual scientific research. While not focused exclusively on the use of CGI, scholars such as Kirby (2008), Buehl (2016) and Lee (2022) have investigated the role of science fiction in public communication of science. Scholarship about using these documentaries for education, however, is inconclusive, as much remains unknown on the rhetorical effects of such documentaries on visual science communication, especially during global pandemics such as SARS, H1N1, and Covid-19.

My research furthers discussion in this area by rhetorically analyzing the BBC's 2012 CGI documentary, *Our Secret Universe: Hidden Life of the Cell*, which draws extensive references from famous science fiction films through cinematic techniques and which uses CGI to stage an epic war between human cells and viruses. My findings show that Secret Universe, although persuasive and visually appealing, leaves much of its awe-inspiring and overly militaristic narrative open to interpretation. Furthermore, its epic warfare narrative may promote ethically noxious messages on the nature of viruses, vaccines, and the meaning of immunological fitness. By communicating immunology through science fiction, *Secret Universe* illustrates that such an approach, although appealing, may also harbor undesirable outcomes and promote harmful ideals, especially when viewed in the context of global pandemics such as H1N1 and covid-19.

Compostability On Campus: A Pilot Project for Assessing the Effectiveness of Compostable Dishware

Isabella Banich
Sponsor: Dr. Allison Rick VandeVoort
Georgia College and State University

Incorporating compostable single-use dishware in campus facilities presents Georgia College with an opportunity to reduce landfilled waste and reliance on single-use dishware. This would enhance the purpose of the existing compost program, which diverts pre- and post-consumer food waste from on-campus dining facilities from landfills and creates a valuable soil amendment for the campus garden and landscaping. To continue pursuing more sustainable solutions for GC Dining Services, this project explores cost-effective, compostable dishware options for campus events and to-go food service. This project qualitatively and quantitatively assesses the ability of our on-campus in-vessel composter to effectively break down single-use dishware marketed as compostable. This project also seeks to determine the compostable single-use dishware's impact on the quality of compost produced on campus. Even without the addition of compostable single-use dishware, the complexity of managing compost is still substantial. This project focuses on weekly measurements of nitrate, ammonium, pH, carbon:nitrogen ratio, and moisture, in addition to weekly qualitative observations. The project synthesized an approach to testing compostable materials, and will bring awareness to the different types of compostable goods and their efficiency in in-vessel composting systems. In the preliminary data, the average pH of the in-vessel and ground compost was 7.66, the average nitrate level in these sample sites 1.807 mg/kg. These levels both suggest safe and beneficial compost to use on campus and in the community. The benefits of implementing a compostable single-use dishware initiative include cutting costs on waste from dining facilities, decreased water use, a decrease in GCSU's carbon footprint and greenhouse gas emissions, and increased education and awareness of sustainable practices in the GCSU community.

Conductivity Analysis of Poly (ethylene oxide) Containing Boron Cross-link Electrolytes for Lithium-Air Batteries

Emily Emilien and Kymani Williams
Sponsor: Dr. Dwayne Daniels
Fort Valley State University

This paper discusses research being conducted on polymer electrolytes, with a focus on conductivity under different temperatures. The purpose of this research was to determine the conductivity of polymer-electrolytes under different temperature conditions while determining if it affected the performance of conductivity. Polyethylene oxide (PEO) and Pure Triglyme-Boron (Pure TB) were the sample groups selected ranging from 4-5 samples, tested at several varying temperature ranges for the different lithium salt blend ratios. PEO was the first polymer electrolyte used in lithium batteries since the 1970s and was used as a benchmark. Polymer electrolytes are extensively used batteries based with a focus on energy storage and energy conversion. Liquid-based polymers have been the focus in the past, however, organic liquids are flammable, toxic, and have limited electrochemical stability. The research conducted dealt with gel-like, and solid-state PEO and Pure TB samples. Solid-state can contain most of the same problems caused by liquid-based polymers. The method used was conductivity testing via a lab-built electrochemical cell, with a multimeter running a current through a copper-based electrode with the polymer in between. Data was accumulated via Lab Tracer, the software which set the voltage parameters, and documented voltage and current over 3 trials per temperature. Resistance was computed to solve for conductivity at each temperature for each sample. All data was plotted via excel spreadsheet, and comparative plots were made per each sample group. In conclusion, the data proved that conductivity increases at higher temperatures as salt blends increased as well.

Confidence and Social Interactions

Emily E. LaPierre
Sponsor: Dr. Chia-Ling Lynn Ho
Valdosta State University

This study will examine the extent to which an individual's self-perceived level of confidence is related to the amount of face-to-face interaction one has with another human being on a daily basis. Twenty undergraduate students from different majors were surveyed via convenience sampling at a large state university. It can be seen that the level of an individual’s self-confidence had no correlation with having spent three or more hours interacting with other people in-person on a day-to-day basis. This study found that on average, people slightly agree that they have confidence in themselves. In addition, this study found that people moderately agree that they spend three or more hours interacting with other people, in-person, on a day-to-day basis.

Covert Resistance to #MeToo: The Uptake of Social Change and Public Anxiety in the Men's Lifestyle Magazine Cover Genre

Mercedes Sarah
Sponsor: Dr. Gwendolynne Reid
Oxford College/Emory University

Anxiety in the Men's Lifestyle Magazine Cover Genre The #MeToo social movement that began in 2017 raised voices and awareness around sexual violence and its role in masculinity, impacting individuals and institutions across the United States (PettyJohn, 2019). The extent to which #MeToo impacted the larger American culture and its masculine ideologies, however, is difficult to gauge. Employing an ideologically rich genre— the covers of men's lifestyle magazines—and concepts from Rhetorical Genre Studies (RGS), this presentation explores the larger impact of #MeToo on American culture. Reflecting the ideologies of the culture it exists within, the genre of men's lifestyle magazine covers plays a powerful role in the (re)production of masculine ideologies to be internalized by its audience. Focusing on the depictions of masculinity and looking for shifts, this presentation draws on analysis and comparison of two sample sets of the genre from before and after #MeToo (12 covers from 2007-2012 and 12 covers from 2017–2022) from GQ, Esquire, Men's Health, Men's Journal, Playboy, and Maxim. Two shifts are identified in the ideological (re)production of masculinity: (1) the replacement of traditional, clean-cut masculine aesthetics with a hypermasculine "caveman" aesthetic; and (2) a dramatic decrease in representations of women as relational objects. The speaker will argue that these patterns represent a sidestepping of the issues raised by #MeToo and a covert resistance to the movement rather than a fundamental shift in American masculinity. While this presentation underscores the extent to which #MeToo may have provoked shifts in how masculinity is (re)produced in this magazine cover genre, it also more broadly considers the extent to which social movements and the resulting public anxiety can impact ideological (re)production in genres. Further, identifying these shifts in masculinity's (re)production through genre analysis allows scholars, activist communities, and individuals to witness the tangible impact of #MeToo on the ideologies that the movement sought to confront.

Creation of a Software Archive for the Museum of Technology

Ryan Ashford, Rachel Breland, and Patricia Starkey
Sponsor: Dr. Tina K. Ashford
Middle Georgia State University

The purpose of this project is to create a catalog and digital archive of floppy diskettes in the Middle Georgia State University's Museum of Technology. The team created a simple offline database to catalog and archive various diskettes that are in the museum for a better organization of the physical media as well as preserve the contents of the software stored on them. The project entails cataloging, organizing, physically scanning, and uploading the magnetic contents of floppy disks to Archive.org, a nonprofit organization centered around the digital preservation of software, webpages, audio, and more. By doing so, we aim to not only prevent the data on these disks from becoming lost or forgotten but also to allow others to download and use the media stored within the Museum of Technology. Justification for the project lies in that a person may use the software that is in this "library" for ideas on new programming of software, for viewing movies or playing an older game, utilizing the system for forensics when the older programs might be used in a crime and there are no other copies somewhere for the cyber forensics investigators to utilize for research.

In the end, we were able to research software and record its use as well as upload into the archives site the software that can now be accessed for today's use and enjoyment as well as the ability to continue this history for future generations. Today, some of the companies that created this software are no longer in business, so this is a means to maintain a product that is now lost and preserve its historical significance.

Critical Race Theory and House Bill 1084: The Great Misunderstanding of K-12 Implementation

Zach Bryan
Sponsor: Dr. Karen A. Terry
Valdosta State University

Few topics emerging within the realm of education have been more divisive or topical within contemporary discussions than Critical Race Theory. This presentation will explain the history of the Critical Race Theory (CRT) movement within higher education, including its initial genesis in the early 1970s. The alternative history of "color blind" racial doctrine will also be discussed due to its parallel evolution as an alternative conceptualization. Academic pioneers such as Alan Freeman and Derrick Bell, who were instrumental in the foundation of the movement, will be discussed and considered. The presentation will then discuss the modern implications of CRT both in terms of its political and educational discussion and its potential implementation or lack thereof in the K-12 classroom setting. The nature of House Bill 1084 and how it may impact Georgia will be explored. The explosion of media coverage surrounding Critical Race Theory and why it was so monumentally topical and divisive will also be discussed specifically in terms of it being considered a divisive concept under HB 1084. Finally, I will explain my beliefs on Critical Race Theory and why both the media news and political outrage were unjustified when considering the actual implications, and content of CRT. Critical Race Theory is one of the most controversial topics of our modern zeitgeist and it is of crucial importance that students and academics alike truly understand it and form their own opinions based on fact rather than speculation. I will be implementing my oral report in a virtual format rather than a face-to-face presentation.

Customized Model for Fatty Acid Selection to Treat Any Viral Infections

Corey Q. Barron
Sponsor: Dr. Thomas Manning
Valdosta State University

There are approximately 240 virus species that can infect humans. The first virus was discovered in 1901, the yellow fever virus. During any given year, there are an additional 4 or 5 new species uncovered. Viruses have diversity in their genetics (i.e., DNA vs RNA; ss vs. ds, length), outer proteins, enveloped or non-enveloped exact mechanics behind their replication, energy demands they derive from their host, and geometry, to name a few. As the Coronavirus epidemic demonstrated, new medications for new viral infections are not easily developed. In this presentation, we will outline a method that incorporates approximately 60 to 70 fatty acids (saturated and unsaturated; long and short chained) that are known to have anti-viral activity. An algorithm will be proposed that selects one or more fatty acids, either bound to a cation (i.e. Cu(II), AG(I), Au(II), based on their biological activity and chemical characteristics—and matches them to a viral particle using these parameters. The match is designed to use multiple molecules to attack new viral species. The framework for this model will be presented.

Developing New Medications for Monkeypox; a QSAR-driven Discovery Approach

Yash Patel and Taylor Taylor
Sponsor: Dr. Thomas Manning
Valdosta State University

Monkeypox is a viral infection that is part of the Orthopoxvirus genus in the Poxviridae family. It is a zoonotic disease that originated in the rainforests of central Africa. Recently, hundreds of cases have emerged in Europe and the United States. In addition to its role as an infectious disease, it also draws some concern due to some similarities to Smallpox. Our project focused on using QSAR techniques coupled with in vitro and in vivo data already published to design three new pharmaceutical agents for the treatment of Monkey Pox. From the National Institutes of Health website "Currently, there is no specific treatment approved for monkeypox virus infection. However, there are several antiviral medications used to treat smallpox and other conditions that may help patients with monkeypox infection." We sent a proposal for three new treatments to a Director at The National Institute of Allergy and Infectious Diseases (NIAID) at NIH. The details of our drug design and how it will behave at a molecular level will be discussed in this presentation.

Developing Paraffin Histological Technique for Mosquito

Yasmin Guzman
Sponsor: Dr. Theodore A. Uyeno
Valdosta State University

Paraffin histological techniques are commonly used to help researchers characterize the structure and function of cells and tissues. A typical paraffin histology procedure consists of the following steps: fixation, dehydration, clearing, embedding, sectioning, staining, and mounting. The goal of fixation is to preserve the structure and components of the tissue, so they appear as close as possible to their original or living state. Dehydration and clearing techniques are then used to facilitate sectioning, staining, and mounting of tissue onto microscopic slides for staining. Because insect exoskeletons are made of hard chitin, they are difficult to penetrate during wax embedding and to cut during microtomy. These obstacles to working with adult mosquito tissue have created a lack of easy and efficient techniques to be used in research.

My goal is to develop an optimized histological process to make serial sections that can be used to investigate internal mosquito parasite loads. Optimizations that I have developed include extended fixation and post-fixation steps, several clearing steps that were designed to penetrate the waxy proteinaceous cuticle, and multiple brief vacuum infiltration steps. As a result, I developed, through multiple iterations, sections of adult mosquitos with improved quality that may offer paraffin histology labs the ability to create serial sections of this important vector of parasites without the need for exotic or time-consuming processes.

Developmental Coordination Disorder: One of the "Other" Twice-Exceptionalities

Jamaceo Rhodes
Sponsor: Dr. Ophélie A. Desmet
Valdosta State University

Developmental coordination disorder (DCD) or dyspraxia often goes undiagnosed or misdiagnosed. Researchers estimate 5 to 6% of people have DCD, yet few educators are trained to recognize and serve these students (American Psychiatric Association, 2013). In plain terms, DCD is a neuromotor disability in which a child's motor coordination difficulties significantly interfere with activities of daily living or academic achievement (DSM–5; American Psychiatric Association, 2013). Twice-exceptionality is when gifted students have one or more disabilities. In our research study, we focused on gifted students with DCD. Research on twice-exceptionality is limited, and there are few research papers or resources available regarding gifted students with DCD, also known as dyspraxia. We conducted a multiple-case study to explore the clinical profile of gifted students with DCD. We collected data from three students (1 girl, 2 boys) ages 5, 10, and 17 who are gifted and talented and have DCD. Findings highlight the characteristics and needs of gifted students with DCD and focus on evidence-based interventions to best promote talent development among this population. We found that challenges associated with DCD may develop into complex psychosocial problems, with difficulties in peer relationships and social participation, bullying, low self-worth and perceived self-competence, and internalizing disorders, such as anxiety. We also found that strengths associated with DCD can be seen with the level of resilience. These students tend to be expressive in all senses. Both because they are more sensitive to certain visual and auditory stimuli (Vaivre-Douret et al., 2020), and because they tend to be more in tune with their emotions (Hyland & Polatajko, 2018). Finally, dealing with motor skill deficiencies has the advantage of forcing everyday problem-solving, which makes DCD kids more diligent, perseverant, and resilient.

“Don’t Say Gay” and Other Political Exploitations in Public Education

Kenneth Watson
Sponsor: Dr. Karen A. Terry
Valdosta State University

The American education system has always been a subject of debate in a myriad of political debates, media arenas, and public forums. Recently, however, such discourse has reached new levels of inflammatory polarization. In the midst of divisive rhetoric regarding race-related instruction in classrooms, a new, more taboo topic rose to the forefront of discussions. Gender identity and other LGBTQ+ issues have been galvanized by a piece of education legislation passed in Florida: HB1557. While there is always a degree of distance between what something actually is versus what it is said to be, the politicization of Florida’s bill into the media misnomer “Don’t Say Gay” borders exploitation. The purpose of this research was to examine the chasm between the media portrayals of Florida’s HB1557 and the bill itself, to explore the social justifications for the bill’s provisions, and finally to highlight the legal precedence for HB1557 in relation to parental rights and school officials’ accountability in P-12 public education systems in the United States. Resources included local and national news media outlets ranging in political bias, official federal and state government directives, peer-reviewed articles, and case studies related to the topic. While this project does not have any intended outcomes, the findings in this research have significant implications for practitioners entering and those currently in the field of education, as HB1557 is swiftly becoming the model for education systems in a growing number of states. Potential implications for other fields of study, especially Title IX laws and political science, abound. Overall, the research revealed disconcerting aggrandizement in the political, financial, and social exploitation of public-school students.

Dual-Modality Deep Learning for Predicting Traffic Congestion Duration

Alexander Schmidt
Sponsor: Dr. Ana Stanescu
University of West Georgia

Traffic patterns offer insight into the flow of traffic, which can help understand how to potentially improve it. Although the problems of predicting crashes and estimating times of arrival have been extensively studied, there is relatively limited research on the problem of predicting the duration of traffic congestion, and the effects crashes have on the duration of congestion. In this work, we propose a dual-modality deep learning approach to predict traffic congestion duration in metropolitan Atlanta. Our solution is based on integrating two heterogeneous data sources: (1) information about crashes, publicly available from the Georgia Department of Transportation, and (2) images extracted from the Google Maps Traffic layer. We built three models to analyze the effects crashes have on traffic congestion in the Atlanta metropolitan area. We trained several deep learning models that aggregate structured (crash information) and unstructured (image data recorded at ten-minute intervals) to predict congestion duration. The first model is trained on crash data (e.g., time, location, number of injuries, vehicles involved, etc.). The crash model uses a regular dense neural network and has a 20-minute error in duration prediction. The second model is a CNN trained on 50-by-50 pixel images centered on the crash location and is capable of predicting congestion duration with an 11-minute average error. The third model is a neural network that integrates crash and image data, and results in a 9-minute error. We demonstrate that dual-modality models have the potential to capture complementary information from the individual modalities and lead to enhanced predictive performance.

Effects of Dynamic Pre-Event Stretching on Hamstring Injury Prevention on Male College Soccer Athletes

Michael Grainger
Sponsor: Dr. Jinkyung Park
Georgia College and State University

Hamstring injuries are the most prevalent injury in soccer and result in long recovery periods away from play. Incorrect warm-up, or lack of, before a game can increase the likelihood of injury. Recently in soccer, there has been a gradual shift from performing static stretching before a game to dynamic stretching and performing more game-like movements. The purpose of this study was to compare the effects of pre-event dynamic and static stretching on injury prevention and range of motion (ROM). 8 male college soccer players (age, 20±0.9) were randomly divided into either dynamic stretching group (n=4) or static stretching group (n=4). The hamstring ROM was measured at baseline and post-protocol (4 weeks) using a straight leg raise test (SLRT) and popliteal angle test (PAT). Subjects performed designated warm-ups before every event. The number of injuries during events was recorded. Compared to static, dynamic did not have statistically significant differences in the mean changes of ROM for SLRT ($p=.144$) or PAT ($p=.426$). There was no significant correlation between changes in range of motion and number of injuries ($p=.317$). The static group experienced significantly more injuries (number of injuries = 7) than the dynamic group (= 2), ($p=.017$). Pre-event static and dynamic warm-ups both provide similar long-term ROM increases, however, dynamic stretching may be more effective in preventing in-game injuries than static stretching.

Effects of Silver Nanoparticles on Respiration of Baker's Yeast

Julia Higdon and Thomas Mancil
Sponsor: Dr. Kurt Winkelmann
Valdosta State University

This study examined the effect of silver nanoparticles on the cellular respiration of baker's yeast (*Saccharomyces cerevisiae*) by determining the rate of carbon dioxide formation. Our goal is to create an accessible undergraduate nanotechnology laboratory experiment in which students synthesize silver nanoparticles and study their toxicity. Silver nanoparticles were synthesized by reducing silver cations with citrate anions, which also served as a coating to stabilize the nanoparticles once they form. Water displacement and gas pressure sensors were used to measure the rate of carbon dioxide produced. Experimental variables studied include temperature, sugar type, yeast brand, nanoparticle age, water purity, and nanoparticle size. Water displacement was found to be the more effective method to measure carbon dioxide production. Conditions of higher concentration of silver nanoparticles, newly made nanoparticles, and lighter nanoparticle color inhibited the rate of respiration of the baker's yeast. The quality of data collected and the experience of the undergraduate research students indicate that this procedure is appropriate for a first-year Chemistry laboratory course. Future work will include the effects of silver nanoparticles synthesized by different methods and the study of freshwater algae instead of baker's yeast.

Efficiency and Effectiveness of Penetration Testing Tools

Eden Alem
Sponsor:
Georgia College and State University

Penetration testing is an attempt to evaluate the security of a computer system, where a security professional acts as an adversary to simulate an attack. To aid this simulation of attack, multiple tools are used by penetration testers. This paper provides a list of effective testing tools in penetration testing areas, such as web application testing, wireless penetration testing, and network penetration testing. The five basic penetration testing phases include reconnaissance, scanning, vulnerability assessment, exploitation, and reporting. Under each area of penetration testing, this paper categorizes each tool based on these five phases. To depict the efficiency and effectiveness of each tool, this paper assesses the scope, maintainability (reliability), review, and usage of the tool.

Employer Perception of Public Health Graduates and Interns on Workplace Competency

Jordan Yeater
Sponsor: Dr. Ernie Kaninjing
and Dr. Damian Francis
Georgia College and State University

The training of public health professionals significantly impacts the delivery of healthcare services. A workforce success survey evaluating the skills and competencies of graduates in public health was administered to both government and non-governmental employers. The survey assessed fifteen areas of competency among graduates from a university in Southeast Georgia. The Association of American Colleges and Universities proficiency indicators was evaluated on a 4-point scale ranging from "Not Observed" to "Competent". Employer satisfaction was also assessed from "Very Satisfied" to "Very Unsatisfied". As a result, thirty-six employers provided data with 37% representation from the nonprofit sector. A third of employers were classified as large organizations (500-1,000 employees) and provided opportunities for engagement in advocacy, health promotion/communication, administration, and teaching. Approximately one-half of employers considered graduates as competent in essential skills such as teamwork, communication, digital literacy, and application of knowledge to the real world. Graduates were also considered competent in creative thinking, critical thinking skills, and data analysis. Employers highlighted the need for improvement in graduates' ability to identify current emerging health issues requiring policy or system-level change and ability to communicate through writing. Of the seven attributes that we evaluated satisfaction, 50% or more employers reported being "very satisfied" with graduate performance. This study concluded employers do believe that most public health graduates from this university possess the level of preparedness for workforce success. However, there remain gaps in some essential skill areas and employers' satisfaction.

Essential Oils as Potential Therapeutics for COVID-19

Matan Chester, Bianca Vasquez, and Angela Abraham
Sponsor: Dr. Nilmi Fernando
Georgia State University

The undergraduate research (CHEM 4160) laboratory course at Georgia State University is designed to introduce independent research and critical thinking through writing skills to undergraduate Chemistry students. In this lab, students will work on Essential Oils (EOs) from peppermint, spearmint, orange peel, garlic, lavender, and thyme. These oils were selected based on literature findings for their potential therapeutic effects on the SARS-CoV-2 virus. The EOs are extracted by steam distillation and analyzed by spectroscopic and chromatographic techniques such as 1H and 13C NMR and GC-MS. The oils will be examined to determine the percent composition and molecular identities of components reported in literature as active components. Students will publish their scientific data in the form of a research report per the ACS guidelines. Throughout the course of the research, students develop literature search, written and oral communication, and scientific data recording skills. These skills along with the laboratory and analytical techniques learned from the research help prepare students for their future careers in science and STEM fields.

Establishing a Quantitative Relationship between Carcinogens in Cigarettes and Lung Squamous Cell Carcinoma through Gene Expression Analysis

Jayasri Mankan
Sponsor: Dr. Ying Xu
University of Georgia

The association between smoking and lung cancer is known, but details about the microenvironmental factors that may enhance this relationship are not well understood. This project investigates why smoking can contribute to lung and other cancers by analyzing the gene expressions of different groups and looking for possible trends. Since smoking is already known to be strongly correlated with lung cancer, lung squamous cell carcinoma is the focus of this study. The TCGA database provided the demographic and biological information of patients and gene expression counts. Patient demographics were matched with their smoking statuses and the duration of their smoking. In one testing group, patients were divided into smokers and non-smokers. In another testing group, patients were divided into bins based on the severity of their smoking, which was quantified by pack years. R Studio and Excel were used to sort through the data and perform multiple differential expression analyses and GSEA enrichment analyses with the GO and REACTOME databases. Significant differences in metabolisms between patients that have partaken in varying levels of smoking are being investigated. Pathways have been grouped into their seven respective categories (ex. cell polarity, proliferation/differentiation/development, etc.). Known carcinogens in cigarette smoke are being linked to their effects on tumors through these pathways, to find a more holistic explanation. The goal is to find a statistically significant relationship that may explain which metabolism smoking affects, and its contribution to cancer, while using supporting details from known and potentially find unknown chemical carcinogens from cigarettes.

Examining Fennel Extracts for Potential Anti-Tumorigenic Properties in Metastatic Triple-Negative Breast Cancer Cells In Vitro

Srisha Jayakumar, Austin Scharf, Ivan Zhu, Brenda Harmon and LaTonia Taliaferro-Smith
Sponsor: Dr. Margaret McGehee
Oxford College/Emory University

Triple-negative breast cancer is a very invasive disease without effective forms of treatment or prevention and disproportionately affects African American populations. Previous literature has shown that the herb fennel may have anticancer and antioxidant properties in other forms of cancer, but almost no research has been done linking fennel with triple-negative breast cancer. The purpose of our experiment was to find the most efficient way to extract fennel, as well as test the extract's ability to reduce the aggressive behavior of metastatic TNBC cells in vitro. Compounds from fennel seeds, fennel plant material, and a whole plant were extracted using both steam distillation and chloroform. Preliminary testing with cell viability assays to establish IC-50 curves showed that fennel plant material extracted through steam distillation resulted in the most cell death. Colony formation and wound healing assays were performed using this extract, and it was found that higher concentrations of the extract impeded the migratory rate. Fennel as a form of anticancer therapy would have numerous positive implications. It provides an interdisciplinary approach to a grave problem by combining the fields of environmental science, biology, and alternative medicine. There are also social implications to this research as well. Currently, the US faces a large problem of health care inaccessibility, partly due to income inequality. Fennel proving to be effective against TNBC means that it could be industrialized at a very cheap cost, or that the population could incorporate it into their diets and potentially decrease mortality rates. In sum, the utilization of fennel as an anti-cancer treatment may help to bridge the gap between socioeconomic classes and their quality of care.

Examining Pain Levels in Competition and Performance Female Athletes

Sylvia Clark, Elizabeth Niswonger, Christina Snider and Molly Dyer
Sponsor: Dr. Kelly P. Massey
Georgia College and State University

In sports, athletes have higher pain tolerance and threshold levels compared to non-athletes. However, there is little research regarding how different types of sports are associated with pain tolerance and threshold in female athletes. The purpose of the study was to examine the levels of pain threshold and tolerance within a group of female competition and female performance athletes to determine if a difference exists. 11 Female athletes (M: 23.1, SD: 7.1) were divided into competition (C) group (n = 5) and performance (P) group (n = 6). Resting hemodynamic measurements, anthropometric measurements, and body composition assessments via dual-energy x-ray absorptiometry (DXA) were measured prior to induction of experimental pain. Pain threshold and tolerance were induced by the cold pressor test (CPT) and three sets of electrical stimulation (Estim) test for upper and lower limbs. A Visual Analog Scale (VAS), heart rate (HR), and blood pressure (only CPT) were recorded during the experimental pain to determine pain levels.

There were no significant differences between groups in beginning measurements ($p > 0.05$) or in physiological responses to the CPT. The pain threshold for both groups occurred at the thirty second (sec) time marker ($p>0.05$). From the upper limb Estim assessment, there were no significant physiological differences between groups for pain threshold (C=70-mV: P=50-mV; $p=0.247$), pain tolerance level (C=102-mV: P=95-mV; $p=0.429$), or in VAS scores. In the lower limb assessment, a significant difference in HR was seen between groups at the 100-mV level (C=71±12.3bpm: P=88±6.1bpm; $p=0.041$), with no significant difference in the corresponding VAS score. Pain threshold was not significantly different (C=100-mV; P=80-mV; $p=0.310$) however the pain tolerance level was significantly different (C=90-mV; P=60-mV; $p=0.032$), again with no differences in VAS scores. From our sample, it seems that although the C athletes had higher pain threshold and tolerance levels for both upper and lower limb assessments, the P group had higher HR measurements throughout both assessments. Further examination into whether performance athletes have altered responses to pain stimuli needs to be completed to understand the performance athlete's psychological response to pain.

Exercise, Social Media, and Mental Health during the Pandemic

Carson Beasley, Rachel Howell, and Reagan Lippold
Sponsor: Dr. Tsu-Ming Chiang
Georgia College and State University

The global outbreak of the COVID-19 pandemic affected people's mental and physical health. It took a significant toll on the physical well-being of many, as well as changed aspects of peoples' everyday lifestyles. COVID-19 has forced people to stay inside, work from home, do everything at home, and ultimately become sedentary overall. This pandemic has been the cause of a significant public health issue: physical inactivity among adults and adolescents, as well as increased social media use (Nagamalar, et al. 2021). Furthermore, vast amounts of reports have shown a significant increase in severe depression and anxiety among individuals due to feeling stuck and inactive (Gestsdottir, et al. 2021). The increase in social media use may also have contributed to this. The direct correlation between mental health well-being and physical health shows a significant lack of healthy behaviors and physical activity. In general, physical activity at least three times a week for 30 minutes reduces stress, depression, and feelings of anxiety.

Therefore, the purpose of the present study was to explore the implications of both social media use and exercise rates in individuals' psychological well-being during the pandemic. A survey was distributed to college students over two years to examine how exercise and social media levels are related to mental health and anxiety. One hundred ninety-eight college students participated in the Year-I study and 154 students in the Year-II study. Overall results showed physical exercise is related to lower levels of anxiety. The detailed results will be shared at the conference.

Experiencing Art and Gallery Culture

Ari Saucier
Sponsor: Dr. Shelly Yankovskyy
Valdosta State University

What is it like to exist in a gallery among the art? What draws individuals from different walks of life to these places to spend time interacting with others in the spaces as well as with the art itself? How popular are these spaces? Do the same people often frequent them or is it a new crowd for each show? How, and for what purpose are these spaces used? Qualitative research was conducted over the course of a semester in the spring of 2022 in order to address these questions. Specifically, data was gathered through participant observation as a gallery assistant, alongside the collection of interviews with important figures from the gallery. The paper this research culminated in describes both the space itself and typical social interactions occurring within it to "set the stage" on which art and gallery culture plays out. The paper then explores subjective experience, the so-called "gallery effect," the appeal of student art, and lastly the socialization that occurs within gallery and art spaces. Findings suggest that a distinct gallery culture does exist which can be felt and observed within the space. These findings are in line with other scholars' work, such as that of Cameron, who suggests that gallery culture not only exists but is actively constructed by those involved. Other researchers, such as Grosvenor, also argue that galleries and their culture have a direct impact on society at large through processes of public education. The research discussed herein is important because it shows how we create different cultural spaces through our held beliefs and their practical applications, as well as the broader impact these spaces can have on people, generally. This tells us more about the emergent nature of culture through our designation and delegation of space.

Exploring the New Black Renaissance through the Lens

Kikelomo Sanni
Sponsor: Anna Weinstein, MFA
Kennesaw State University

Today we are witnessing our very own cultural shift within the black arts, the New Black Renaissance (as we may informally call it). Not so different from its counterparts that came before, the Harlem Renaissance and the Black Arts Movement, this paradigm focuses on the rapid incline of black creatives in spaces that may have originally been against them. For film, it has gone through an interesting revolution of portrayal of black people. From the likes of *Birth of a Nation* to the emergence of blaxploitation films in the 70s, to the rise of multifaceted content created by independent filmmakers today. But what makes these black stories that are being told to now win Oscars and Emmys? Is the influx of black filmmakers getting the recognition they deserve or is there still a wider gap to bridge in the industry? What are the themes seen in these movies and how do they influence the already-built genres? What are the parallels between the films generated in this renaissance from the ones before and will there be a similar pattern of a supposed end to this new revival? In this research, I intend to observe the films created during this New Black Renaissance as well as how the relevant times, like the Black Lives Matter Movement, have reflected the content of films being put out. My research will also show a comparison of the movies that had to rely heavily on white producers to tell these stories to black people having full creative control in the present day. My aim is to enlighten the accomplishments black people were able to achieve in the film industry thus far, the obstacles they may continue to face, and what this may mean for the future of black film

Fluidity and Liminality: Piracy in the 19th Century South China Sea

Kennya Jean-Baptiste
Sponsor: Dr. Ghulam A. Nadri
Georgia State University

Opportunistic Maritime piracy is generally understood in the literature as attacking and plundering ships at sea. Maritime piracy was an occurrence all over the world. However, often Eastern piracy is overlooked. This paper seeks to examine pirate identity and argues that the fluid nature of pirate identity contributes to its efficacy. The paper also argues that the pirate identity and lifestyle challenged the social norms and legitimacy of the local government. This paper also contrasts Eastern piracy with Western piracy. It argues the Western idea of piracy is too rigid to be applied to Eastern piracy

From Victory Gardens to Inflation Gardens: Investing in Our Backyard to Combat Food Insecurity, Increase Income, and Reduce Inflation

Heather A. Chason and Michael A. Carter
Sponsor: Dr. Fady Mansour
Columbus State University

Maintaining food security and conserving income during an era of high inflation, unexpected pandemics, and global geopolitical instability are essential to preserving quality of life. Using quantitative data from the National Garden Association and experimentation with growing our own garden, May 2021 – September 2022, we investigate the cost-effectiveness and benefits of backyard farming and how this might reduce inflation and supply shortages ailing our country. To answer this, we calculated the startup and maintenance costs of a home garden along with the average yield the garden produced and compared our findings to the cost of purchasing produce commercially. Our results indicate that although the initial costs of starting a home garden can vary, the revenue generated from the produce harvested outweighs the cost of production, with average savings ranging from $128.47 to $2,023.92. While discussing the multiple benefits, we also examine the complications that can arise from backyard food production. This study concludes that holding all variables constant, investing in a home garden benefits individuals and families in income and food security aspects. Furthermore, the economic impact could be substantial. The savings acquired from backyard farming fosters the idea of equitable income distribution by providing disadvantaged families the opportunity to generate income. We suggest that government support of backyard farming through taxes, facilitating exchange markets, and media advertising will increase participation and food security for the disadvantaged population. Backyard farming will stimulate economic growth, reduce the strain on national logistics, alleviate inflation, generate income, and promote equity and national security.

Generating Features for Machine Learning Study of Cyclotides

Rachel Schaffer
Sponsor: Dr. Sairam Tangirala
Georgia Gwinnett College

Cyclotides are organic molecules that may be isolated from certain plants and have a wide range of biological activities, such as being insecticidal, anti-tumor, and anti-microbial. They typically contain 28-37 amino acids and are characterized by their head-to-tail cyclized peptide backbone and an interlocking arrangement of three disulfide bonds. The remarkable chemical stability of cyclotides provides an exciting range of potential therapeutic applications based on their intrinsic biological activities. In this study, we use a set of files created by Molecular Dynamics (MD) study of KalataB1 molecule (a type of cyclotide) to create a feature vector(s) consisting of numerical measures/quantities that capture the chemical behavior of Kalata-B1 molecule. We process the data files generated by MD simulations and develop a training data set for a machine learning model that replicates the simulation results of MD. Thus far, we have been able to use Python functions to filter through thousands of data files and arrange the data in a readable format, as well as to use the available XYZ coordinates of the KalataB1 molecule to calculate the Euclidean distances and Coulomb matrix feature resulting from different atoms of Kalata-B1. Also, additional existing machine learning packages from chemistry applications are also being used for easier and quick development of our machine learning model.

How Chemistry Can Fight NDD

Cheyenne Stapleton and Lindsey Henderson
Sponsor: Dr. Thomas Manning
Valdosta State University

We are students in Principles of Chemistry 1 that are involved in a class project about Nature Deficiency Disorder or NDD. As biology majors, we have observed first-hand how NDD can affect someone's outlook on life, creativity, and cognitive development. In this project, we are required to use coordinates to find specific locations on campus. At each of the twelve locations, we have to take pictures and answer chemistry-related questions based on the site. For example, we use an app called INaturalist to identify plants, find information on the WEBB telescope at the VSU observatory, and learn about herbicides and pesticides used in the coffee industry. We will also be building a map of the Suwannee River valley while focusing on rivers and springs. This project allows us to learn applied science that is not normally used in class by creating a hands-on experience. This is a great way to fight NDD, because it forces an outdoor adventure! Not only does it get us out in the fresh air, but allows us to use our critical-thinking skills. It further aids us in the classroom by giving us extra practice on problem solving. For example: finding how many moles are in a substance, and what different compounds are involved. Overall getting involved in this project opened our eyes to chemistry can affect our lives as well as others.

Hyperoxia Injury Alters the Expression of Collagen Type IV in the Developing Lung

Yeongseo Son, Nicholas M. Negretti, Gabriel Haire, Christopher Jetter, Erin J. Plosa
Sponsor: Dr. Jennifer M. S. Sucre
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Approximately half of infants born <28 weeks develop chronic lung disease, or bronchopulmonary dysplasia (BPD), characterized by impaired alveolarization. While adult lung injury is largely reversible, injury during lung development results in permanent respiratory structure and function losses. The molecular mechanisms underlying the vulnerability of developmental lung injury are not well defined—a knowledge gap we consider foundational to the lack of curative BPD therapies. Making up about half of all basement membrane (BM) components, the network-forming protein collagen type IV provides a molecular scaffold. Our preliminary data show that alveolar type 1 cells express type IV collagen during the saccular and alveolar stages of development, especially α3α4α5(IV). Based on this data, we hypothesized that hyperoxia injury during the saccular stage specifically affects α3α4α5(IV) expression. To test this hypothesis, we conducted RNA in-situ hybridization and immunofluorescence for Col4α1 and Col4α5 in our mouse model of saccular stage injury. We found that levels of Col4α5 significantly decrease in P14 injured mice while Col4α1 significantly increases in P7 injured mice. This finding supports our hypothesis that levels of different collagen type IV networks are altered following saccular-stage hyperoxia injury. We propose that when a developing lung is injured, a developmental switch from α1α1α2(IV) to α3α4α5(IV) happens less in the alveolar BM. Instead of a network that is more resistant to proteolysis, the BM of injured lungs could be made with a network that is less durable under stress, providing a biological rationale for why saccular-stage injury during lung development might be irreversible. This discovery could potentially close the knowledge gap and pave a path towards a solution for BPD. Future directions for this study include imaging for collagen type IV using thick lung tissue sections to understand the dynamics of the different collagen matrices in 3-dimensions.

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Inhalation Method for Treatment of Lung Cancer

Taylor Macera
Sponsor: Dr. Thomas Manning
Valdosta State University

Lung cancer is the leading cancer-causing death in the United States. It has an 80% mortality rate. It is the second most diagnosed cancer in men and women in the United States. Paclitaxel is a chemotherapy drug that is used to treat lung cancer. It is currently one of the most widely used chemotherapy drugs. The primary goal of this study is to identify innovative ways to treat lung cancer. A novel vaporization method is used to reduce resistance and increase efficacy. Solvents were used with a vaporizer to produce nanodroplets that would be used to treat lung cancer deep within lung tissue. Inhalation of nanodroplets into the lung allows for direct contact with lung cancer. Ethanol and an ethanol mixture are tested separately as potential carriers for the cancer drugs. Taxol is used, as it is a well-known cancer drug that is already on the market. This method provides an innovative and effective method for treating lung cancer.

"In the Blood": Decoding and Understanding the Nature of Systemic Violence through the Works of Dr. Sindiwe Magona

Elijah Byrd
Sponsor: Dr. Renée Schatteman
Georgia State University

The praised South African writer Dr. Sindiwe Magona has produced numerous works of fiction and non-fiction about her home country which address the generational trauma inflicted upon her people, the amaXhosa, by the Apartheid government. Her novel, *Mother to Mother*, is a piece of historical fiction written in response to the murder of Amy Biehl, a white American college student, by three young black South African men in the midst of the school protests of 1993. Written in the epistolary style, the story is told from the viewpoint of the fictional mother of one of the killers as she writes to the mother of Amy Biehl to explain the heated political climate, racism, and oppression which led to her son's rage and her daughter's death. Pulling from Mother to Mother and Dr. Magona's non-fiction essays "It is in the Blood" and "Why I Wrote Mother to Mother," this paper will extrapolate and commentate on Dr. Magona's views concerning racial reconciliation and systemic violence in South Africa. Can and, perhaps, should oppressed people reconcile with their oppressors once the system they labored under is abolished? This presentation will suggest that Dr. Magona's view is that, while generations of trauma can never be erased, there can be work done to prevent future tragedies, and that working towards reconciliation is valuable even if true healing is never achieved.

Investigating the Effects of Algal Turbidity on the Dwarf Seahorse (*Hippocampus zosterae*) Mating System

Presenter: Darshi N. Patel
Sponsor: Dr. Emily Rose
Valdosta State University

Dwarf seahorses (*Hippocampus zosterae*) are an excellent environmental indicator species because they spend their entire lives in coastal communities that are threatened by human-induced eutrophication. The goal of this study was to quantify laboratory reproductive success and identify the mate preferences in clear vs turbid treatments. The experimental design included paired (1F:1M), female-biased (2F:1M), and male-biased (1F:2M) treatments, in clear and turbid waters with a total of 128 seahorses across 8 replications. Of the 48 potential matings, the study yielded 40 males with reproductive success, 7 with brood reductions, and 1 non-mating. Mating latency was shorter for turbid treatments compared to their respective treatments in clear water. There was no detectable effect of algal turbidity on reproductive success, but differences were seen among the three treatments of varying sex ratios, with brood sizes being the highest in the female-biased treatment (28 ± 4.56), followed by the male-biased treatment (25.31 ± 4.94), and lastly, the paired treatment (17.94 ± 4.90). For paired treatments, size-matched mates' body weights were correlated with the brood size in the clear water but not in the turbid water. In sex-biased treatments, fish's weights best predicted the brood sizes when females were given a preference in mates. For sex-biased treatments, 75% of matings in clear water were size assortative, whereas mate preference was random in turbid treatments. Preliminary analyses (n=3) report greater levels of courtship behaviors for turbid treatments than clear treatments. Ongoing behavioral and statistical analyses will further elucidate the relationship between mate choice and reproductive success and will enable better predictions of reproductive patterns in the wild populations with varied sex ratios. This study's results highlight the critical need for interpreting the results of behavioral studies conducted in pristine lab conditions when investigating mating systems of coastal fishes adapted to eutrophic waters.

Literature as a Political Weapon in Latin America

William Steinberg
Sponsor: Dr. Ericka Parra
Valdosta State University

The Peruvian novelist Mario Vargas Llosa once stated, “Why is it that in Perú and other Latin American countries writers have to be basically politicians, agitators, reformers, social commentators, moralists, instead of creators and artists?”

When a bureaucracy fails to bring desired change, there are alternative maneuvers and tools - both socially and culturally - that ordinary citizens begin to utilize in order to bring the change to fruition. Some of these alternative methods have been as peaceful as silent protests and as aggressive as terrorism. However, one of the most effective tools on the global scale, dating back to the earliest formations of the political unit, has been the use of literature as a political weapon. This has been especially true in the case of Latin America as their respective countries built their own governments after gaining independence and being relinquished from Spanish colonization.

When voices calling for freedom are silenced by dictators and the only consistency is economic and social oppression, literature is what infiltrates the political realm and challenges the political culture.

To answer Mario Vargas Llosa’s question about the role of writers, he answers himself: “The fundamental reason is not to be found so much in the social condition of our countries or in the problems they face, as in the fact that literature, for better or worse, has for centuries been the only effective means of exposing these problems.”

Mathematical Modeling of Different Pest-Control Strategies

Kelsey Cadenhead
Sponsor: Dr. Susmita Sadhu
Georgia College and State University

In this project, we formulate and analyze a mathematical model of a non-smooth system of differential equations representing the interaction between a pest and its natural enemy with different control strategies. Assuming that the natural enemy of the pest is a generalist predator (one that can feed upon an extensive group of prey and thrive in various environments), we describe their interaction by the continuous time model studied in the article, "Bistability and limit cycles in generalist predator-prey dynamics," Ecol. Complexity, 14 (2013), pp. 48-55. We introduce control strategies in the form of harvesting (catching/killing/chemical tactics) and releasing natural predators in the continuous time model when the density of the pest goes above a prescribed threshold. We compare different harvesting functions and threshold values that would result in the most efficient measure of pest control. We focus on parameter regimes where the continuous time model has multiple attractors and use analytical and numerical methods to analyze the dynamics of the model.

Measuring Hydrophobicity and Host-Guest Complexation of Coumarin 343 and Cucubit[7]uril

Ryan Spencer
Sponsor: Dr. John Hansen
University of West Georgia

In this experiment, the organic fluorophore Coumarin 343 is added to two different Cucurbit[n]uril, a non-fluorescent, to study guest-host complexes. Measuring the fluorescence of guest-host complexes we determined binding behavior of CBn with a non-polar molecule and how the different dimensions of CB7 and CB8 effects this binding. It appears that, the non-polar end of the Coumarin 343 molecule is able to fit deep enough within the barrel-like structure of the CB8 and that the exchangeable proton of the carboxylate on the opposable end of coumarin is hydrogen bonded to a carboxyl group of the CB8. The dimensions of CB7 do not allow the Coumarin 343 molecule to fall as deeply within the cavity of the CB7 structure, and as a result, the polar end of the Coumarin reacts with the surrounding solvent instead of the carboxyl group of the CB7.

Modelling Acid Rain in Laboratory Conditions

Aidan Moses Simmons
Sponsor: Dr. Tzvetelin D. Iordanov
Georgia Southwestern State University

Turbidimetric method was utilized to model the formation of acidic rain in laboratory conditions. A precisely measured droplet of analyte was heated in a closed sample cell to achieve vapor saturation and subsequent photo-induced nucleation. Condensation caused the decrease of transmittance due to light scattering. The series of experiments were performed for different concentrations of nitric acid, ammonium hydroxide, and sodium chloride. Data was collected over periods of 310 seconds, while the temperature was increased from 25oC to 50oC. Light scattering measurements were performed at a wavelength of 540 nm. The results suggested that the lower pH of analytes contributes to higher nucleation and particle growth rates.

Mothers and Mirrors: *The End of Alice* and *The City Son*

Georgia J. Wynn
Sponsor: Dr. Adam Wood
Valdosta State University

Trauma is like a mirror, although victims' reflections may not look the same. Sexual trauma is an important topic of discussion in the literary scope and beyond. Sexual trauma often focuses on female victims and male perpetrators; familial cases of sexual abuse typically involve fathers or some other older male figure as the abuser and a daughter or young female family member as the receiver. This study explores two novels featuring male characters who suffer from sexual abuse at the hands of their mothers. In *The End of Alice* by A.M. Homes, Chappy perpetuates his trauma onto girls, while Tarun, in *The City Son* by Samrat Upadhyay, fills a more traditional victim role. Using mimetic theory and psychoanalytic theory, this study aims to answer the question, "Why do we feel empathy towards both Tarun and Chappy despite one being ruined by his trauma and the other being a ruiner as a result of his trauma?" The answer: because they suffer abuse at the hands of their mothers. As the result of biases, studying a character like Chappy, who commits horrific acts, as a victim, can be challenging without the use of psychoanalytic theory, a more objective lens. Mimetic theory regards art and literature as reflections of the facets of the universe. Although these novels are fictional, the sexual trauma male characters endure within them is the reality for some boys and men, so we can empathize with Tarun and Chappy because they seem real. Recognizing and discussing male sexual trauma, in and out of familial contexts, is important because men who suffer from sexual abuse are much less likely to report their cases than females.

Optimal School Garden Model
Strategies to Combat Food Insecurity

Jami Nakan
Sponsor: Dr. David Patterson
University of North Georgia

Approximately forty-six percent of Lumpkin County, Georgia K-12 students qualify for the free and reduced lunch program. A key challenge in combating food insecurity and providing students with healthy food is the availability of affordable, local produce as well as proper food independence education. As a part of the Hometown Harvest program at the University of North Georgia, our team has been focusing on developing community garden models for the past eight seasons. To accomplish this, we have pioneered a program that provides our university and community, including K-12-aged students, free access to organic produce. I hope to expand our program to a free-to-use online, educational platform for children to foster knowledge of sustainable, small-scale gardening that can be undertaken at their own homes.

A recent study surveyed 502 college students in Texas and found that “65.5% of students failed to pass the […] Food Sufficiency Screener," (Owens). The substantial portion of the college campus that is at risk for food insecurity as a result of the COVID-19 pandemic also had changes to employment status and living arrangements, which likely resulted in changes in academic performance.

In our research thus far on garden models, we used a Precision Agriculture System (PAS) and heirloom Black Cherry tomatoes to assess optimal (i.e., most cost-effective) organic produce growing conditions in Lumpkin County, Georgia. Our PAS is a digital data collection system that measures soil conditions. Data collected within our open-air garden and tunnel garden in various seasons lead to substantial variations in produce quality. These differences could lead to dramatic disparities in yields within school and community gardens, thereby decreasing the quantity of produce entering the local food system.

In addition to monitoring conditions for optimal small-scale school garden design, we will build an online platform as an aid to current science education in school systems around Georgia. This site will combine local knowledge from Appalachian master gardeners (i.e., elders) with a long history in the region as well as citing resources from Indigenous gardening practices with sustainable gardening practices of the current era. The main goal of this site is to be geared towards elementary-aged children with a simple, modern user-friendly interface but it will also offer content for people of all ages.

Our website will focus on low-cost strategies to optimize produce for all seasons, effectively empowering communities to have an alternative route to a healthy lifestyle. Some affordable garden development strategies include growing saplings in old milk cartons and soda bottles so that holes may be poked in the bottle for drainage. In urban communities, large buckets of old wood stakes offer a contained environment to grow tomatoes and support the vines. We hope to experiment with hula hoops and old sheets to replicate the tunnel environment and create more low-cost garden methods. A crucial part of the modern garden and lifestyle movements is the focus on environmental health. Hometown Harvest currently has compost trash cans in local school cafeterias to promote sustainability education. The compost collected goes back into the garden’s soil to provide the required nutrients for the next crop to grow while reducing the need for expensive supermarket soil.

A final part of reducing food insecurity in small communities is collaboration. Hometown Harvest has a You-Pick system so that any student or community member may gather as much organic produce as they need at any time they need. We have found that the community’s encouragement and support for this project, such as donations of kitchen compost or heirloom seeds, have been important in creating a unifying effort to maintain the gardens and the organization.

Website content will include video tutorials, easy recipes with organic produce, and a tutorial system integrating composting systems, the garden cycle, and soil quality findings from the Precision Agriculture System. This project will ultimately combine a child-friendly virtual education platform with a collaborative community effort to reduce food insecurity and break the cycle of health disparities.

Persistent Nematode: Fact or Fiction

Darius Ruff
Sponsor: Dr. Kyle Slusher, USDA ARS
Fort Valley State University

Entomopathogenic nematodes (EPNs) can be a valuable alternative to insecticides for growers looking to manage pest problems. Consistent improvement of EPN attributes, such as longevity and viability, help ensure successful pest control. Here we tested the survival of two persistent strains, NY 01 and NY 04, against two commercially available nematode strains, ScAll and SFSN. Five replications of each strain were introduced to thirty-milliliter plastic cups containing oven-dried sand with an eight percent moisture content for each of the following evaluation periods: 1, 7, 14, 21, 28, and 42. At each evaluation, cups were individually rinsed into 300 ml of water while being stirred at 330 rpm using a five-centimeter stir bar and magnetic stir plate. Two milliliters of this solution were then placed in a petri dish and the number of live and dead nematodes was counted. This was repeated two times for each cup. For most of the assessment periods, the two commercial strains had significantly lower survival than the two persistent strains. Only on day 1 and day 14 were the strains statistically similar. Based on these results, there is evidence that the persistent strains have higher survival over time compared to commercial strains. This can be beneficial to growers as it can lead to fewer nematode applications, thus saving money and labor.

Physiological Evaluation of Newly Invasive Jorō Spiders (*Trichonephila clavata*) in the Southeastern USA Compared to their Naturalized Cousin, *Trichonephila clavipes*

Benjamin Frick
Sponsor: Dr. Andy Davis
University of Georgia

A newly-invasive spider from east Asia, *Trichonephila clavata*, or "jorō spider," is spreading in the southeastern United States. Little is known about the biology or physiology of this species in this new range. Interestingly, a closely-related species in the same genus, the "golden silk spider," *Trichonephila clavipes*, is already successfully established in this same region over the last 160 years. The golden silk spider, which is native to the tropics, has not expanded its range beyond the southeast, likely because of thermal limitations. This investigation is to determine how the biology and physiology of *T. clavata* compare to *T. clavipes*. We reason that if their physiologies are similar, then *T. clavata* would be similarly confined to the southeast. We examine online records submitted to iNaturalist.org to compare seasonal distributions and timing, and we collect females to measure physiological traits that help predict environmental tolerance, including metabolic rates, cardiac functioning (heart rate) during cold exposure, and survival during brief (2 min) below-freezing temperature. Results show the *jorō* spider has a shorter season than its cousin, indicating it can complete its lifecycle within a narrow period of suitable weather. It has an inherently higher metabolism (twice as high) and has a 77% higher heart rate when exposed to low temperatures. Finally, *jorō* spiders survive better (74% compared to 50%) in a brief freeze. These findings suggest the *jorō* spider can exist in a colder climatic region than the southeastern USA, which can be useful information for management or planning purposes.

Planned Parenthood:
Structural Evolution and Organizational Change

Sana Punjani
Sponsor: Dr. Eric Solomon
Oxford College/Emory University

If the voices silenced by Planned Parenthood could speak, what would they say? To address this question, the paper explores how the organization has continually centered the experiences of white women by placing stipulations on the definition of motherhood. Such definitions rely on models of Victorian domesticity. The work provides a historical analysis of the structures, both figuratively and literally, that the organization has implemented to bolster these ideals. This paper traces said values as they have transitioned out of once blatant white supremacist objectives into practices that have a more insidious effect on non-white women. By employing my first-hand accounts, reviewing online reviews from Planned Parenthood patients, and delving into white feminist theory, this piece aims to restore historical amnesia.

The research concludes multiple findings about the experience of women of color at the hands of Planned Parenthood. First, "educational" flyers, among other artifacts, produced by the organization permitted them to violate the reproductive rights of women of color by assuming sexual deviancy. Such an assumption was conversant with racial stereotypes of the era. Consequently, the establishment etched into the foundation of reproductive care the idea that women of color were fungible. This participated in other conversations about the role of said women in simultaneous contexts such as Jim Crow. Specifically, Margaret Sanger's population-control campaigns possessed rhetoric that resembled other problematic narratives about non-white women. By giving voice to the women who surrendered their reproductive rights to a non-profit that upheld white supremacy, society can better meet our moment. Other scholars and I can virtually address the existing desire to purify the nation, a desire that has shaped legislation into modern eugenics policy: the reversal of Roe v. Wade. This scholarship contributes to research on the history of Planned Parenthood and its role in current conversations around reproductive justice.

Political Party Affiliation and the Significance of Race: How Race is Correlated with Political Party Identification

Justus Robinson
Sponsor: Dr. Bernard Tamas
Valdosta State University

The 2020 Presidential election was one of the most historic elections in the United States. The world witnessed both Presidential candidates break and set a record for obtaining the most popular votes of any president in United States history. Controversies and speculations surrounded the election, but most importantly, the world observed that The United States is arguably the most divided that it has ever been. The Black Lives Matter movement gained momentum during this year and took to the public their support for the democratic candidate, and disdain for the republican candidate, while people against the movement demonstrated the exact opposite. As a result of this division, this essay asks: is race a significant component in determining one's party identification? In this essay, the data collected from the American National Election Studies 2020 Time Series Study is evaluated and used to produce various graphs and tables that measure the correlation between the independent variable, "Race," and the dependent variables, "Party Identification", "Democratic Feeling Thermometer", and "Republican Feeling Thermometer". Alongside race, other independent variables are measured with the dependent variables to depict their significance with party affiliation. These variables include the variables of "Gender," "Education Level," "Income," and "Urban and Rural Locations." One graph produced in this essay was the "Race By Republican Feeling Thermometer," which showed that more whites voted republican than non-whites. In addition to the conducted research, a literature review on the correlation between race and party affiliation was analyzed. For instance, various authors from the article Black Voters, Black Candidates, and Social Issues: Does Party Identification Matter? conducted research at Christopher Newport University to determine if race was more significant than ideologies regarding party affiliation. These authors found that the democrat party identification is the biggest factor in Black voter decision-making, validating that race was a more significant factor over party ideologies. Considering the findings of both the conducted research and the previously conducted research, the conclusion that this essay reached was that white individuals were more likely to be republican, while non-whites were more likely to be a democrat. Both the primary and secondary research validates that race is, indeed, a significant factor in party affiliation.

Postcolonial Discourse:
A British Perspective

Anna Cooper
Sponsor: Dr. Marty Williams
Valdosta State University

This research project analyzes *Wide Sargasso Sea* by Jean Rhys, *The Grass is Singing* by Doris Lessing, and *The Heart of Darkness* by Joseph Conrad using post-colonial criticism to reveal evidence of oppression through power dynamics that occur between key characters in the examined works. In particular, I examine the relationships between characters representing the roles of the colonizer and the colonized, provide context for the occurrence of double consciousness, and highlight the possible existence of post-colonial criticism through meaningful similarities between texts set in different colonial eras and settings. My analysis of these three texts shows the direct impacts of colonization and its formation of an ideological racial hierarchy resulting from Britain's colonialist imperative, and this deconstructive examination showcases how colonialism has promulgated Britain's post-colonial legacy. Analyzing the plots of these texts emphasizes contrasts between key characters that provide evidence of the authors' similar ideological perspectives while providing background for the way these authors depicted certain characters.

As I have focused on the main task of examining texts and applying them to the characteristics pertinent to colonialism and the post-colonial criticism, I have been able to become more knowledgeable not only of historical implications in general but have also come to realize how influential colonization has been to shape real human relationships as portrayed in literature over time.

Practical Solutions of Circular Doubly Linked List Implementation

Caleb Epps and Alessa Castillo
Sponsor: Dr. Anurag Dasgupta
Valdosta State University

Upon implementation of the circular doubly linked list data structure (CDLL), it was found that the two distinct problems chosen to solve were able to function effectively, meaning that the programs were well-suited for CDLL implementation. A music player Android app was built to have previous and skip functionality where the press of a button changes the previous or next song in the provided playlist. Playing to the end of the last song allowed the playlist to return and play the first song. Forward and reverse functionality was also provided to a song for the user to traverse the song's play length and return to the start of the song after traversing to the end. The second program featured a color wheel built with twelve colors, each color occupying an object in the CDLL. The wheel functioned to match analogous, complementary, or supplementary colors based on the location in the CDLL and the user's input to provide a color palette and suggest wardrobe options. The various color matching relied on CDLL traversal in both the forward and reverse directions for efficiency.

Precision Studies for String Derived Z′s at Hadron Colliders

Andrew McEntaggart, Alon E. Faraggi
Sponsor: Dr. Marco Guzzi
Georgia Institute of Technology
Kennesaw State University

One of the most well-motivated extensions to the Standard Model currently searched for at particle colliders is the Z′, an extra neutral gauge boson. Z′s emerge from extensions to the electroweak symmetry group in the Standard Model, which occur in certain string models and Great Unification theories. We consider Z′s in heterotic string-derived models and study Z′ resonant production in the Drell-Yan process at the TeV scale at the Large Hadron Collider (LHC). We generate various kinematic differential distributions at NNLO in Quantum Chromodynamics (QCD) using an amended version of the open-source program MCFM. We explore the parameter space of such models and investigate new bounds on the Z′ couplings. We also study the impact of kinetic-mixing interactions of the Z and Z′ vector bosons. In particular, we find that forward-backward asymmetry (AF B) distributions at the LHC are particularly sensitive to the Z′ coupling and its kinetic-mixing interaction with the Z boson as compared to other observables. The AF B distribution has discriminatory power and it can play an important role in validating models of Z′ at the TeV scale. Our study proceeds on a general ground and extends the current search for the Z′ boson to new models using various kinematic distributions of final-state particles which can in principle be measured at the LHC and at future colliders.

Prototyping a UWG-Centric Smart Assistant to Support Student Life

Steven G. Kight
Sponsor: Dr. Ana Stanescu
University of West Georgia

At most universities, information is presented in a static, web-based fashion. This proves an issue, as static web-based information can be hard to navigate. This project explores the feasibility of building a smart virtual assistant to recognize an individual user and retrieve solicited information and present the information in a human-like manner. Although Deep Learning has produced state-of-the-art results in speech and object recognition, the problem of training Neural Networks on a highly specialized, initially-limited, multimodal dataset has not been sufficiently addressed. We trained several deep networks within a highly modular and expandable software framework. The facial recognition module utilizes webcam data to encode facial features that are passed to a NN for user identification. The voice recognition module encodes a sound file that is then utilized by a NN to identify the user. A combination of face and voice features can also be leveraged for improved recognition of individuals. Our preliminary results show that even with limited data, while the facial model achieves 88% accuracy and the voice model achieves 83% accuracy, a heterogeneous model can achieve up to 89% accuracy. The conversation aspect leverages a NN to recognize patterns within a given input and determine the appropriate response before formatting it to include the answer to the question if there is a need to do so. This aspect operates efficiently and accurately with 96% accuracy. The contributions of this work are twofold. First, we demonstrate the feasibility of prototyping a highly customizable, intelligent, campus virtual assistant. Second, we conduct extensive experiments to better understand how deep networks can better learn over multiple modalities

Psychological Effects on Bilingual Children's Education

Laura James
Sponsor: Dr. Lavonna Lovern
Valdosta State University

The purpose of this paper is to explore the impact of bilingual language skills on children and adults. According to the National Center for Education Statistics (NCES) update in 2022, "The percentage of public-school students in the United States who were English learners (Els) was higher in fall 2019 (10.4, or 5.1 million students) than in fall 2010 (9.2 percent, or 4.5 million students)". This paper will examine both the positive and negative impacts on children and adults involving educational achievements, social competencies, and adult achievement scores. The paper will examine the academic and theoretical positives and negatives discussed in the articles such as "Models of Bilingual Education: Comparisons of Effectiveness" (By Moore and Parr, "Bilingual Development and the Education of Bilingual Children during Early Childhood" by Garcia, and "Psychological Aspects of Bilingualism" by Hakes.), Garcia, Eugene E. "Bilingual Development and the Education of Bilingual Children during Early Childhood and lastly Hakes, David T. "Psychological Aspects of Bilingualism," are just a few that will all be covered extensively. The paper will conclude that, while often creating challenges for younger children, being bilingual provides both advantages and opportunities as these students enter higher education and the workforce.

Public Health Districts Readiness for Program Evaluation of Nutrition and Physical Activity Programs

Madeline Meiser
Sponsors: Ms. Ivey Whitworth MS and Dr. Damian Francis Ph.D.
Georgia College and State University

Program evaluation is a critical component of public health practice and can enhance effectiveness and accountability for public health actions. As part of a State-wide public health district (PHD) program evaluation, an online survey was administered to 17 PHD program managers to assess readiness for program evaluation of the Healthy Communities Initiative (HCI) nutrition and physical program. The 31-item survey assessed readiness using the CDC framework for evaluation practice on a 5-point Likert scale ranging from "strongly agree" to "strongly disagree".

11 PHDs completed the survey. In assessing capacity for evaluation, 64% of districts strongly agreed that planned goals were aligned with HCI goals. In contrast 64% reported an inadequate evaluation team. While 54.6% reported representing stakeholders' interest, 45.5% had no plan for engaging stakeholders. Approximately 75% strongly agreed they identified the target population but 55% were unfamiliar with resources needed for program evaluation. There was low readiness in the domain "focus of the evaluation" with 50% of districts strongly disagreeing that they had a clear evaluation design, evaluation questions, or plan to address the CDC standards. Fifty percent or more strongly disagreed that they had a plan for use of evaluation findings or a medium to disseminate findings to target audience. In conclusion, PHDs program evaluation goals are aligned with HCI goals for nutrition and physical activity and addresses the priority target population. Deficits in readiness related to capacity and resources, stakeholder engagement, focus of the evaluation, gathering credible evidence and planned dissemination of findings needs to be addressed.

Reaching Out and Lifting Up:
Peer Mentoring in Teacher Education

Myah Anderson and Kristal Matthews
Sponsor: Dr. Rhonda Amerson
Georgia State University

This presentation will discuss the basis of peer mentoring programs in academia and the purpose of Middle Georgia State University's Department of Teacher Education's peer mentorship program. It will also investigate the logistics, social outreach, and interactions between mentors and mentees. To address the history of peer mentorship in the field of education, we explore the work of educator and theorist Paulo Freire and his elaboration on the practice of educational fellowship. MGA's Teacher Education Peer Mentorship Program takes the initiative of working with first- and second-year Early Childhood/Special Education students in collaboration with their third- and fourth-year peers to navigate obstacles and concerns with the ultimate goal of advancing together. MGA's peer mentoring team and its patrons have worked to prepare an arrangement that guides the discourse of common questions, aspects, and contributions of the Teacher Preparation Peer Mentorship Program. Alongside the program's attributes, we will use information about how current students feel supported in terms of academics and mental health to guide support plans. We will address the ways Middle Georgia State University faculty and staff look for signs of distress and use student-supporting techniques. This program's purpose is to increase connectedness among a concentrated non-traditional and commuter student population. This presentation will communicate MGA's available resources and how to expand students' attention to them. This presentation will address how MGA's faculty/staff, and Teacher Education Peer Mentorship Program can address student support needs. Through social outreach and teambuilding experiences, we will discuss how these components create a learning culture where students can seek help. The outcome of this program is to support teacher education students through their mental health and academic journey.

Realismo Mágico y Trauma: El Corazón Acuoso de "La Muñeca Menor" (Magical Realism and Trauma: The Watery Heart in "The Youngest Doll")

Georgia J. Wynn
Sponsor: Dr. Ericka Parra
Valdosta State University

Trauma can distort victims' worlds. *La Muñeca Menor,* written by Puerto Rican author Rosario Ferré, is a Spanish short story that blurs the lines between the real and the fantastic. The story illustrates the protagonist's past, specifically, one traumatic incident that alters her self-perception and leaves her with a permanent disability. Following the incident, the protagonist, a talented doll maker, marries a doctor who treats her like a spectacle to gain wealth. He displays her on the balcony like her nieces display their marriage dolls on the pianos in their homes. The protagonist's breaking point is when her husband removes two diamonds from the eyes of her niece's wedding doll and pawns them for a watch. Like the husband robs the doll of its diamond eyes, he also robs his wife blind: she loses her beauty, wealth, dignity, art, and freedom. Her position as a victim of trauma, a disabled person, and a woman, along with her husband's objectification of her, leads her to become one of her dolls by the end of the story. Through the lens of magical realism, this story illuminates the brutal effects of misogyny on females' freedom. Taking an interdisciplinary approach to the discourse of magical realism, trauma and disability studies, and gender, this article examines the impact of hegemonic masculinity on the protagonist's relationship with reality and society. I aim to connect the protagonist's trauma with scholarship examining magical realism and its conveyance of patriarchal dominance in the protagonist's life. The PowerPoint element of the project will be in Spanish, while the oral aspect will be in English.

Robert Colescott's Remodeling of Greek Myth

Avery Barnett
Sponsor: Dr. Glenda Swan
Valdosta State University

Mythology was at the center of life in ancient Greece. Depictions of myths adorned everyday objects like pottery as well as public buildings in order to visually communicate their cultural values to members of their society. While the original cultural context of these myths no longer survives, many artists have continued to reinterpret them to express their own modern thoughts or feelings. These myths found an unlikely muse in Robert Colescott, a black man born in 1925's America who felt pressured in his youth to pass as white before choosing to embrace his race. Colescott used his art to express the difficulties that his blackness has had on his life and career. He often employed Greek myth – which is often associated with whiteness and elite culture – to create visual allegories for his modern life through this traditional lens. His approach was satirical, bending the meanings of these myths in a tongue-in-cheek, humorous approach to the social issues that he and many others like him faced. In his 1981 painting titled The Three Graces: Art, Sex and Death, he inverts elements from the myth of the Judgment of Paris to cast himself as the object of divine judgment, reflecting his experience as a Black artist. His work was made to shock viewers, as he depicted these three graces as sexual objects in the process of destroying a constructed version of himself. While Colescott's work may not be very visually similar to ancient Greek works, his concerns with issues of power and control can also be found within their myths and images.

"Save the Bees" – Effects of Urbanization and Local Habitat Characteristics on Bee Populations in Texas

Sarah Toole
Sponsor: Dr. Andrea Ramirez
Florida State University

The purpose of this proposed study is to evaluate the effects of urbanization and local habitat characteristics on bee diversity/richness and bee overall population abundance over five years in fifteen cities in Texas. Understanding the impact of different environmental elements on the bee population is vital as bees are pollinators and, therefore, critical to crop growth and human food consumption. My project proposes to study the bee population over a five-year time frame in fifteen cities in Texas, and how the richness/diversity and abundance of the bee population would be affected by the distance of resources from the bee nests, the number of resources that the bees had access to, and the amount of construction (development). The anticipated results would be consistent with negative effects of urbanization on local habitat characteristics, with increased urbanization leading to fewer female bees, a decline in the overall abundance of bees, and a decline in species diversity/richness. Any future work should focus on reducing the environmental impacts of urbanization and aiming to protect the bee population by providing human assistance if needed.

Securing Belonging:
The Triumphs and Tribulations of
Church-to-Mosque Conversion in Hamburg, Germany

Hannah Kreuziger
Sponsor: Dr. Florian Pohl
Oxford College/Emory University

Building a mosque has become a highly contentious topic in the United States, but this process is distinctly complex in Germany. Engaging scholarship on citizenship theory, the presentation asks how German Muslims respond to public and legal campaigns against them and their building projects and what strategies they use to secure inclusion and belonging. As part of the discourse on the position and visibility of Islam, mosques have been vilified because they are interpreted as claims to power in public space and contenders against traditional German identity (e.g., Becci & Giorda 2017, Becker 2017). As a result, European cities like Hamburg have seen increased Islamophobic hostilities, primarily through opposition against mosque building projects. Based on ethnographic fieldwork, the study focuses on the recent highly controversial cases of a church-mosque conversion to point out unexpected ways in which inclusion, as policy and desire, is reshaping German Muslim communities today. In 2018, the Al-Nour mosque opened its doors to Hamburg's Muslim community in the building of the former Protestant Kapernaum Church. The sale and subsequent conversion of the vacant church had been met with praise and condemnation from various voices in Hamburg. However, the study finds that the project's success was made possible by the deliberate citizenship work of the Al-Nour leadership aimed at altering public images of Otherness and stigmatized difference. A central theme in Al-Nour's self-representation was that of openness, gender justice, and commitment to 2 interreligious dialogues. In other words, inclusion became possible because the Muslim community anticipated repercussions and responded by expressing an assertive yet tactically adaptive understanding of German identity and belonging. The citizenship discourse evident in Al-Nour's response can be described as a form of disciplinary inclusion (Shryock 2013), which offers the promise of inclusion only in return for certain identity concessions. However, there is evidence of both opportunity and coercion in the activities of the Al-Nour community. Although the broader social discourse on Islam in Germany circumscribes and shapes the identities to which Muslims as individuals and groups can aspire, the presentation concludes by drawing attention to some of the unexpected developments through which members of the Al-Nour community have reframed expectations about them and their mosque. It, therefore, argues for a more complex understanding of citizenship work at the intersection of policy and desire

Settler Colonialism in Palestine: How Settler Colonial Identities Inform Historical Narratives and Understandings

Jessica Cloud
Sponsor: Dr. Leslie Whitmire
Georgia State University

This is intended to be a face-to-face presentation as an analysis of contemporary theories of settler colonialism for the purpose of understanding the Palestinian-Israeli conflict. I explore one of the defining aspects of settler colonialism through the investigation of Israeli museum exhibits and memorials. I initially provide a comprehensive definition of settler colonialism. This definition is informed by academic research of scholarly works by Lorenzo Veracini on settler colonialism as a distinct form of the wider phenomenon of colonization, and Julie Peteet's ethnographic work in Palestine as it is characterized by settler colonialism. Aspects of this definition are utilized to analyze some of the ways in which settler colonial identity informs historical perceptions. For example, the cultural-historical erasure of Palestine is related to settler colonial theories as it applies to the identity of settlers as both the indigenous and the exogenous Others. This is demonstrated through surveys of Israeli museums, exhibits, and memorials with exclusionary expressions attempting to erase the cultural-historical experiences of Palestinians. The methodology employed includes participation in virtual tours of museums and national memorials paired with the implementation of scholarly research for the purpose of creating informed interpretations of the cultural significance of museums and memorials. This research contributes to understandings of how institutions can structure cultural interpretations of history and a method that could be applied to ethnographic research.

Sex Differences in Renal Mitochondrial Function of Young Healthy Rats

Adam Jones and Ryan Schibalski
Sponsor: Dr. Daria V. Ilatovskaya
Medical College of Georgia, Augusta University

Sex differences are distinctions between males and females that are caused by genetic, developmental, biological, and environmental factors. As a result of these distinctions, males and females respectively exhibit susceptibility to a number of diseases. Furthermore, mitochondrial dysfunction has been implicated in a majority of these diseases. The goal of this study was to compare the baseline function of renal mitochondria in young, healthy male and female rats.

Mitochondria were isolated from the cortex and medulla of kidneys collected from 11-week-old male and female Sprague Dawley rats. Seahorse Assays were performed on isolated mitochondria using the XF24E Seahorse Analyzer, with sequential injections of ADP, Oligomycin, FCCP, Antimycin A, and Rotenone, to measure oxygen consumption rates (OCR) at various points of mitochondrial respiration. Spectrofluoremetry was performed using TMRM and Amplex Red dyes to measure mitochondrial membrane potential and hydrogen peroxide production, respectively. Western Blot analysis was performed on snap-frozen renal tissues to observe protein expression; statistical analysis was run in OriginPro.

We report increased mitochondrial membrane potential, hydrogen peroxide production, and antioxidant expression in female mitochondria samples, particularly in renal medullary tissue. Additionally, we report increased Basal OCR, ATP-linked OCR, and Spare Capacity OCR in the mitochondria of renal cortical tissue from our male samples.

Sex differences exist in the renal mitochondria that affect membrane potential, antioxidant defense, and respiration. Oxygen consumption is heightened in males, whereas membrane potential and antioxidant protein expression are increased in females. This data confirms unique bioenergetic profiles in male and female kidneys, which can be exploited via precision medicine treatment plans.

Should Blood Be Thicker than Water? Examining the Place of Preferential Treatment within the Stoic Cosmopolitan Ideal

Nana Yaa Awere
Sponsor: Dr. Allison Piñeros Glasscock
Georgia State University

At the core of ancient Stoicism lies a cosmopolitan view of social relationships. Human beings possess a rationality unlike any other creature, and many Stoics thought that rational nature entailed an understanding that one is a citizen of the world. In practice, this meant treating all people like family–with care, justice, and dignity–regardless of relational status. The idea of treating everyone as family raises questions about whether the Stoics would have permitted the prioritization of blood relatives over strangers despite the need to treat everyone well. This is a question of whether preferential treatment is compatible with the Stoic cosmopolitan ideal. Some Stoics seem to think that preferential treatment is permissible; in his On Appropriate Acts, the Stoic Hierocles appeared to favor the prioritization of one's bonds with her parents and siblings as opposed to strangers, and he also discussed the importance of honoring one's own country. Similarly, Cicero—who was not a Stoic himself but reported on Stoic views and was heavily influenced by them—also thought that despite our various social relationships, we should be most loyal to our nation. Although Cicero and Hierocles are aligned with Stoicism, it is unclear whether their apparent endorsement of preferential treatment is compatible with the orthodox Stoic views that comprise Stoic cosmopolitanism. Consequently, the aim of this research is to examine evidence supporting the endorsement of preferential treatment within Stoicism and determine through close readings of primary and secondary texts whether preferential treatment is compatible with the Stoic cosmopolitan ideal. Additionally, I will consider the implications of my research on the broader understanding of Stoic ethics while addressing how this examination of ancient ethics might inform contemporary ethical views concerning our treatment of others.

Simple Synthesis of Trimetallic Electrocatalysts for CO2 Reduction

Jodeci L. Mitchell
Sponsor: Dr. Tolulope O. Salami
Valdosta State University

Carbon dioxide is a potential carbon resource because of its abundance on earth. Also, it is a gas that is rapidly increasing in the atmosphere due to human activities. Thus, developing the next-generation electrocatalyst materials for electrochemical reduction of CO2 to multi-carbon fuels and chemical feedstocks is an important area of research. We are currently using a simple method to develop a library of Trimetallic alloys that are currently being screened for their catalytic potential. Our presentation will showcase the synthetic methods of the alloys from cyanogels and the analysis of the alloys.

Sino-American Competition in the Field of Artificial Intelligence

Timothy Sabau
Sponsor: Dr. Daewoo Lee
Columbus State University

China's "Sputnik Moment" for Artificial Intelligence (AI) occurred in 2016. The full-scale mobilization led China to catch up to and even surpass the US in some sectors of AI development. The National Security Commission on AI (NSCAI) used a variation of the "AI Stack" as a rough metric to determine a country's progress in AI. This research takes the NSCAI Stack system, condenses it from six to five variables (Hardware, Algorithms, Applications, Talent, and Data), and then applies it to grade AI policy for the US. From there, stakeholder analysis is considered, and policy proposals are placed on a three-tier system based on policy payoff and the likelihood of implementation. This research looks at policies ranging from semiconductor manufacturing to immigration procedures and establishes a ranking system. This research also provides background on the AI competition and compiles a broad range of statistics and phenomena indicative of AI progress for both countries. This research concludes that US implementation of tier one and strategic tier two policies could be effective in maintaining and regaining the AI edge in numerous areas of the Stack. Unfortunately, regardless of policy, there is almost no conceivable way the US could regain an edge in Data, but policies that bolster Talent acquisition and expand Hardware capabilities could prove invaluable. The results also indicate that many highly effective policies are not massive in scope or unrealistic in implementation– they often just require awareness of the issue and relatively low-cost implementation. In fact, many good AI policies are universally good policies; they just have not received the necessary attention until very recently. Finally, the results suggest that AI policy's recurring shortcomings are not the lack of good ideas but disagreement or failure to implement those ideas synergistically.

Social Media Usage and Uncertainty Intolerance

J'Maica Frame-Cabell
Sponsor: Dr. Chia-Ling Lynn Ho
Valdosta State University

Prior literature found that the use of mobile phones will reduce individuals' intolerance of uncertainty and yet intensify their anxiety levels when coming into contact with things that are foreign to them. To learn more about the relationship between social media usage and how one responds to an unfamiliar phenomenon, in this case, interacting with strangers, the current study surveyed twenty undergraduate students via convenience sampling. This study found that social media usage in participants was positively and weakly correlated with an individual's tendency to avoid interacting with strangers. The results are in line with other studies, which suggested that excessive social media use will intensify the intolerance of uncertainty toward phenomena that are unanticipated.

So Much to Say: Contributing Alternative Discourses on College Mental Health

Julia Kwak, Cody Nelson, and Gracie Wilson
Sponsor: Dr. Alicia DeNicola
Emory University

Research in recent years has shown that college counseling centers are struggling to meet the demand for student mental health needs. Much of what informs those needs are standardized clinical instruments used by counseling services (Center for Collegiate Mental Health, 2022) and surveys from various mental health advocacy organizations (Center for Collegiate Mental Health; Active Minds, Sept 2020; Healthy Minds), all of which assess the needs and experiences of individual students. Building upon recent studies that center student experience as socially influenced (Rosenbaum and Liebert, 2015; Anderson-Fye and Floersch, 2011), the present study approaches student experience culturally, investigating how students relate to one another and how they make sense of the terms used on those surveys. This study uses an anthropological lens and ethnographic approach to (re)center student experience: to make visible the experiences, nuances, and cultural influences that traditional counseling methods may not provide the space, tools, and language for. Through semi-structured interviews following student discourses of their academic and social environments, this study argues for the importance of understanding linguistic patterns connected to feelings of success and failure, and student relationships to the expectations placed upon them as both individual and relational. The study also looks at the ways that students think about and gain autonomy within these systems. In doing so, this study contributes alternative discourses and methodological approaches regarding student experiences previously absent from scholarship on student mental health and college culture. This study will be presented virtually by the student researchers using the webinar option.

Spatial Analysis of Vaccine Policy and Coronavirus

Elizabeth A. Thornton and Jodeci L. Mitchel
Sponsor: Dr. Jia Lu
Valdosta State University

The spatial analysis of vaccine policy and coronavirus research is necessary for the purpose of gathering information for a more efficient policy response to future pandemics. There is a large amount of literature on vaccination for diseases, but its impact on COVID-19 is unclear. Thus, it is necessary for us to research this topic. We gathered data from Ourworldindata and the World Health Organization and studied COVID cases, deaths, and vaccination policies in over 200 countries. Then, we used the Minitab software to conduct correlation analyses. The results depict that COVID-19 infection rates are higher in countries with a higher vaccination rate, probably due to the fact that these countries encourage vaccination as a result of their high infection rates, and high vaccination rates lead to a decrease in precautionary measures among the population, hence an increase in exposure to the virus. Nevertheless, there is a correlation between vaccination rate and lower hospitalization and death rates. This provides evidence that antibodies present in the human body after COVID vaccination could possibly protect against the deadly effects of the virus but not fully prevent contracting the virus. However, future research is suggested in order to further investigate this notion.

Stigmatizing Sexuality: Public Support for Restrictions on Blood Donation for Men Who Have Sex with Men

Brandon Booker
Sponsor: Dr. Anne Price
Valdosta State University

Blood donation is an essential component in the health care system. Blood is needed to compensate for blood lost during surgery or for patients with serious health conditions. Potential donors are asked questions to determine their donation eligibility; however, with the U.S. currently facing the biggest blood crisis the nation has seen in over a decade, people may begin to wonder why some people are being are being turned down on the opportunity to save another person's life. This research asks, "How do age, gender, sexuality, and political identity affect individual's attitudes regarding whether they support the right of sexually active gay and bisexual/pansexual men to donate blood?" I conducted survey research using Qualtrics. I used Chi-square tests to see if there were significant associations between identity characteristics and support for restrictions on blood donation for men who have sex with men. I found that that categories of political identity are associated with variation in support for blood donation restrictions. 18% of conservatives strongly agreed with restrictions on blood donation for sexually active gay men and 9% somewhat agreed. In contrast, 0% of liberals strongly agreed with restrictions, and 2% somewhat agreed. 10% of those identifying as some other political group strongly agreed and 0% somewhat agreed. Surprisingly, I did not find gender or sexuality to be significantly associated with support for restrictions on blood donation for gay, bisexual, or pansexual men.

Super Shellfish:
How Oyster Restoration Can Help Save Our Oceans

Madeline Pond
Sponsor: Dr. Thomas J. Manning
Valdosta State University

While many people associate oysters with butter sauce, these incredible animals are so much more than a delicacy. Supplying erosion control, water filtration, a hub for biodiversity and so much more by simply existing make oysters an amazing species worth protecting. Green technology is an overarching term that describes the use of technology and science to reduce anthropogenic impacts on the natural environment. Green technology encompasses a large array of research, including but not limited to hydrology, agriculture, energy, material science, and atmospheric science. Our research utilizes renewable resources and natural chemical sources to create base structures to be used to rebuild oyster bars. It demonstrates a biodegradable, mobile, and affordable way to reconstruct a base for a key stone species that is suffering massive habitat loss. Oyster bars serve as natural erosion control, water filtration, and food and shelter for hundreds of species. Following the 12 principles of green tech, our research shows a sustainable way of helping preserve this species. This presentation discusses results from the "Living Dock" by Jack Rudloe and the UGA Marine Lab (Skidaway Oceanographic Institute) involving novel materials and methods produced by VSU students and faculty, past and present.

Tattoos and Bumper Stickers: Public Symbols as a Window into Appalachian Identity

David Myers
Sponsor: Dr. Robin O'Day
University of North Georgia

The presentation examines the use of public symbols in everyday life with attention to automobile bumper stickers and tattoos in the Appalachian region of North Georgia. Based on over ten oral narrative interviews with local community members, the study investigates the meanings behind people's use of bumper stickers and tattoos and why they chose to display them. As "cultural artifacts," bumper stickers and tattoos can operate as a window into local culture and subcultures. Bumper stickers attached to vehicles tend to share a view, express frustration, or offer some perceived insight, solution, or wisdom. The bumper sticker may express a personal philosophy, political anger, outrage, parental pride, sexual preference, or social comment. It may also represent personal humor, ethnic identity, class resentment, and commentary on American culture, values, and social institutions. The research found that tattoos, on the other hand, tend to express more personal meanings that may not be immediately evident without explanation. The interviewees articulated social norms, values, and local cultural experiences through attention to bumper stickers and tattoos. This ethnographic study used the methods of semi-structured oral narrative interviews with informed consent. The interviews were video recorded and transcribed. The presentation will discuss the role tattoos and bumper stickers play in interviewees' lives and how they connect to their local identities.

Teaching History through Video Games

Hannah Stanley
Sponsor: Dr. Thomas Aiello
Valdosta State University

Educators have always faced a difficultly with history. Students notoriously characterize history class as being boring, filled with memorizing dates and people long dead. The video game world has ignored this fact and produced many games based exclusively on history, from Ancient Egypt to the Medieval Era. Projects like the Assassin's Creed Series and Red Dead Redemption are rarely wholly historically accurate, but they remain historical. Historical Video Games are an engaging tool for teaching history. While many of these historical video games have some inaccuracies, they do educate students about figures, places, and issues of the time period they cover. As a tool of education, video games have created possibilities for historical engagement that other media do not. These stories have inspired tours and museum exhibitions, granting students real life interaction with heritage sites in places like Italy and Egypt. These videos games have a positive overall effect on the field, as it grabs players attention. Students educate themselves while doing something they enjoy, playing video games. While these games often fail to get details correct, they popularize stories of history, and create interest in students to potentially correct details through their own research. Video games give new and old students of history a new way to interact with the past.

Teaching with Technology During the Pandemic

Alisha Gordon
Sponsor: Dr. Danilo Baylen
University of West Georgia

The presentation describes and discusses a study focusing on actions and responses to the pandemic by teacher education programs in higher education institutions in India (Joshi, Binay & Bhaskar, 2020), Namibia (Boer & Asino, 2022), Nigeria (Eze, Sefotho, Onyishi, & Eseadi, 2021), and the United States (Leech, Gullet, Cummings, & Haug, 2022). Four faculty members (i.e., one from each country) completed the initial survey asking for information about (a) teacher education degree program, (b) curricular content knowledge and skills, (c) instructional framework or pedagogical approach, (d) recruitment and admission, e) student population (f) graduation requirements, (g) faculty background, (h) technology use and practices before and during the pandemic, (i) challenges to teaching before and during the pandemic, (j) program policy changes, and (k) context and culture. Based on the collected participants' narratives from four teacher education programs, the researchers conducted follow-up virtual interviews via Zoom application to clarify and confirm the accuracy of the data. After the researchers received confirmation from participants, they subjected the data to content analysis, which identified themes, patterns, similarities, and differences across the country-specific teacher education programs. Findings include variations in program types, curriculum, student populations, recruitment strategies, admission procedures, and faculty. For example, three of four teacher education programs reported undergraduate students registering for education core courses at the beginning of their third year. However, for one teacher education program, students must complete a non-education degree before pursuing and completing a second degree in education. Further, each teacher education program managed the impact of the pandemic depending on available and accessible technology and resources. One teacher education program integrated technology into all courses while the rest of the programs struggled to connect their students online at the onset of the pandemic. Finally, the researchers will discuss the challenges of delivering the programs remotely or at a distance.

Technological Distraction in Italian Personal Relationships

Anna Marie Boughton, Caroline Veal and Regan Mitchell
Sponsor: Dr. Tsu-Ming Chiang
Georgia College and State University

The increasing presence and reliance on mobile phones and portable devices have impacted social relationships and connections (Huber, 2021). Allowing mobile devices in spaces preserved for interactions, like mealtimes with family and loved ones, has opened doors for distraction. It may severely impact personal relationships in the development of healthy attachment (Huber, 2021; McDaniel, 2020; Gaudreau et al., 2022). Young married adults perceive technology to play significant roles in their relationship issues. It showed partners tend to spend similar lengths of time on their devices despite boundaries and restrictions set on phone usage (Vaterlaus et. al, 2020). Thus, the purpose of this project was to observe the frequency of phone usage to understand the implications of technological distraction in interpersonal relationships, especially in a culture where it is valued. In a study abroad program, the researcher used an observational method to explore phone usage at the table by Italians sharing meals. Based on how Italians value family time and meals, the study expects to find low usage of phones during mealtime. The observational data was collected from 8 Italian cities. It included 190 tables and 570 individuals of different ages. The assumed relationships and phone usage were recorded to document signs of distraction. Overall, the results showed tables observed had little presence of phones. Therefore, it showed less technological distraction. The detailed results will be shared at the conference. The implications of technology usage are being discussed in various developmental topics such as eating disorders in adolescents, attachment in families and couples, parenting styles, and other measures relating to interpersonal relationships. This presentation will further discuss the implications and future direction of the project.

Teen Pregnancy:
Social Impacts and Solutions

Raneshia Hudson
Sponsor: Dr. Ellis Logan
Valdosta State University

This research focuses on measures to prevent teen pregnancy. Going through a teen pregnancy is typically not going to be easy. Teenage pregnancy is linked to early experimentation with sex, typically around the age of 14-18, which may lead potential pregnancy. However, in 2016 young ladies as young as age 10 have also increasingly been engaging in early sex, resulting in pregnancy. Teens should be more aware and educated about the harsh reality that comes with raising a child during high school and college years.

In 2020, the teen birth statistics show that 1,000 births occur every hour for females between the ages 14-19, globally. This is down eight percent from 2019. In 2020, roughly 13% of young women who have their first baby between the ages of 15 and 19 years old have an increased likelihood of having more children later in life. Additional, 78% of these teen births occurred outside of marriage, globally. Even though young women are having children early, the teen birth rate in the United States remains higher than in other countries.

Further, I will explore how teen pregnancy could have a negative impact on both the mother and the child, especially when it is an unplanned pregnancy. To help control and prevent teen pregnancy we can create policy initiatives to modernize and strengthen sex education in public schools. Another strategy for reducing teen pregnancy is for parents to speak with their children early about sex. Parents should employ honest realistic dialogue about sex, set standards, and address difficult questions positively. However, I would consider having a baby education class for high school girls for one month to get the full experience of what it would feel like to be a mother. If we educate young girls early about pregnancy, we will see major progress.

Temporal Shifting in Post-Modern Native American Literature

Tyler Cosper
Sponsor: Dr. Ubaraj Katawal
Valdosta State University

In *Ceremony* by Leslie Silko and *The Night Watchman* by Louise Erdrich, Native American characters connect with their cultural, ancestral past to confront existential threats in the present. This process is described as "temporal shifting" by Anastacia Schulhoff in her article "More Than Native American Narratives: Temporal Shifting and Authentic Identities." Through temporal shifting, Schulhoff argues that Native Americans can mentally shift to an era before European colonization in an attempt to reorient their perspectives. Using Schulhoff's concept and my own research, I will demonstrate how Tayo in *Ceremony* and Thomas in *The Night Watchman* utilize their ancestral roots as a means to face present-day issues, and how Native American culture allows for a reimagining of the commonly accepted view of time.

The Challenges of Data Recovery in Solid State Drives

Joseph Smith, Conner Moeck and Nicolas Kimmel
Sponsor: Dr. Lydia Ray
Columbus State University

Solid State Drives (SSDs) are modern storage devices, more efficient than traditional hard drives. As the use of SSDs becomes more widespread, we are challenged with understanding the intricacies of these devices, especially from a data recovery standpoint. In the interest of fast rewriting, SSDs utilize a garbage collection process. This process prioritizes making sure the deleted files are all grouped together and they are collected and deleted automatically. Some SSDs utilize an operation called TRIM which both finds the files to delete and deletes them almost instantly. This project was done by a group of three students – Nicholas Kimmel, Conner Moeck, and myself – in Spring 2022. In this project, we explored how TRIM impacts deleted data recovery. We installed Windows on an SSD. We created a lot of different files and stored these in the SSD through an automated process. Windows 10 OS allows us to enable or disable TRIM operations. We conducted data recovery once with TRIM enabled, and then with TRIM disabled. We compared the results to understand how TRIM impacts deleted data recovery in digital forensics investigation. This research was undertaken and completed during the Spring of 2022. We concluded that the TRIM operation makes it difficult to recover files; however, there are ways to circumvent this from happening.

The Ecosystem of Collaboration: Artist as Art Piece

Logan Mossor
Sponsor: Jonathan Fisher, MFA
Kennesaw State University

Collaboration in the visual arts has presented itself in many ways, ranging from the common exquisite corpse games in schools to grand-scale environmental works like Christo and Jeanne Claude's *Running Fence*. In either context, multiple individuals with different talents contribute to a shared artistic outcome. Performance-oriented collaborations involve the participants seeing themselves as artist, collaborator, and the art medium. These overlapping identities create a space where ideas are shared, and the creativity of each participant amplifies that of the rest. Collaborations often result in a completed visual product, but the most important element in collaborative art is the experience of the participants themselves. The artists' movements and ideas are recorded in the collaboration as it happens; the finished product merely keeps a record of that experience. For this reason, collaborative art can be performance art in the moments of its creation. Through the research of performative and collaborative projects such as Yves Klein's *Anthropometries* and performances such as Marina Abramovic's *The Artist Is Present*, my goal is to stage and document three different collaborative projects that explore the cultivation of creativity. These collaborative performances will include a diverse and inclusive range of participants. Additionally, these projects will be staged in public spaces to bring art into the lives of passerby outside of the usual museum setting. The result will be a presentation of these collaborative art projects, discussing the connections those projects have to art history, and the artistic value that staging future collaborative artworks could have on the art community.

The Effects of Pollution on Carotenoid Allocation in the Eggs of Bluegill and Redbreast Sunfish in Columbus, GA

Likhita Aluri
Sponsor: Dr. Michael Newbrey
Columbus State University

Of the many factors studied to better understand the health of organisms, carotenoids are pigments gained through food and function as antioxidants in organisms. Bluegill and Redbreast Sunfish are the two species to be used to study carotenoids in eggs of fishes. I intend to study the allocation of carotenoids in fish eggs. Carotenoids are limited but help in fish health which brings the question of how much and types a fish would give to its eggs. Environmental factors determine if, how much, and types of carotenoids can gain; factors like the food sources and the quality of their environment. After gathering research in my review of the limited literature, samples of both intended study species will be collected from a categorized polluted and unpolluted water source and the egg sample gathered will be analyzed to see carotenoid types and general allocation. The goal of this research is to better understand carotenoids in fishes as well as to see if the environment of a fish limits its allocation of carotenoids to its eggs.

The Effect of the Soul Swim Cap on the Assessment of Percent Fat Estimate by Air Displacement Plethysmography: A Pilot Study

Briana Thompkins
Sponsors: Dr. Mark J. Kasper and Dr. Lois Bellflowers
Valdosta State University

Air displacement plethysmography (ADP) estimates body composition. The volume of air displaced while sitting inside an enclosed chamber is combined with body mass to estimate a percent body fat. Air that is trapped in hair will skew volume displacement and underestimate fat percentage. Therefore, a standard swim cap is required to completely cover and compress all scalp hair air. Problem. A standard swim cap fails to cover and compress all scalp hair of African American's (AA) who present with long, thick afro's, locks, or box braids. A new soul swim cap was specifically designed for AA, but the literature is void on its validity with ADP. Purpose. To assess the effect of the soul swim cap on ADP percent fat estimate in AA who present with scalp hair that does not fit inside a standard swim cap**.**

Each subject was tested three times under all three conditions via random order – no cap, standard cap, soul cap. Dual energy absorptiometry (DXA) was the criterion. Repeated measures ANOVA evaluated percent fat differences. Statistical significance was set at $p < 0.05$. Results. n=7 females. No differences for mean percent fat between: no cap (30.3%), standard cap (30.4%), soul cap (31.3%). However, there was a significant difference between the criterion DXA percent fat (39.6%) and each cap n ($p<0.05$).

The study's result concluded that in AA who present with long, thick afro's, locks or box braids, the type of cap for ADP may not matter. However, the percent fat estimate is underestimated when DXA is the criterion.

The Great Resignation: What are the Factors That Caused People to Quit Their Jobs across the 50 States?

Nyla Cyan Williams
Sponsor: Dr. James LaPlant
Valdosta State University

This quantitative study examines the key predictors of why the American people vastly resigned from the labor force starting in 2020. Historical factors led to 4.3 million Americans resigning from their jobs, a movement that was later quoted in the media as "The Great Resignation." This study evaluates what factors across the United States led to the 2020 Great Resignation, or 2.9% of the entire workforce quitting their jobs starting in March 2020. When examining the rate across the 50 states, resignation rates rose with Kentucky having the highest rate at 4.5% in comparison to the lowest rate, Pennsylvania, at 2.1%. This study analyzed 11 independent variables: COVID-19 cases by state (2021), percentage of African American by state (2019), percentage of LatinX by state (2019), per capita household income (2019), population density by state, percentage of bachelor's degree or higher (2019), total business applications by state (2021), number of political demonstrations in 2020 by state, region of the state, state access to Medicaid, and the percentage of tourism in the state's GDP (2019). The impact of these variables on the dependent variable, the resignation rate across the United States, is determined through correlation analysis, scatterplots, a boxplot, and multivariate regression analysis. Three of the eleven variables proved to be significant in the study. The population density within the states, per capita household income within the states, and the percentage of bachelor's degrees or higher across the states were all found to be highly significant in the bivariate analysis at $p<.01$. These factors surprisingly became insignificant at the end of the multivariate analysis. Consequently, it appears that recent social factors have allowed American people to choose different lives for themselves, and it is imperative to understand how to respect the decisions of our people while making business and economic law. Equity should be at the forefront of American success.

The Impact of COVID-19 on Women-Led Small Businesses

Lizbeth Avendano
Sponsor: Dr. Katia Galdino
Georgia Southern University

The Covid-19 pandemic affected businesses worldwide due to prolonged shutdowns. Since everyone had to stay home, it was hard for people to make money; many had to take care of their loved ones, and numerous children stayed at home. This affected a lot of people's work-life balance. Women entrepreneurs particularly faced increased challenges trying to balance work and family during the pandemic, as most daycare facilities and schools were also closed, and women tend to face most of the burden of taking care of their families. In this study, we look at how women ownership, compared to men ownership, affected the performance of small and medium-sized businesses worldwide, and whether access to financial support, mostly governmental resources, affected this relationship. Relying on data from the World Bank Enterprise Surveys collected in 2020 with over six thousand small businesses in 12 countries, we find that women-led businesses had a higher decrease in sales than men-led businesses, although this relationship was contingent on whether the business received governmental support. This study contributes to entrepreneurship research and practice by looking at gender diversity and small businesses' performance during the Covid-19 pandemic, a context that extends the boundaries of work-life balance literature and its effect on entrepreneurial outcomes.

The Implementation of RFID in an Attendance System

Cravon A. Mallory, Jr.
Sponsor: Dr. Chunlei Liu
Valdosta State University

Radio frequency identification (RFID) is a wireless technology that uses radio frequencies to transmit data between a tagged object and a reader when the tag comes within the vicinity of the reader. Because of its versatility, RFID has been used in various access control, inventory management, and database systems. The purpose of this project is to explore the hardware and software implementation of RFID technology through a class attendance system, which would be more efficient and accurate than the traditional roll calling. The attendance system needs three main functions: writing student names onto RFID tags for registration, class enrollment, and attendance data collection. To implement these functions, we select hardware available on the market and choose the following low-cost hardware. An Arduino UNO R3 microcontroller is used to control serial data communication and manipulation between passive RFID tags and a high-frequency MFRC522 reader module. A DS321 real-time clock module records the time with crystal oscillator frequencies and a Micro SD Card module records the tag IDs and attendance records into text files. These modules are connected to the UMO R3 through USB ports. Combined costs for the hardware components are under $100. The software for the attendance system is developed as a C++ program and is uploaded to the microcontroller using the Arduino IDE. A GUI is also developed using C# and Windows Forms on Visual Studio Code to provide a user-friendly interface to control serial communication with RFIDs. Tests with various data inputs, communication speed, storage, and number of students verified that the attendance system is implemented successfully. Future development on the GUI and Arduino code is needed to ensure an optimal and satisfactory system.

The Literature of Siu Kam Wen and Julia Wong Kcomt: Disrupting Universalism in Peru's Popular Narratives

Maria-Paula Ramirez Wong
Sponsor: Dr. Randy Malamud
Georgia State University

Peru has the largest population of Chinese people in all of Latin America. In Peru, "Tusán" describes the identity of Chinese Peruvians or Peruvians of Chinese ancestry. Many Chinese and Tusán writers, artists, and politicians have shaped the Peruvian historical and social landscape. Yet, Peru's national narrative ignores Chinese contributions. Tusán families began emerging in the 1870s but would not be acknowledged or given racial category by the Peruvian government until the 20th century. Scholar Isabelle Lausent-Herrera argues that this lack of acknowledgment signified that Chinese-Peruvians had no real place in Peruvian society. Historians Elliott Young and Jason Chang argue that constructions of Latin American mestizaje and national belonging relied on anti-Chinese racism. My presentation aims to complicate popular narratives of what it means to be Peruvian and Tusán by engaging with the literature of two important contemporary writers: Siu Kam Wen (b. 1950) and Julia Wong Kcomt (b. 1965). While Siu Kam Wen explores the Chinese diaspora within the border of Peru through the "immigrant consciousness," Julia Wong Kcomt's poetry conveys her cosmopolitan vision between borders. Both authors explore diasporic identities, Peru's xenophobic history, and disrupt Peru's national Eurocentric narrative by presenting their own decolonial and alternative knowledge which has emerged from their Asian-Peruvian experiences.

The Mental Health of Collegiate Athletes Due to Athletic Demands

Madeleine Mayer
Sponsor: Dr. Christine James
Valdosta State University

Mental health is an essential ingredient to one's success within any demographic, but specifically, it is a significant component of life for collegiate athletes. This component has been largely overlooked when considering the relevance and severity of the impact that it has on the athlete's sport performance, academic success, and physical health. Through my research I will consider these topics as well as the various factors that impact collegiate athletes' mental health. I will also discuss research that suggests collegiate athletes and non-athletes are not different from one another regarding the mental health pressures they are experiencing. Furthermore, I will introduce the connection that is present between an athlete's mental health and their academic performance, as this is a topic of discussion in a study by Karagiorgakis and Blaker (2021). Denny and Steiner (2009) mention a dichotomy between internal and external factors within the athlete's life that potentially impact their happiness, and therefore their overall mental health. However, this is a system that does not provide sufficient detail to fully encompass the broad spectrum that is a collegiate athlete's mental health. I will refute the dichotomy presented by this study that mental health challenges in a collegiate athlete's life can be expressed as a matter of strictly internal or external factors. Instead, I will defend the argument that factors impacting collegiate athletes' mental health are not capable of fitting into two simple categories and must be assessed on a different scale than non-athletes due to the different stressors in their lives.

The Missionary vs. Her Movie

Hannah M. Clark
Sponsor: Dr. John Dunn
Valdosta State University

Gladys Aylward was a British Missionary in the Republic of China. There she founded an inn called "The Inn of the Eighth Happiness." As the basis of her ministry, the inn was a place for traveling caravans to stop on their way through the mountains. While in China, Aylward became a Chinese citizen. After becoming a Chinese citizen, Aylward worked for the Republic of China as a foot inspector, where she helped enforce new laws prohibiting the binding of young girls' feet. Aylward's impressive life and works were recorded by Alan Burgess in the book *The Small Woman*. In 1958, this book was adapted into a film titled *The Inn of the Sixth Happiness*

The purpose of my research is to examine the life and works of Gladys Aylward and compare them to her portrayal in the film *Inn of the Sixth Happiness*. Aylward made considerable humanitarian contributions during the Second Sino-Japanese War, and she worked extensively with orphans during her lifetime. However, her legacy of lifelong service was glossed over for a cinematic romance. Throughout the course of my research, I intend to demonstrate how the film is highly romanticized and historically inaccurate, thus diminishing her extraordinary contributions as a missionary. It is important to recognize that although many films are based on true stories, there are still many inaccuracies within popular entertainment. Although the film industry favors exaggeration, the stories of famous individuals should be re-told in a manner that is both entertaining and true to the nature of their life.

The Necessity of Hands-On Science through the Lens of Non-traditional Teaching

Raya Schilke
Sponsor: Dr. Gayle Ramirez
Valdosta State University

Children are naturally curious about the world around them. Hands-on experiments and demonstrations are essential to effectively teaching science content to elementary-aged students. When students are provided with opportunities for multisensory explorations, they engage firsthand with scientific content while using the Crosscutting Concepts as tools to make sense of phenomena which encourages engagement and fosters creativity, a vital key to student comprehension. Our research focused on creating learning opportunities that are student-centered and allow multisensory engagement with science content, such as those provided by the Tellus Science Museum in Cartersville, Georgia. Inquiry-based learning encourages students to engage in the use of science process skills through curiosity and exploration. After compiling tactile activities to be paired with live science demonstrations, the opportunity is provided for students to observe phenomena and draw conclusions on their own. By exploring the application of this concept through a non-traditional teaching setting, curiosity and engagement are encouraged while evidence is gained, supporting an application within a traditional classroom setting. The purpose of this research is the investigation of the effectiveness of hands-on science activities and to promote the emphasis of direct student participation in order for better comprehension and more effective teaching. The results were compiled from the observation of the in-person application of said activities, with approved scholarly literature to support. The written material emphasized the project claim along with the desired application within traditional classroom environments.

The Overruling of Roe v. Wade: Educational Affects and Consequences

Emma Strickland
Sponsor: Dr. Karen A. Terry
Valdosta State University

In 1973 the Supreme Court of the United States (SCOTUS) made the groundbreaking decision in a 7-2 vote to protect a woman's right to abortion. Roe v. Wade held that "the abortion right is part of a right to privacy that springs from the First, Fourth, Fifth, Ninth, and Fourteenth Amendments." (Roe w. Wade, 1973) In 2022 the Supreme Court overruled this decision in a 5-4 vote and turned the authority on abortions over to the states. The overturning of Roe V. Wade will have an impact on the education system. Graduation rates, teen births, child poverty, and college decisions can also be impacted because of abortion laws. According to the Center for Disease Control and Prevention, teen pregnancy is a main contributor of female dropout rates. Out of teenage mothers, only about 50% receive high school diplomas by age 22 compared to 90% of traditional female students. According to the Turnaway Study by ANISRH, children from a denied abortion are affected negatively in terms of financial well-being and development. Women denied abortions had an income that was approximately 4 times lower than the poverty level and were 3-times more likely to be unemployed. The decision by SCOTUS to return women's and girls' reproductive rights back to the states to decide has brought Georgia's Heartbeat Bill (HB 481) into the forefront of debate with impact on P12 schools and colleges to consider. Georgia's current stance on sex education in schools has vague curriculum mandates. With these new changes should schools require health courses? Do schools need to push safe sex and abstinence practices? Should all students be required to take family and consumer science? Can teachers even discuss issues around abortion considering Georgia's HB1084?

The Perverse Principles of Poetry: Examining the Bleak Truth in 'Richard Cory' and 'The Raven'

Leigh Ann Overlaur
Sponsor: Dr. Ubaraj Katawal
Valdosta State University

I will be presenting an oral project analyzing the early perception of mental health through two works of poetry, "Richard Cory" by Edwin Arlington Robinson and "The Raven" by Edgar Allan Poe. These two poems were written in the late nineteenth century, but they seem to have a modern understanding of the effects of mental health. In my essay, I write about the poems' relationship to society and suicide and the correlation between death and depression. Additionally, I also touch on the author's personal lives and why they might have written such raw pieces of work. These authors were pioneers of their time because of their unfiltered look at the darkest parts of the human psyche. As a result, not only does my work apply to literature, but it can be applied to psychology as well because of the psychological instances and studies that are discussed. Furthermore, I include quotes from the works themselves, plus excerpts from scholarly articles written on the subject matter. Through my presentation, I hope that people will realize how prevalent mental health awareness has always been, and how it is constantly embedded in the media around us.

The Philosophy of Winning: Leadership and Culture within Sport

Ashton Jones-Obikpo
Sponsor: Dr. Lavonna Lovern
Valdosta State University

This paper examines leadership and team cultures of sporting franchises as these relate to the success of the program. The paper will begin with an examination of Trait Theory and Situation Leadership Theory followed by an investigation the works by (list the authors of the papers by last names only) as theoretical foundations for establishing successful and unsuccessful programs. The second part of the paper will focus on a case study approach highlighting the Alabama and Nebraska teams within the NCAA Division I FBS as they relate to the aforementioned research. The case study will consider the impact of leadership and team culture on the psychology and motivation of the players as well as on the success of the program. Finally, the case study will highlight the research discussions concerns regarding efficacy, ethical, and long-term social impacts on the success of both the program and the players. While further studies need to be done to verify the conclusions of this paper, there is initial indication from the research and from the case study that leadership and team culture are significant factors in determining the success of the program and the players.

The Political Economy of Insulin

Jay Jones
Sponsor: Dr. Deric Shannon
Oxford College/Emory University

Insulin has entered the national spotlight due to its high cost and dangerous implications for diabetics. The U.S. healthcare system and choices made by the three dominant insulin manufacturers regarding production, patents, and distribution have transformed insulin into a profitable commodity, often leading insulin-dependent diabetics to ration their supply and face life-threatening consequences. This paper examines insulin's place at the intersection of the economy, political systems, and social movements, especially in the U.S., and focuses on insulin's pricing: why it is so costly, how this pattern of price increases emerged, and how the state and grassroots organizations have responded. In this paper, I discuss insulin's economics (specifically the global market, the market share of different insulin producers, consumption, and pricing) and politics (insurance, patent law, monopoly protection, trade secrets law, FDA regulations, and government responses to insulin price increases), as well as involvement by non-profits and social movements in promoting access to insulin. I also explain how the individualization and depoliticization of the diabetic community are entangled with insulin pricing and its relationship to the broader disabled community. Identifying the origins and impact of insulin pricing, as well as various proposed solutions, reveals many avenues to address the structural roots of this problem and to increase access to insulin. Experiences of disability are directly shaped by political economy, class, and capitalism, but these links are sometimes sidelined in popular and academic understandings of disability and class. In this way, looking in-depth at insulin access and pricing can illuminate many other crucial connections between disability justice, capitalism, and the state.

The Therapeutic Value of Cinematic Storytelling: A DBT-Based Interpretation of *Eternal Sunshine of the Spotless Mind*

Haley Hunt
Sponsor: Anna Weinstein, MFA
Kennesaw State University

Analytical, thorough, and accessible stories can significantly improve the quality of people's lives. This presentation shows how Michel Gondry's *Eternal Sunshine of the Spotless Mind* (2004) brings peace to those dealing with grief, anxiety, and uncertainty. It advocates for the novel concept of "cinematherapy," a practice that utilizes film as a tool for personal growth and healing at any age. By prescribing specific films to illustrate therapeutic concepts, cinematherapy aims to promote growth and introspection via externalized, observable means. In *Eternal Sunshine of the Spotless Mind*, Joel attempts to erase every memory of his ex after she does the same to him. By the end of this movie, the couple comes to terms with the concept of radical acceptance– a belief that embraces hurt and heartbreak as the only way to move forward. This presentation introduces the basics of cinematherapy, radical acceptance, and the way Gondry's film supports these concepts. By evaluating studies on the effectiveness of media-based therapy, this presentation aims to spark conversation among enthusiasts of psychological and filmmaking fields, as well as emphasize the benefits media offers to the individual psyche.

The Use of Modern Technology in Museums

Katherine Nichols
Sponsor: Dr. Lavonna Lovern
Valdosta State University
Webinar Oral

This paper focuses on the uses of modern technologies in museums. It briefly discusses the definition of public history and clarifies what makes someone a public historian. These definitions come from a variety of educational institutions and organizations that specialize in public history. The paper explores different examples of technologies that are being used in museums around the world. The specific examples of technologies presented in this paper illustrate different technological functions. Some exhibits, like *QRator*, were explicitly designed to gain information from the visitors of the museums. Other exhibits, like *The Ara as it was*, are used to give visitors a more immersive historical experience utilizing different forms of mediated reality. In defining mediated reality and other technologies, the paper is formatted to expand on how that specific example's usage impacted the exhibit in which it was used. The paper is not recommending the use of technology in place of traditional museum exhibits. Instead, the paper examines both the positive and negative reactions of museum patrons to the use of technology. The paper concludes that technology can be used to enhance and expand museum patronage without disrupting traditional exhibits.

The Use of Photovoice Technique to Explore Veteran Identity: a Qualitative, Community-based Participatory Action Research Model

Joseph Pabian, Trenholm Fahy, Alicia Zarker, Elizabeth Schultz, Lauren Ernst-Fortin and Meredith Robertson
Sponsor: Dr. Stephanie Jett
Georgia College and State University

Researchers often attempt to define what it means to be a veteran, but it is rare for that question to be directly asked of veterans. Traditionally, experimenters define the variables and ask the participants to provide responses without being included in the research process or reaping any direct benefit from participation. We argue it is vital that we elevate the voices of special populations, like veterans, by employing more qualitative, community-based participatory action research (CbPAR) models where participants are empowered to use their voices to tell their stories and researchers serve to help communicate their stories to the community. In this presentation, we will present an argument for the importance of and increased need for using these methodologies in special populations in order to address the real concern of distrust in scientists and clinicians that are frequently encountered in these populations and the exploitative nature of scientific research frequently experienced by these groups. We will present these arguments through a study our lab will be conducted starting this semester and continuing into 2023 using a qualitative research technique called photovoice (Abraham et al., 2020, True et al., 2018), where veterans will be asked to take pictures using digital cameras that answer the following prompt: What does being a veteran mean to you? IRB approval has been obtained and data collection will start shortly. Participants will then be interviewed individually to complete semi structured, photo-elicitation interviews where they will be asked several questions to help the researchers understand the symbolism of the images relating to the prompt for the participants. Transcripts of the interviews will be analyzed to uncover common themes and elements. External validity will be addressed through member checking (Koelsch, 2013), in which participants will review transcripts, discuss identified themes, and choose representative images to present in an art gallery for the community to allow for their stories to be told.

The Search for a Universal Influenza Vaccine: Broadening Influenza and Immunization using Next-Generation COBRAs and Nanoparticle Technology

Abigail Roegner
Sponsor: Dr. Jarrod Mousa
University of Georgia

Commercial vaccines against influenza have low efficacy and must be redesigned annually due to the high mutability of the primary influenza antigen, hemagglutinin (HA) proteins, on the surface of the virus. This raises the cost of the influenza vaccine and decreases its accessibility. The objective of this study was to aid in the development of a universal influenza vaccine by broadening the inhibition capacities of antibodies elicited by the antigens to the HAs of influenza A subtypes H1N1 and H3N2. The hypothesis was that by combining new vaccine technologies, Computationally Optimized Broadly Reactive Antigens (COBRAs), and nanoparticles, their potential to broaden immunity would be maximized to elicit antibodies inhibiting viral strains across different time periods and influenza subtypes. Lead COBRA candidates Y2 (H1) and TJ5 (H3) were anchored in repeating patterns to the surface of the I53_dn5 nanoparticle as formulations of Y2-I53_dn5, TJ5-I53_dn5, and Y2-TJ5-I53_dn5. BALB/c mice were immunized with the assembled vaccines. The antibodies produced by the mice were collected through blood samples at 56-days post-prime. The protective capacities of the elicited antibodies were evaluated against different H1N1 and H3N2 influenza strains with hemagglutination inhibition (HAI) assays. The HAI results supported both our hypothesis and research objective, with Y2-I53_dn5 and TJ5-I53_dn5 eliciting antibodies that provided significant levels of cross-group seroprotection against both H3N2 and H1N1 wild-type viral strains, respectively, from 2009 to 2019. The vaccine techniques evaluated in this study have the potential to greatly benefit healthcare by increasing both the efficacy and accessibility of protection against influenza. I would value the opportunity to spread awareness about the influenza vaccine and the positive implications of my research by presenting face-to-face at the GURC.

The Relation between Contrast Sensitivity and Macular Pigment

Cameron Wysocky, Adrian Bozocea, Jacob Harth and Brianna Putnam
Sponsors: Dr. Randy Hammond and Dr. Lisa Renzi-Hammond
University of Georgia

Previous optics literature reports a positive relationship between individuals' macular pigment optical density (MPOD: the amount of macular pigment (MP) in the fovea) and contrast sensitivity (CS: ability to detect differences between an object and its background). However, past research failed to exclude wavelengths within MP's absorption spectra. This has prevented accurate measurements of CS because the spectral characteristics of the assessment stimulus are changed. The purpose of this pilot study is to test the relationship between MPOD and CS using a novel optical device that controls for MP's filtering effects by using light sources outside of MP's absorption spectra.

A novel optical device was constructed to measure contrast sensitivity at various spatial frequencies. To ensure accuracy, the device utilized a light source outside of MP's absorption spectra (520 nm). Participants were tested twice, a minimum of 24 hours and a maximum of 7 days apart, to enable an evaluation of the device's reliability. The contrast sensitivity function was measured at the following spatial frequencies: 1.6, 3.2, 8, 16, and 24 cpd. At both visits, six randomized order trials were conducted per spatial frequency. Participants' MPOD was measured during the first visit using heterochromatic flicker photometry.

21 participants ($M = 28.95 \pm 10.34$ years; 63.6% female, 81% White, non-Hispanic, 4.8% Latino/a/x, 9.1% Black/African American, 4.8% Asian/Pacific Islander) were assessed on contrast sensitivity and MPOD. The optical device's coefficient of reliability for the area under the contrast sensitivity curve showed high reliability ($r = 0.851$, $p < 0.001$) between visits. A Pearson correlation showed no significant relationship between participants' MPOD and area under the contrast sensitivity curve scores ($r(19) = -.054$, $p = .817$).

The findings of this pilot show that previous CS studies have failed to account for MP's filtering properties and correlations drawn between MPOD and improved CS are faulty.

Transforming Taboo:
Discursive and Generic Uptake in
South Asian Mental Health Recovery Narratives

Anusha Kothari
Sponsor: Dr. Gwendolynne Reid
Oxford College/Emory University

Mental health in South Asian communities is urgent, unaddressed, and taboo and needs further study. Studies show that South Asian immigrants across ages and genders are disproportionately affected by depression, anxiety, insomnia, and eating-related psychopathology (Karasz et al., 2019). According to the South Asian Public Health Association, 1 in 5 US South Asians report experiencing a mood or anxiety disorder in their lifetime. A review of relevant research identifies finding culturally sensitive approaches as a pressing need (Karasz et al., 2019). Developing a culturally-relevant approach, however, requires understanding the lived experiences of members of that culture. The mental health recovery narrative genre, an emerging variation on the illness narrative, provides one record of these lived experiences. Illness narratives, in fact, have been studied by medical anthropologists like Arthur Kleinman (1988), who writes that they intimately share the "innately human experience of symptoms and suffering" (p. 3), and that the "illness experience is culturally shaped" (p. 5). With this understanding, my research asks what mental health recovery narratives from South Asian communities can reveal about the mental health crisis within those communities. This presentation will share my genre analysis of eight samples of South Asian mental health recovery narratives from the platform Mann Mukti, meaning mental liberation in Hindi. It will examine the rhetorical moves writers employ as well as the discourses and genres they take up in their texts. Taking a rhetorical genre studies lens, my research identified five recurring rhetorical themes and moves: the gradual regaining of control, nuanced call to actions, enargia, the completeness of narratives, and anonymity. These patterns are especially meaningful when interpreted through the specific cultural context, which includes South Asian collectivist culture, immigration and globalization struggles, and other factors that contribute to mental health stigma in South Asian communities. Overall, I argue that this genre has transformed a personal need to be heard empathetically and completely into a recurrent social exigence that is recognizable to other South Asians. Ultimately, it is a hopeful genre that communicates a culturally situated solution for a seemingly intractable problem.

Unraveling the Rapid Signaling of Versatile Plant Stress Hormone, Methyl Jasmonate (MeJA)

Teressa Konyo Akuoko
Sponsor: Dr. Ansul Lokdarshi
Valdosta State University

Plant growth and productivity rely on rapid energy management strategies designed to cope with dynamic environmental conditions (e.g., fluctuating light intensities, temperature, humidity, and pathogen interactions). Previous work identified a novel fast-regulatory switch in Arabidopsis thaliana that functions at the nexus of two fundamental energy management programs, cytosolic translation, and reactive oxygen species (ROS) signaling. The General Control of Nonderepressible 2 (GCN2), a cytosolic serine/threonine protein kinase, is rapidly activated in response to ROS emanating from chloroplasts under a variety of abiotic and xenobiotic stresses. GCN2 then phosphorylates its target, eukaryotic translation initiation factor (eIF)2 alpha, resulting in readjustments to the active protein synthesis for stress remediation. In the work presented here, we show that plant defense hormone, methyl jasmonate (MeJA), requires light (therefore, chloroplast function) to activate the cytosolic GCN2-eIF2alpha module. Additionally, loss-of-gcn2 mutant seedlings showed increased sensitivity towards MeJA stress and altered accumulation of MeJA responsive transcripts versus wild-type. In conclusion, we provide evidence that the GCN2-eIF2alpha module is critical for mediating survival responses towards MeJA stress and may serve as a missing link in a non-canonical retrograde signaling pathway whereby the status of the photosynthetic machinery feeds back to the cytosolic protein synthesis apparatus for rapid energy management under diverse abiotic, xenobiotic, and biotic stresses.

Utilizing Mathematical Modeling to Approximate Tumor Growth

Michal McAlpine
Sponsor: Dr. Patcharin Tragoonsirisak Marion
Fort Valley State University

Cancer is one of the leading chronic illnesses plaguing our healthcare system. As the medical field advances in treatment for these patients, Ordinary Differential Equations (ODEs) are commonly utilized to track tumor growth within cancer patients. Being able to successfully track tumor growth would aid in changing the trajectory of future cancer treatment with specific regard to chemotherapy. In prior research, although these ODE models were helpful, many equations cannot be solved easily and it is difficult to find the exact solutions. In our preliminary research, we initially utilized both Exponential and Gompertz models in order to create and visualize growth trends incorporating both the hypothetical results and true values. The Exponential model was often used at predicting early tumor growth, and the Gompertz model was shown to provide the best fits for breast and lung cancer growth. Mathematica software is being used to find the computational results. The Euler's method, which is the basic numerical method, has been used to solve both models. To increase the accuracy of the results, we also use the Huen's method (also called modified Euler's method) to improve our results. Relative errors are calculated in order to depict the overall difference between the approximated values compared to the exact values, and this also works to illustrate validity within our methods. The overall analysis consists in studying and comparing, both analytical and numerical values, the results for each mathematical model and each numerical method will be discussed.

What Really Matters in Effective Teaching?

Abigail Cannon
Sponsor: Dr. Yan Yang
University of West Georgia

Literature shows that there are a variety of factors in effective teaching, including social-cognitive and behaviorist approaches, but there is still more to learn about what really matters in the educational process. The purpose of this project was to investigate these factors and determine an overarching principle of effective teaching through two qualitative studies. Study One involved 1 teacher and 20 students, and Study Two involved 3 teachers and 15 students. In Study One, I observed a kindergarten class for two days while focusing on effective classroom management strategies, and I interviewed the teacher for 30 minutes about her practice. In Study Two, I observed a childcare setting for 8 hours, and I interviewed the lead teacher for 1 hour with a focus on her behavior management strategies. Thematic analysis of the observational and interview data resonated with previous research results about the importance of building positive relationships with students in effective teaching. Specifically, the findings of this research project clearly show that students are more likely to view their teachers as role models for their behavior when there is a trusting and supportive relationship between the two of them. When students see their teachers as both friends and role models, teachers can successfully establish a well-managed classroom with student-centered learning based on meaningful conversations and natural consequences instead of the more traditional operant conditioning systems. These findings provide empirical support for Social Cognitive Theory, particularly the importance of positive relationships, as well as demonstrate the power of modeling in effective teaching. Implications of this study and future directions of this research will be discussed.

Whose Narrative Is It?: The Intrusive Imagination of White Transcribers and Editors in African American Narratives

Andrea Merritt
Sponsor: Dr. Leslie Whitmire
Georgia State University

Slavery is often presented in American history through an Anglocentric lens that, when not reflecting the white enslaver's presumption of his own right to own Black people, encompasses a white-centered worldview that assumes Blacks were innately inferior to whites. Because of the few firsthand records written by enslaved people themselves since most of the black population in the South were illiterate. However, based on the few accounts that have been preserved from the Antebellum era, a general idea of the lives of enslaved people can be deduced from these accounts. Through the available narratives from enslaved African Americans in the 19th century, there are key characteristics that reveal and differentiate descriptions of the slave experience through the voice or lens of the enslaved versus those that are depicted through the transcription or post-editorial work of white narrative overseers. These findings will further serve to demonstrate the oversight in which white transcribers and editors had on African American narratives and how these writings become somewhat tainted as a result of losing their original authentic voice.

Why Do People Commit Crimes?

Caleb Acoff
Sponsor: Dr. F.E. Knowles, Jr.
Valdosta State University

In America alone over 10 million people commit some sort of crime a year. The majority of those crimes are simple assaults and DUIs. Over time, the number of violent crimes has steadily increased, including crimes like murder and domestic violence. In 2021 murder rates went up about six percent from the previous year. With cities like St. Louis averaging 64 murders a year, the question has often been asked why do people commit crimes? There have been many reasons why a person commits a crime, shockingly, most people who commit crimes are not necessarily bad people. Some of the reasons for committing a crime include greed, anger, jealously, revenge, or pride. However, in some situations, another reason for committing crimes is survival. If someone commits a crime simply to provide for their family, does that make them a bad person? With the increase in crime rates across the nation, some would argue that anybody who does a criminal act is a bad person, which is simply not true. I personally feel that the word criminal is often taken out of context because if someone has lived through years of violence and crime, their mental state may not be clear as the rest of the world. And I also think that just because someone breaks the law does not mean they are always looking to hurt people.

With Great Intellectual Property Comes Great Responsibility: The Moral Decay of Spider-Man in the Marvel Cinematic Universe

Gracie Whitney
Sponsor: Dr. Gina Caison
Georgia State University

The latest Spider-Man trilogy, directed by Jon Watts and positioned at the forefront of the Marvel Cinematic Universe, features a Peter Parker, who, unlike any of the other popular iterations of the character, answers not to his particular moral center but to the politically and financially powerful. My research into the trilogy engages with the conceptualization of the first Peter Parker as a young man with an acutely defined morality and a strong sense of responsibility to his family and community, arguing that the origins of the character are rooted firmly in ideologies of the working class. I draw this portrait of the original character in order to sharply contrast what was a unique superhero who charmed millions with his devotion to those around him with the current MCU's blank-faced "Avenger" who functions as little more than one of many identical gears in a well-oiled machine of capitalist propaganda. Peter Parker's transition from working-class hero to class traitor indicates a parallel transition within Marvel Studios from a commitment to creative integrity to a commitment to financial gain. However, this betrayal of character, the reduction of Peter Parker to a morally vacuous, near-anonymous hero who functions as little more than a glorified union buster, has done little to deter superfans from the latest Spider-Man franchise.

Through a close reading of primary texts such as *The Amazing Spider-Man* comic book series and *Spider-Man: Homecoming*, along with the theoretical work of Adrian Acu's "Time to Work for a Living: The Marvel Cinematic Universe and the Organized Superhero," I argue that Spider-Man's popularity continues to grow despite the complete upheaval of the character due to the altered function of the superhero both within Marvel comics and in popular culture at large. Further, through engagement of this criticism, my research explores the MCU Spider-Man films contribution to Marvel Studios' reinvention of the superhero, as they leave a once complex character with clearly defined motivations without a moral compass to guide him, unequivocally altering the concept of superhero in the public imagination.

Worlds within Worlds: Heterotopias in Kazuo Ishiguro's "Never Let Me Go"

Laura Northup
Sponsor: Dr. Theresa Thompson
Valdosta State University

This project argues Kazuo Ishiguro's *Never Let Me Go* presents a heterotopic and utopic society that creates clones for the purpose of providing organs to the more privileged "possible" version of the donors. The novel is told through the eyes of Kathy, a caretaker for the donor clones that are raised in boarding schools. The boarding schools are full of bodies that are undesirable to those within the external utopia. The donors are feared "in the same way someone might be afraid of spiders" by many of those who take part in the utopia kept from donors. Kathy describes what Foucault says is the "mixed, joint experience" of the mirror, a place where she discovers her "absence from the place where [she] is since [she] see[s herself] over there" (Foucault 24). She states, "The first time you glimpse yourself through the eyes of a person like that, it's a cold moment. It's like walking past a mirror you've walked past every day of your life, and suddenly it shows you something else, something troubling and strange" (Ishiguro 36). The entirety of the narrative is structured around Kathy holding a mental mirror to her memories, and in doing so, her memories expose some of the heterotopic spaces that donors had to exist in. The entire novel exudes sentimentalism as Kathy works through her memories of life at the boarding school. Kathy herself is a character between two existences; she was created to be a donor, but her existence as a caretaker leaves her a liminal observer of the spaces she encounters. Every space she reminisces upon possesses multiple layers of meaning that can be paired with Foucault's different heterotopias. My project closely reviews Foucault's heterotopias in the context of the spaces in Ishiguro's Never Let Me Go with the goal of encouraging others to perceive more spaces through Foucault's theoretical lens.

Hallyu and the Digital Graphic Novel: Understanding Student Perceptions of Korean Culture through Webtoons

Abigail Welch
Sponsor: Dr. Jin Sook Lee
University of California- Santa Barbara

Using the theoretical framework of Michael Agar's 'languaculture,' this study examines how non-heritage foreign language students taking an introductory Korean course at one U.S. university develop and alter their perceptions of Korean culture through reading webtoons (Korean digital graphic novels.) Previous research indicates that implementation of graphic novels both in and out of formal educational settings has increased adult literacy through increased personal engagement and motivation. Research on Japanese and American graphic novels suggest positive correlations between students developing deeper connections with their target culture per the creation of interactional spaces for which students from different cultural backgrounds can initiate conversation. However, not much research to date has investigated the impacts of Korean popular culture on language education beyond Korean pop music given the recent emergence of Hallyu (Korean Wave) in western countries. Few studies have currently been conducted on user experiences with webtoons. With the rise in 'glocalization' and translations of these graphic novels, new research is emerging about the potential use of Korean webtoons as tools for developing critical cultural awareness and language learning through cultural contexts on platforms such as NAVER Webtoon. Through this study, participants will partake in a qualitative pre- and post-interview regarding their level of understanding of Korean culture per the Valle's Model of Culture. Participants are exposed to different webtoons over ten weeks, being asked to keep a journal of their experiences toward both written language and visual cues. This study aims to provide insight into a new potential informal learning tool to increase student confidence and retention in Korean courses. The findings from this study seek to initiate a conversation over new ways of integrating Korean culture into language curricula and reinforce the importance of both in-and-out-of-school literacy for foreign language understanding.

Poster Presentations

An Integrated Approach to the Biodiversity and Conservation of *Odontotaenius disjunctus* and *O. floridanus* (Cleoptera: Passalidae)

Katelyn Enderle
Sponsor: Dr. Frank M. Fontanella
University of West Georgia

Accurate species delimitation and descriptions are a fundamental prerequisite for biological research. We are currently in the midst of the 6th mass extinction, with background extinction rates measuring 1000 times faster than species that the majority of life forms on earth are facing. Conservation biology often aims to assess and protect existing biological diversity and is concerned with the sustainable use of natural resources over the long term. The assessment of biodiversity is the first step to the successful design of any conservation strategy. Identification of the organisms and the extent of morphological and genetic variability between them are the essential components of any biodiversity assessment. Amongst these, the identification of individual organisms via taxonomical and/or molecular means is vital for designing any conservation strategy. The patent leather beetle, Odontotaenius disjunctus and O. floridanus, are easily recognized saproxylic (dead wood dependent) beetles with distributions extending across the eastern United States and restricted to the highlands of central Florida, respectively. Recent studies inferred four well supported lineages that diverged during the Pleistocene and replaced each other geographically across the eastern United States. However, it has been shown that reliance on a single gene may be misleading because of asymmetrical gene flow, introgression, and other stochastic processes that affect mtDNA disproportionately. In this study, we use multilocus coalescent-based species delimitation methods and multivariate analyses of morphological data to examine whether the phylogroups merit taxonomic recognition as species in light of multiple lines of evidence under the general lineage concept.

Access to Lactation Support Services and the Relationship with Breastfeeding Initiation across Georgia Counties

Sherifa Akinniyi
Sponsor: Dr. Sina Gallo, RD
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Breastfeeding is associated with improved maternal and infant health outcomes, yet Georgia's breastfeeding rates are lower than the national U.S. average. Lactation support services such as those provided by trained professionals like International Board Certified Lactation Consultants (IBCLCs), support groups, and peer counselors can help overcome barriers to breastfeeding. We aimed to explore the relationship between lactation support services and breastfeeding rates across the 159 Georgia counties. We used publicly available data with the primary outcome being breastfeeding initiation, defined as receiving any breast milk after delivery, based on 2018-2019 US Birth Certificate Data. Lactation support services included the number of IBCLCs, La Leche League support groups and WIC peer counselors within a 25-mile radius collected from ZipMilk.org as of May 2022. The Capitol Impact Gateway was used to identity zip codes in each county and the number of services was converted to a rate per 1,000 live births. USDA's rural-urban continuum codes distinguished metropolitan, rural, and urban counties and the CDC/ATSDR Social Vulnerability Index (SVI) measured overall vulnerability of each county using 15 U.S. census variables. There were no significant associations between breastfeeding initiation and lactation support services. Georgia counties classified as rural-urban and having a very high SVI were more likely to have lower breastfeeding initiation rates ($p<0.01$). This study identified Georgia counties with the lowest breastfeeding rates which should be a target for future interventions. There are other factors not identified in this study which will affect the choice to breastfeed.

A Comparative Study of Genomic DNA Extraction Methods from *Arabidopsis thaliana*

Julio A. Rodil
Sponsor: Dr. Lokdarshi
Valdosta State University

Genomic DNA contains all the genetic, chromosomal material of an organism and a common procedure for gaining valuable insights about the genetic information involves the extraction of genomic DNA. The primary purpose of genomic DNA extraction is to separate this genetic material from rest of the cell, including proteins, RNA, organelles, etc. The purified genomic DNA can be used for a variety of downstream tasks such as individual gene function studies, whole genome sequencing, generation of mutants and their characterization using the ubiquitous molecular biology tool, polymerase chain reaction (PCR). As of these downstream applications begin with the genomic DNA purification, it is critical that the genomic DNA extraction procedure results in highest quality DNA while being cost effective, less time consuming, least sample requirement and relies on the use of non-toxic reagents. In the current work, I set out to investigate all the three current methodologies for genomic DNA extraction (*Phenol: Chloroform, Sodium dodecyl sulfate* and a commercial kit) from the model plant, *Arabidopsis thaliana.* The primary goal of this research was to (i) establish the method of choice for our lab and, (ii) extend the findings towards the development of a new method that is highly economical and sustainable for any plant biology lab interested in the manipulation of genomic DNA.

Aircraft Runway Tracking and Navigation Using Ultrasonic Positioning Beacons

Kody Pierce and Shaen Mehrzed
Sponsor: Dr. Valentin Soloiu
Georgia Southern University

Intelligent Vehicles Laboratory Department of Mechanical Engineering Georgia Southern University Currently, airport ground traffic, from both aircraft and ground vehicles is tracked using the Airport Surface Detection System (ASDE). This method mainly uses radar multilateration for direct positioning of aircraft. The mapping system evaluated in this research uses both stationary and moving beacons which emit and receive high frequency sound waves in all directions and finds relative distances of in-sight beacons using time-of-flight (ToF) and the speed of sound. While existing systems have been effective with manual vehicle operators, autonomous safety features will require more precise and comprehensive localization abilities, as demonstrated by the presented results. Even during the global transition to more autonomous navigation features, additional sensor readings for runway navigation can improve runway traffic control and transportation safety. Studied was the use of an ultrasonic multilateration mapping network to integrate with air traffic control ground tracking systems by testing the ultrasonic mapping system's localization accuracy, time response and reliability regarding infrastructure and vehicle beacon relative positioning. It was found that ultrasonic beacon positioning, when properly installed, has a localization precision of +/- 2cm and an average localization error of 2% (standard deviation of 0.5%). The data frequency was found to be a function of mobile beacon distance from stationary ones, being at maximum 25Hz and at minimum 15Hz. No significant changes in data frequency or localization accuracy were observed over a 24h stationary run.

A Mathematical Study of Popular Music

Tristin Sahagun, Caleb Epps,
and Michael Cartier
Sponsors: Dr. Denise Reid and
Dr. Lorena Aguirre Salazar
Valdosta State University

We wanted to research how aspects of popular music have changed over the decades and predictions on future music trends. Of particular interest was the beats per minute (bpm) of the top songs dating back to the 1950s. The top 100 songs of each year were studied, and Python programs are being written to find the data on over seven decades of music. Once the data is obtained, numerical analysis techniques and equation fittings will be used to see if there are any trends. We will make a comparison between various numerical methods that can be used. We also will use this information to see if it could be used to predict future music patterns. We wish to also look at other aspects of the songs such as length, danceability, and tempo. This research is a work in progress.

An Investigation of the Impact of Post-traumatic Growth, Coping, and Resilience on Coherence and Perceived Self-Efficacy in Young Adult Survivors of Sexual Harassment and Trauma

Alicia Zarker, Lauren Ernst-Fortin, Meredith Robertson, Elizabeth Schultz, Trenholm Fahy and Joseph Pabian
Sponsor: Dr. Stephanie E. Jett
Georgia College and State University

The Association of American Universities performed a climate study on sexual misconduct among college students in the Spring of 2019. The study discovered that sexual assault survivors experience detrimental long-term repercussions, such as reduced retention rates and participating in risky behaviors. Given the high victimization rates and low reporting rates, it is critical to comprehend how survivors deal with and move past traumatic events. There has been a lot of research on sexual trauma survivors' resilience and coping, but less on components of coping in daily life for these people, such as reported sense of self-efficacy and coherence. In our study, coherence was measured through the 29-Item Sense of Coherence Scale, and self-efficacy through the New General Self-Efficacy Scale. We measured coping using the Brief COPE and resilience with the Brief Resilience Scale. We assessed Post-Traumatic Stress Disorder (PTSD) symptomatology using the PTSD Checklist - Civilian Version. Qualtrics was employed to develop the surveys, which was then distributed through the university's SONA subject pool and snowball sampling on social media. People who exhibited higher degrees of coping, and resilience were expected to also exhibit increased levels of perceived coherence and self-efficacy. Preliminary results indicate that there is an insignificant, positive correlation between coping and self-efficacy and coping and coherence, and an insignificant, negative correlation between resilience and self-efficacy and resilience and coherence. Further investigation is required. Knowing more about the connections between these factors may assist survivors of sexual trauma not only succeed in their academic aspirations, but also better appreciate the breadth of the issue. It also plays a crucial role in advancing knowledge on how to help trauma survivors manage and treat their trauma.

A Novel Non-Invasive Method for Imagining Seeds in *Arabidopsis thaliana siliques*

Brylie Ritchie and Chase McLeod
Sponsors: Dr. Theodore Uyeno and Dr. Ansul Lokdarshi
Valdosta State University

Abstract Retracted Pending Publication

A Novel Puzzle to Familiarize Students with the Periodic Table

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Various types of puzzles are widely used in STEM learning activities due to their ability to familiarize students with given content using a strategic approach. In this novel puzzle, there are two steps to complete the exercise. The first step involves the participant identifying periodic table element abbreviations within a specific word. The second step involves fitting the corresponding element names into a blank crossword format. The students become familiar with the elements and their abbreviations, as well as their location on the periodic table. This exercise is part of a Chem1211 class and a book of novel puzzles will be prepared and distributed.

A Pilot Study on Mental Health Treatment Preference in Veterans with Post-Traumatic Stress Disorder (PTSD)

Elizabeth Schultz, Meredith Robertson, Lauren Ernst-Fortin, Alicia Zarker, Joseph Pabian, and Trenholm Fahy
Sponsor: Dr. Stephanie E. Jett
Georgia College and State University

This study investigates combat veterans of the United States Armed Forces who report significant PTSD symptomatology and their preferred mental health treatment preferences. Due to the high prevalence of PTSD within the population, combat veterans may require greater access to mental health treatment. However, because of factors like stigma and honor culture, it is suggested that there is a tendency for veterans to not utilize the available mental health treatment resources. Clinicians' ability to predict outcomes of treatment adherence and compliance is hindered by gaps in understanding of therapeutic modalities in which veterans participate or prefer. However, a lack of research exists which explores treatment options veterans might prefer when given a choice. To address these gaps, we developed a treatment choice list that included possible treatments for PTSD, ranging from empirically validated (first-line options - e.g., group counseling, cognitive behavioral therapy) to nontraditional (second-line options - e.g., agricultural therapy) and experimental (e.g., marijuana, psilocybin) treatment options. Brief summaries of the treatment options were provided in the survey to allow for informed decisions regarding interest to be made. Participants were then asked to indicate their willingness to participate in each treatment choice on a sliding scale of zero (no interest) to five (very interested). This study utilized a modified community-based participatory action research (CbPAR) design, which defers a priori hypotheses in favor of a population-driven exploration of shared interests and preferences within the community. The preliminary results indicated that veterans are less interested in first-line treatment options, but rather favor second-line or other experimental options instead. From the results, clinicians who work with this population will be informed of their attitudes and preferences for treatment modalities and allow veterans' voices to be elevated and amplified through another venue.

Assessing County Food Environment Using the Healthy Food Assessment Index

Amelia Glaser and Madeline Mesier
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Physical food environment includes the availability and accessibility to foods and has a major influence on dietary patterns and disease risk. Geographic coordinates were collected for food establishments in Baldwin County, GA. The North American Industry Classification System (NAICS) was used to classify full-service grocery stores and convenience stores. The Nutritional Environment Measures Survey was used to assess Healthy Food Availability Index (HFAI) with scores ranging from 0-30 points. HFAI was separated into low (0-9.9), medium (10-19), and high (19.1-30) and mapped according to census block groups. Mean HFAI score by NAICS categories were assessed using the student t-test.

Out of 181food establishments, 50 were considered full-service grocery (6) or convenience stores (44). The mean HFAI for grocery stores (M=22.5, SD=3.3) compared to convenience stores (M=7.5, SD=4.4) was significantly better, $t(48)=8.0, p=0.00$. Convenience stores scored between 2-18 out of 30 on the HFAI and were present in 90% or more of the census block groups in the County. Approximately 17% of residents live within ½ mile of a full-service grocery store. WIC and SNAP were accepted by 86% and 70% of stores respectively. There was no significant difference in the HFAI score by WIC or SNAP acceptance. Our project concluded that there are few food stores with a high HFAI in Baldwin County. Convenience stores are very prevalent within areas of high population density which could be an opportunity for them to have a positive impact on the health of their neighborhoods if they offer healthy options at affordable prices.

A Quantitative Analysis of Blood Lead Levels and Associated Factors in U.S. Adults

Osjah Ragin
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Fort Valley State University

This study was to identify risk factors associated with increased blood lead levels in US adults. Data was obtained from the National Health and Nutrition Examination Survey (NHANES). The sample included 4301 US adults aged 20 years or older in the year range 2017-2018. High blood lead level is defined as the lead level in one's blood that is equal to or greater than 5 μg/dL. Multivariate logistic regression was used to analyze the risk factors associated with high blood lead levels. The risk factors analyzed included age, gender, race/ethnicity, education level, family income, body mass index, as well as the use of tobacco and physical activity. The analysis results showed that gender of male, age of 80 or older, low family income, and current smokers were significantly associated with increased blood lead levels in US adults. This study identified significant risk factors associated with increased blood lead levels in US adults, which should be targeted for interventions to improve the health of the population.

A Quantitative Investigation of the Effectiveness of 3D-Printed Plastic Natural Convective Heatsinks Using Computational Fluid Dynamics

Shyra LaGarde
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South Dakota State University
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Electronic devices employ heat sinks, which provide cooling of key components, thus improving the reliability and life of these devices. The heat sinks often rely on natural convection, which simplifies the design by not relying on a fan. This maintains a lower air velocity which helps reduce noise. This thermal management solution is cost-effective in comparison to forced convection because there are no additional components, such as a fan to promote heat dissipation. Natural convection heat sinks made of aluminum are typically used for these devices because of the material's high thermal conductivity, which can effectively transfer heat without assistance. Traditional manufacturing methods limit the possible geometries to optimize heat transfer. The objective of this research is to design optimized geometries made of plastic rather than aluminum, so we can take advantage of advances in 3D printing technology because they are lightweight, low cost, and resist corrosion. We use computational fluid dynamics software to create simulations that will predict the heat transfer performances of the heat sink geometries. The generated models compare the overall heat transfer and velocity of the traveling air. Multiple characteristics of the simulations can be refined, including ambient temperatures for a representative electric device and heat flux on the heatsink surface. By developing computational models of geometries with plastic materials we can create shapes that are not possible with conventional manufacturing methods through 3D printing techniques. A quantitative investigation of the effectiveness of 3D-printed plastic natural convective heatsinks using Computational Fluid Dynamics.

Beliefs about the Behavior of Children from Single-Parent Families

Nybriah Gudes
Sponsor: Dr. Anne Price
Valdosta State University

This research paper examines people's beliefs about the behavior of children from single versus two-parent families. I became interested in this topic because of personal views I experienced when working in multiple settings with children of various backgrounds, and because I had a single mother for some of my childhood. First, I reviewed the research on this topic to see what is known about whether children's behavior in school may be affected because they grew up in a single-parent household. Next, I conducted survey research using Qualtrics. I surveyed all genders, and individuals 18 and over using convenience sampling for a total of 27 respondents. My dependent variable was: State your level of belief with the following statement: "Children who grow up in two-parent families are better behaved than children who grow up in single parent families" with response choices ranging from strongly agree to strongly disagree. I found that 23.1% of respondents strongly agreed that children who group up in two parent families are better behaved and 38% somewhat agreed with that statement. My predictor variables were marital status and age. I found that younger individuals were less likely to believe that those children who grew up in two parent households are better behaved. It is important to understand what individuals believe about the behavior of children from different family types. If teachers or others in the community expect children from single parent families to be less well-behaved than children from two-parent families, they may be biased in their judgement of children's behavior and school performance.

Biomonitoring for Presence of Zebra Mussels (*Dreissena polymorpha*) in Lake Lanier using Environmental DNA (eDNA)

Hannah Fontenot and Amy Rodriguez
Sponsor: Dr. Margi Flood
University of North Georgia

Biological monitoring, the practice of evaluating the overall health of an ecosystem by observance of the number and diversity of the organisms found within the community, is a common and invaluable tool for the assessment of the health of aquatic habitats. Recent applications of DNA recovery and detection have shown that environmental DNA (eDNA) can be an appropriate tool for the detection of the presence of target species, particularly when those organisms are difficult to observe by more traditional means. In April of 2021, a substantial number of the invasive mussel species *Dreissena polymorpha* (zebra mussel) were discovered attached to a boat destined for Lake Sidney Lanier. This watershed currently has neither a known population of zebra mussels nor a monitoring system aimed at detecting a potential introduction. In June and July of 2022, we collected water from six defined locations in Lake Sidney Lanier, and tested all samples for the presence of *D. polymorpha* eDNA using real-time polymerase chain reaction (PCR). We also collected and tested water from the Tennessee River, a site of known *D. polymorpha* infestation. We successfully recovered and detected target DNA in the samples obtained from the Tennessee River. No target DNA was identified in the samples collected at Lake Lanier. We believe our designed study is an effective method to detect target species' presence and can be a valuable detection tool for species monitoring and management programs.

Can Painting Nest Boxes Provide a Cooler Environment for Breeding Eastern Bluebirds?

Mathew Gordon
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Global temperatures have been on the rise for decades as a result of climate change. Birds are an important indicator of ecosystem or habitat quality. Temperature, due to its effect on vegetation, is one of the primary indicators of suitable habitat. This is especially true during nesting, as extremely high or low temperatures can cause nest failure. In cavity nesting birds, extreme temperatures can be reduced in nesting boxes by making alterations to the exterior of nesting boxes, such as adding a coating of reflective paint. The goal of this study is to determine if there is a significant difference between the interior and exterior temperatures in painted nesting boxes compared to unpainted boxes. We monitored 50 Eastern Bluebird nest boxes that were either painted white (treatment) or left unpainted (control) at Panola Mountain State Park in central Georgia. Each box contained two temperature data loggers - one inside the box and one on the underside - and recorded temperatures every hour throughout the 2022 breeding season from June 4th to August 15th. We anticipate our results will show the temperature outside the treatment nest boxes will be higher than inside, while we expect temperatures to be similar inside and outside in the control boxes. This temperature data can help develop a better understanding of how rising temperatures as a result of climate change are impacting the nesting conditions of cavity-nesting birds and how to provide proper habitat to manage for these species.

Carotenoid Extraction Using an Emerging Green Approach

Alexa Luna
Sponsor: Dr. Gopeekrishnan Sreenilayam
Valdosta State University

Carotenoids are the pigments found in plants that have been proven to be excellent antioxidants. These pigments could potentially have the ability to scavenge free radicals within the human body produced by common metabolic reactions. An overwhelming number of free radicals in the body is what leads to oxidative stress which can cause a number of degenerative chronic diseases. These supplements are currently being extracted using volatile organic solvents (VOS). These solvents pose plenty of risk to the environment, are very dangerous to work with in larger quantities, and are not very economical. Deep eutectic solvents (DES) on the other hand, are organic solvents composed of biodegradable compounds which are much safer for the environment. This extraction method is fairly new but most definitely worth exploring. In this project, four different choline chloride bases DES were used to extract these pigments from leaves and then analyzed using an HPLC with YMC C30 Carotenoid column. These results were then compared with spinach leaf extraction data using six common VOS and carotenoid extraction was deemed successful using DES. In the future, quantifications of the carotenoids will be analyzed and compared.

Cloning of an Aquaporin Gene into *E. coli*

Princess Wynn
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Valdosta State University

Aquaporins are proteins that selectively transport water across membranes. The current work is part of a larger research project to use aquaporins to create a biomimetic film for the desalination of water. This part of the project used cloning techniques to produce *E. coli* that can express an *algal aquaporin* protein. The goal is to produce aquaporin in sufficient amounts to use to make desalination membranes. Prior bioinformatics research found an aquaporin gene in a microalgae called *Trebouxia*. This gene was successfully cloned into *E. coli*. This gene was chosen because of its high sequence similarity to an aquaporin gene in a saltwater sea lettuce, *Ulva mutabilis*. The hypothesis is that aquaporin proteins from saltwater organisms may be better choices for the desalination of water than from other species.

Compost in Soil Analysis at Georgia College and State University

Shannon E. Northen, Isabella Banich, and Savannah Kimbrell
Sponsor: Dr. Allison Rick VandeVoort
Georgia College and State University

Compost from the Georgia College and State University (GCSU) in-vessel composter was investigated in order to determine the effect in which this type of soil amendment had on the environment. An in-vessel system is used to break down post-consumer food waste from non-organic contaminates and combined with non-treated sawdust in preparation for its entry into the composter. Compost remains in the in-vessel unit for approximately 5-10 days (depending on ambient conditions), before it is removed to wind-row piles at the same site. For this study, the compost piles were sampled weekly. As the compost was retrieved the temperature of the interior and exterior of the pile was noted along with qualitative analysis of the environment at the time of the sampling. The mass, nitrate level, and pH were measured at the lab. The samples were averaged and used to find trends within the data. Overall, it was found that the average pH of GCSU compost was approximately 7.66, when measured with the electrode. The average nitrate level of 1.81 mg/kg, with the use of the nitrate calibrator that was ion-specific. This study preliminary shows that compost produced from the GCSU site should increase the quality of the soil to which it is added. The addition of nutrients within the soil from the compost will improve the soil's environmental conditions for microorganisms, which in turn will liberate plant nutrients from the compost.

Computational Analysis of UDP-glycosyltransferase Variation across Strains of *Caenorhabditis elegans*

**Ari Levin, Kyra Chism, Rockford Watkins,
Maci Benveniste, Niyelle Tucker, Aleya Johnson,
Bailey Nicolas, Rahil Taujale,
Muhammad Zaka Asif, and Arthur S. Edison
Sponsor: Dr. Dwayne Daniels
Fort Valley State University**

Caenorhabditis elegans is an ideal model organism due to its' amenability, cost effectiveness, and rapid reproduction rate. However, little is known about the UDP-glycosyltransferases (UGTs) responsible for their innate detoxification response. UGTs are a large family of phase II enzymes involved in detoxification in many different species. UGTs interact with small molecules in the worms' environment including toxins. The Edison Vertically Integrated Projects (VIP) Computational Team is a group of undergraduate students who are working to identify the diversity that exists in UGTs across C.elegans isolates found in the Caenorhabditis elegans Natural Diversity Resource (CeNDR) database in order to make inferences about the relationship and function of various proteins, including those responsible for detoxification. The CeNDR database is a collection of wild isolates of C.elegans and their genomic data found globally used by researchers worldwide. Out of the 250 glycotransferases are responsible for transferring sugar molecules to various substrates, there are about 79 UGTs that transfer sugar molecules to small molecules including toxins. Two approaches were implemented to identify UGTs and make inferences based on their variation. First, we created a catalog of UGTs in the N2 reference strain and used them to create a phylogenetic tree that allowed us to depict the relationships between the UGT protein sequences. For our second approach, we quantified UGT variation using the strains found in the CeNDR database. The results and inferences from this research will help us explore possible functions of UGT genes and improve our understanding of UGT variation in C.elegans.

Conductivity Analysis of Poly *(ethylene oxide)* Containing Boron Cross-link Electrolytes for Lithium-Air Batteries

Emily Emilien and Kymani Williams
Sponsor: Dr. Dwayne Daniels
Fort Valley State University

This paper discusses research being conducted on polymer electrolytes, with a focus on conductivity under different temperatures. The purpose of this research was to determine the conductivity of polymer-electrolytes under different temperature conditions while determining if it affected the performance of conductivity. Polyethylene oxide (PEO) and Pure Triglyme-Boron (Pure TB) were the sample groups selected ranging from 4-5 samples, tested at several varying temperature ranges for the different lithium salt blend ratios. PEO was the first polymer electrolyte used in lithium batteries since the 1970's and was used as a benchmark. Polymer electrolytes are extensively used batteries based with a focus in energy storage and energy conversion. Liquid based polymers have been the focus in the past, however organic liquids are flammable, toxic, and have limited electrochemical stability. The research conducted dealt with gel-like, and solid-state PEO and Pure TB samples. Solid-state can contain most of the same problems caused by the liquid-based polymers. The method used was conductivity testing via a lab built electrochemical cell, with a multimeter connected running current through a copper-based electrode with the polymer in between. Data was accumulated via Lab Tracer, the software which set the voltage parameters, and documented voltage and current over 3 trials per temperature. Resistance was computed to solve for conductivity at each temperature for each sample. All data was plotted via excel spreadsheet, and comparative plots were made per each sample group. In conclusion, the data proved that conductivity increases at higher temperatures as salt blends increased as well.

Corrective Feedback in Second Language Acquisition: an Examination of the Research on Recasts

Mark Mears
Sponsor: Dr. Victoria Russell
Valdosta State University

This research investigates second language (L2) learners and the role of recasts and corrective feedback for three different linguistic features. All three studies that were examined used a proactive incidental focus on form approach to creating spontaneous uptake opportunities for learners to respond with successful uptake. The first study investigated formulaic errors. A goal of mine was to recognize the forms, acquire a framework conceptually of how to teach formulaic segments, and how to provide productive recasts in a classroom. The second study contrasted the effects of intensive recasts compared to extensive recasts for the acquisition of English articles. This research was meaningful because English articles are difficult for many English learners. The final study that was explored for this poster examined variables for successful uptake for the English /ɹ/ among L1 Japanese learners using intense, high-quality instructional recasts. All three interactionist studies investigate how recasts and corrective feedback impact the L2 learner. On my poster, I provide the pedagogical implications of the research.

Crohn's Disease and COVID-19: A Literature Review

Ferris Abu-Ghosh
Sponsor: Dr. Frank Cruz
Georgia State University

This research project is a literature review that explores the relationship between Crohn's disease and COVID-19. Questions including whether having Crohn's exposes individuals to a higher risk of contracting COVID-19, and how medications for Crohn's impact symptoms of COVID-19 are explored. Several research papers that explore the relationship between these two disorders were analyzed, including papers by (Monteleone & Ardizzone, 2020) and (Papa et al., 2020), and the findings were reported in the poster. It was found that Crohns patients express higher amounts of ACE 2, a monocarboxypeptidase. It was also found that Crohns patients are not at a higher risk of contracting COVID. It was also found that immunosuppressants, as opposed to anti-TNF alpha agents, cytokine blockers, and interleukin blockers, expose individuals with COVID to worse symptoms. All in all, having Crohn's does not subject individuals to higher risks when COVID is contracted, but certain treatments of Crohn's could lead to worse symptoms of COVID-19. This particular literature review is significant to the field of Biology and Public Health as it addresses the relationship between a common, chronic disorder and a Coronavirus strand that was responsible for the latest pandemic, helping to address concerns that thousands of individuals have.

Cyanogel Templating Method for the Synthesis of Pd-Ni Bimetallic Alloy Catalyst for CO2 Reduction

Karli M. Icard
Sponsor: Dr. Tolulope O. Salami
Valdosta State University

In recent years there has been a pressing need for progress in the development of CO2 utilization technologies, such as electrochemical CO2 reduction (CO2RR) to multicarbon alcohols. This need is driven by the increase in the concentration of CO2 in the atmosphere. Lately, our research effort focuses on using cyanogels as precursors for the synthesis of novel bimetallic alloy catalyst towards CO2 reduction. Currently, we are developing a Pd-Ni catalyst for the electrochemical reduction of CO2. Our presentation will highlight the synthesis of the Pd-Ni alloy using cyanogels, the adhesion of the alloy to glassy carbon electrode, and the electrochemical study of the electrode towards CO2 reduction.

Determining the Ratio of Praise to Correction Statements in a High School Classroom

Katie Reece and Caroline Cibulskas
Sponsor: Dr. Kymberly Harris
Georgia Southern University

Two student researchers observed one teacher in a high school English classroom in a resource setting to determine the ratio of praise to correction statements made by the teacher to individual students as well as whole group comments. Praise statements were defined as the recognition of positive behavior, production of completed assignments, and specific praises. Correction statements were defined as specific behavior correction, academic feedback, and misbehavior. Data were collected over the course of a 12-week field placement using observation. Both student researchers were placed in the same classroom which contained 12 students with disabilities. Researchers indicated that a praise-to-correction statements ratio of 4:1 results in higher rates of student engagement and lower rates of misbehavior. When teachers praise positive behaviors, students can discriminate which behavior receives positive acknowledgment instead of correction, causing the rate of misbehavior to decrease (Floress et al., 2018). The use of praise to promote positive behavior in the classroom is a well-researched practice. When teachers use correction statements to reprimand misbehavior, it reinforces the misbehavior through attention instead of the desired behavior (Floress et al., 2021). The two student researchers anticipate results that will illustrate a high rate of praise leading to higher rates of student engagement.

Developing a Non-invasive Morphological Technique to Study Vertebral Element Heritability in the Dwarf Seahorse, *Hippocampus zosterae*

Thomas Wilson
Sponsors: Dr. Emily Rose and Dr. Ted Uyeno
Valdosta State University

The number of vertebral elements in pipefishes is a heritable trait. Unknown yet is whether the trait is heritable in other syngnathids, such as seahorses. To address this question, we are developing a non-invasive x-ray imaging protocol to count the vertebral elements in the dwarf seahorse, Hippocampus zosterae. Seven broods of dwarf seahorses were raised in the laboratory and two offspring from each brood were euthanized every week in order to obtain a time series. They were then fixed in formalin and transferred to 70% ethanol four days later. The time series allowed us to identify the earliest age at which clear, high-resolution images could be made. Preliminary results indicate that this technique has shown great promise with high-resolution images of both adult dwarf seahorses and juveniles as young as 14 days old that allow us to count vertebral elements clearly. To assess the accuracy of the x-ray technique, we can verify our results using more time-consuming and destructive means, including paraffin histology and clearing and staining techniques. Vertebral element counts using all three protocols were identical and confirmed that x-ray imaging is an acceptable methodology. We are now using this method in a larger study to look at the heritability of the vertebral elements of this species. Because our x-ray images are taken at a power level that is similar to dental images, we are also exploring the best method to image live dwarf seahorses over the course of their lifetime in order to begin investigating developmental questions.

Development of Alternate Visual Resources for Color Vision Deficient Individuals: a Pilot Study

Alena Pfeifer
Sponsors: Lynsey Steinberg, MSMI, CMI and Dr. Soma Mukhopadhyay
Augusta University

Congenital color vision deficiency is a common visual disorder that affects as much as 8% of males, and 0.5% of females. Loss of color differentiation is often due to the absorption of light spectral shifts, which is caused by genetic alterations of the genes affecting 3 photo pigments opsins: long-wave, medium-wave, and short-wave in the retina. The most common type of alterations involves shifts in the long and medium cones, leading to deuteranomaly (reduced green light sensitivity), or protanomaly (reduced red light sensitivity). Individuals with this disorder can have difficulty distinguishing colored graphics, including educational ones used in anatomy and physiology courses. The cardiovascular system is a particular issue, due to its common red and blue coloration to denote oxygen-rich and oxygen-poor blood respectively. Resources for individuals in these courses are either limited or non-existent, and difficulty is observed which impacts the academic performances of affected students. This study aims to develop anatomical graphics and models that could be used in classes and laboratories as resources for color-vision-deficient individuals. Anatomical illustrations of the human heart were created and re-colored with colors uncustomary to usual interpretations. The usual “blues” and “reds” of the vasculature were altered to make those better accessible to the color-deficient students taking Anatomy & Physiology courses. An anatomically correct 3-D model of the heart was developed under this pilot project and also painted to reflect the same color scheme as the illustrations. Pilot studies with selected volunteers were done to evaluate the beneficial impact of these visuals and model and have shown positive results. From these results, we propose that implication of these models and visual resources will have a positive impact on color-vision-deficient individuals and their learning in anatomy and physiology courses.

Drone Control Using Facial Gestures and Long Short-Term Memory (LSTM) Networks

**Shaen Mehrzed, Joshua Hale, Destinee Hicks,
Darryl Wiltz, Noah Dyer, and Akintomide Adebile
Sponsor: Dr. Rocio Alba-Flores
Georgia Southern University**

This paper presents a drone control method that uses electroencephalographic (EEG) sensors to detect facial movements made by a drone pilot. Facial expressions were recorded using the OpenBCI EEG headband. The headband contained three electrodes that were used to capture the electric potentials from the brain, at three different frontal cortex locations: F_p1, F_pz, and F_p2. Fourier Transform (FFT) data was streamed to MATLAB for feature extraction using the Lab Streaming Layer on the OpenBCI GUI. BCILABS, a third-party plugin for MATLAB, was used to gather data from the OpenBCI live stream. Four different facial gestures were selected for this project: raise-brow, blink, bite, and rest. A database was created using facial gestures from three different participants. The database was automated with a 30-second data logging period with three samples/second, yielding a total of 90 data points from the three EEG channels. Each data logging process began with a 2-second actual gesture, followed by a 4-second rest, and was recorded for 30 seconds. A total of ten different recordings were created for each participant. A baseline was established for each participant using the rest data. The feature extraction step was performed by computing the Root Mean Squared Error (RMSE) for each gesture. For the classification step, the Long Short-Term Memory (LSTM) network was used.The results of the classification showed an overall accuracy of 89.11%. The blink data yielded an accuracy of 91.0%, the rise-brow gesture had an accuracy of 98.7%, the biting gesture had an accuracy of 84.2%, and the rest position yielded 95.7% accuracy. After the LSTM network classified the facial expressions, its output was used to perform three different movements of a palm size DJI Tello drone.

Effects of Nerve Cord Transection on Expression of Voltage Gated Ion Channels in the Abdominal Ganglia of Crayfish (*Procambarus clarkii*)

**Glory C. Omodia*, Richard J. Wilson*,
Chelsey Christensen, Virginia Garcia, and Arturo Rosete
Sponsor: Dr. David J. Schulz
University of Missouri, Columbia**

Previous studies have demonstrated that crayfish are able to regain control of their swimmerets after transection to the ventral cord. This was further supported by electrophysiological recordings representing fictive locomotion patterns. In addition, changes in the activity of neurons and circuits controlling tail flip and locomotion have been reported following nerve cord transection in crayfish. However, changes in ion channel expression in neurons within the ventral cord to promote recovery have not been studied. The ventral cord of a crawfish consists of 11 ganglia, 5 in the thoracic nerve and 6 in the abdominal nerve cord. Our study focused on the 6 abdominal ganglia, where our experimental group consisted of 8 crawfish transected at the TH5 and AB1 while our control (sham) received no transection, to measure changes in ion channel expression in both transected and sham crawfish across selected genes. Using the lead ganglion hypothesis as a reference, we hypothesized that there will be a significant upregulation and downregulation of channel genes across ganglia when compared between transected and sham. To test this hypothesis, we harvested the abdominal ganglia, validated primers for 12 ion channel and gap junction transcripts, and performed real-time quantitative RT-qPCR on the ganglia. We selected the following genes for our analysis*: INX1, INX2, INX3, Shab, Shaw, Shal, Shaker, NAV, SKKCa, BKKCa, NALCN, IH.* We found that some genes were changed across all ganglia downstream of the transection, while others remained either unchanged or altered only in a subset of ganglia. For example, our results indicated a significant downregulation of *NAV*, a voltage-gated sodium channel, in all 6 abdominal ganglia. Conversely, the voltage-dependent potassium channel *Shab* was significantly upregulated in the three ganglia posterior to the transection site. Taken together, our data suggests that injury to the ventral cord of crayfish has significant effects on the regulation of ion channels in relation to gene expression.

*Denotes equal contribution.

Enceladus: Analysis of Hydrothermal Vents as a Possible Reservoir for Life beyond Earth

Sam Panzica and Ian Mclean
Sponsor: Dr. Martha Leake
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Flybys of Enceladus by the Cassini probe (2015) revealed a global ocean infused with organic compounds and biologically available energy sources have suggested the possibility that life may have begun and is still active on Enceladus. The discovery of cryovolcanism in the south polar region, otherwise known as the "Tiger Stripes" of Enceladus, suggests the presence of hydrothermal vents systems through the advent of tidal dissipation. Here we discuss the conditions required for the formation of these hydrothermal systems and the possibility that these conditions allow for life to arise. We will reveal the internal structure of these vents and review the multi-body tidal forces scenario which gives rise to the internal heating of Enceladus.

Essential Oils as Potential Therapeutics for COVID-19

Matan Chester, Bianca Vasquez, and Angela Abraham
Sponsor: Dr. Nilmi Fernando
Georgia State University

The undergraduate research (CHEM 4160) laboratory course at Georgia State University is designed to introduce independent research and critical thinking through writing skills to undergraduate Chemistry students. In this lab, students will work on Essential Oils (EOs) from peppermint, spearmint, orange peel, garlic, lavender, and thyme. These oils were selected based on literature findings for their potential therapeutic effects on the SARS-CoV-2 virus. The EOs are extracted by steam distillation and analyzed by spectroscopic and chromatographic techniques such as 1H and 13C NMR and GC-MS. The oils will be examined to determine the percent composition and molecular identities of components reported in literature as active components. Students will publish their scientific data in the form of a research report per the ACS guidelines. Throughout the course of the research, students develop literature search, written and oral communication, and scientific data recording skills. These skills along with the laboratory and analytical techniques learned from the research help prepare students for their future careers in science and STEM fields.

Exploring Optimism and Mental Health Symptoms

Isabella Sineo
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University of South Carolina-Beaufort

Optimism bias occurs when people overestimate the probability of positive outcomes and underestimate the probability of negative outcomes happening to them. Studies have shown that people with mental health issues such as depression are less likely to have this bias (Colby & Shifren, 2011). Smith and Segel (2011) found that people who were mentally and emotionally healthy had tools for coping with unfortunate situations and maintained a positive perspective. The current research aims to determine the relationship between optimism and mental illness. Fifty participants completed the Life Orientation Test (revised version) (LOT-R; Scheier & Carver, 1994) and Depression, Anxiety, and Stress scale (DASS; Lovibond & Lovibond, 1995) via an online survey. A correlational test revealed a significant negative correlation between the variables. There was a significant negative relationship between optimism ($M = 13.83$, $SD = 4.45$) and depression ($M = 11.55$, $SD = 9.61$), $r(38) = -.40$; $p = .01$. A correlation test found that there was a significant negative relationship between optimism ($M = 13.83$, $SD = 4.45$) and anxiety ($M = 12.70$, $SD = 9.54$), $r(38) = -.35$; $p = .03$. A correlation test found that there was a significant negative relationship between optimism ($M = 13.83$, $SD = 4.45$) and stress ($M = 15.65$, $SD = 8.73$), $r(38) = -.35$; $p = .03$. This research indicates that as one's level of optimism increases, their mental health symptoms decrease. This suggests that optimism is a valuable characteristic and helps to illustrate why we see elements of optimism incorporated in therapy. The present study confirms that optimism is correlated with lower levels of depression and stress, and these factors could play an important role in someone's quality of life.

Expression and Purification of HphB and ArAT: Enzymes in the L-Phenylalanine Homologation Pathway

Juan-Paolo Reynes
Sponsor: Dr. Shogo Mori
Augusta University

Natural products (NPs) are organic molecules produced by microorganisms and plants that are often used in drugs and drug leads. Organisms use biological catalysts called enzymes to perform the biosynthesis of these compounds. Homophenylalanine (L-Hph) is an uncommon amino acid derived from phenylalanine (L-Phe) by a chemical process called homologation. L-Hph is used as a building block of some peptide NPs to enhance their biostability. HphB and aromatic amino acid aminotransferase (ArAT) are two out of four enzymes involved in the biosynthesis of L-Hph. In the proposed biosynthesis of L-Hph, HphB catalyzes dehydrogenase/decarboxylase to convert 2-benzyl-3-hydroxybutanedioic acid (B3HB) to 2-oxo-4-phenylbutyric acid (OPB). ArAT is responsible for the first and last step of the homologation pathway: the conversion of L-Phe to phenylpyruvic acid (PPA) and 2-oxo-4-phenylbutyric acid (OPB) to L-Hph. This project focused on expression and purification of HphB and ArAT. After cloning of genes encoding HphB and ArAT into the expression plasmid pET28a, HphB was overexpressed in E. coli and purified by an affinity column chromatography. It is now ready for the enzymatic assays for its characterization. However, the purification of ArAT was unsuccessful as the protein was insoluble. It was cloned to be expressed with different tags that enhance the protein solubility, such as 6×histidine tag at N- and/or C-terminus as well as maltose binding protein tag, all of which did not make the protein soluble. Further expression experiments using different constructs and conditions will be performed in the future. Characterizing enzymes involved in the homologation of L-Phe to L-Hph could allow for future engineering of the pathway to produce L-Hph analogs and other homologated amino acids. These compounds can be used to increase the potency and stability of existing drugs, as L-Hph is used as a chiral building block in some pharmaceuticals, such as angiotensin-converting enzyme (ACE) inhibitors.

Extraction of Carotenoids Using Non-ionic Deep Eutectic Green Solvents

Maria V. Alvarez, David B. Vasquez, and Lizett Rubio
Sponsors: Dr. Gopeekrishnan Sreenilayam and Dr. Ligia Alexandrina Focsan
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Carotenoids are natural pigments that are found in fruits and vegetables. They are frequently used in the health, food, and pharmaceutical industry all over the world because of their health-promoting properties. These pigments can act as antioxidants for the human body, which can reduce the risk of chronic diseases. Humans cannot synthesize these pigments naturally, so they must be ingested by consuming fruits and vegetables. Nowadays there is an increased interest in developing green solvents to extract these pigments efficiently. Currently, volatile organic solvents (VOS) are being used to extract carotenoids but these are replaced by green solvents such as deep eutectic solvents (DES). These "green solvents" have advantages such as biodegradability, low toxicity, low cost, and simple preparation. In this research, four different non-ionic DES derived from an Acetamide-Urea system were utilized due to their low eutectic points. These DES will be used to extract the carotenoid pigments from natural sources such as fruits, vegetables, or leaves. The extracts will be analyzed using the HPLC instrument with a YMC C30 carotenoid column.

Fall Prevalence and Evidence-based Measures for Prevention

Hannah Kendall, Joshua Seworkpor, Bryson Langford, and Isabelle Grodzki
Sponsor: Dr. Laura Kim Gosa
Georgia Southwestern State University

A fall is an event that results in a person coming to rest inadvertently on the ground or floor or other lower level (World Health Organization, 2021). According to the World Health Organization (2021), falls are the second leading cause of unintentional injury deaths worldwide; each year an estimated 684,000 individuals die from falls globally, of which over 80% are in low- and middle-income countries; adults older than 60 suffer the most significant number of fatal falls; and 37.3 million falls that are severe enough to require medical attention occur each year.

Falls can impact an individual in many ways, and these impacts can cause physical injuries, have adverse social consequences, and induce psychological distress in the individual. Inpatient falls are common adverse events that can lead to injury, longer hospital stays, and increased healthcare costs (Hoke & Zekany, 2020). Evidence-based fall prevention programs are essential to decrease the risk of an individual falling and experiencing these harmful effects. Inpatient fall rates range from 5.09 to 6.64 per 1000 patient days across the nation (Hoke & Zekany, 2020). In 2008, the Centers for Medicare & Medicaid Services classified inpatient falls as adverse events that should never occur to patients in a healthcare facility and eliminated reimbursement for the extra costs related to the care and treatment of patients experiencing an inpatient fall (Hoke & Zekany, 2020). Hospitals now bear the burden of these costly falls. The average cost of an inpatient fall with injury in patients 65 years and older is $30,550 per patient fall. For this at-risk population, falls are the leading cause of fatal and nonfatal injuries (Hoke & Zekany, 2020). This poster aims to discuss the prevalence, risk factors, and evidence base measures to reduce falls among patients in the inpatient setting. Silva (2017) noted the causes of falls are multifactorial, and the risk factors vary by patient. Classifying a patient as high or low risk for falling based on the number of risk factors appears irrelevant; it takes one risk factor to lead to a fall (Silva, 2017). The key is accurately identifying risk factors with an appropriate action plan to address each element. Silva (2017) concluded that fall prevention initiatives must be tailored to each patient. Leaders must engage and empower staff to provide evidence-based safe care, recognizing positive efforts to prevent falls or harm and facilitating an immediate debrief when a fall occurs (Silva, 2017). Prevention strategies should emphasize education, training, creating safer environments, prioritizing fall-related research, and establishing effective policies to reduce risk (World Health Organization, 2021). Nurses are well placed to undertake and contribute to a falls risk assessment of their clients and to recommend preventive interventions, thereby reducing the fall risk (While, 2020).

Food Deserts and Food Insecurity in Valdosta, Georgia

Zy'Ronica Lindsey and Zachary Collis
Sponsor: Dr. Anne Price
Valdosta State University

The goal of this project was to document the presence of food deserts in Valdosta, GA, and analyze the factors affecting food insecurity. The questions we posed were, "What are food deserts? Do food deserts exist in Valdosta, Georgia? How does a lack of transportation lead to the purchase of low-quality and/or cheap foods? Our literature review showed that based on 2000 and 2006 census data on locations of supermarkets, supercenters etc; the USDA found over 6,500 food deserts in the United States (Harrison). Research also showed that minority communities were the most affected by food deserts. In order to test this information's relevance to the citizens of Valdosta, we implemented various methodologies, including an interview, survey, and site visits, to assess the impact of food deserts in the lower-income, mostly minority neighborhoods and how this impact differs from that of those who live in wealthier neighborhoods. The couple we interviewed discussed the difficulties of purchasing quality foods without access to a vehicle, which provided evidence that food deserts do affect lower-income citizens. The site visits also supported this by the obvious quality difference in fresh produce and meats depending on the neighborhood. Both of these findings were reiterated by the 100-person survey we conducted, in which most respondents lived in food deserts and around 30% of respondents found it difficult to commute to the grocery store.

Gaps in Women's Leadership and Pay Across 26 University System of Georgia Institutions

Tanisha Goldsboro
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Nationally, women make up about 60% of college students. Does the leadership of University System of Georgia (USG) institutions reflect the same gender distribution? And, are there gender pay gaps across universities in Georgia? This study was conducted using entirely publicly available data. We collected name, title, and salary data from openGA.gov for the year 2020 and combined this with a gender variable we created by inferring gender based on first and middle names and referring to faculty biographies for gender pronouns. The findings that in the Georgia university system, there are 7 female presidents out of 26 universities. 33% of the highest-paid positions belong to women. 47% of deans are women. 45% of department heads are women. Male full professors make on average $7,110 more than women. The average salary for female full professors is around $97,000 compared to the average of $104,000 that a male professor makes. There is a significant positive relationship between the percentage of women in the top 20 highest-paid positions and having a female president. There is a positive relationship between the percentage of department heads that are women and the percent women in the top 20 highest paid. There is a negative relationship between the percentage of women in the top 20 highest-paid positions and the gender salary gap for full professors, meaning universities with more highly paid women have less of a gap in the pay for full professors. There is a positive relationship between the percentage of the student body that is African American and the percentage of women in the top 5 highest paid. Universities with more highly paid women are associated with more African American students.

Gender Differences Related to Teacher Engagement

Megan Foster, Avery Hendrickson, and Jaheim Laws
Sponsor: Dr. Kymberly Harris
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The researchers collected observational data from middle school teachers to determine the difference, if any, in the type and number of teacher engagement between male and female students within two middle school classrooms through observation. We hypothesize that there is a difference in teacher engagement between male and female students. The researchers were placed into two different classrooms: a 6th-grade mathematics resource classroom and a 7th-grade English classroom. Comparisons of teacher engagement were made between the content presented, gender differences, and the presenting disabilities in the class. The observational method that the researchers used is momentary interval collection in the two classrooms. The anticipated results are that there will be an observable difference in the types and frequency of teacher engagement between male and female students. Positive teacher-to-student relationships are developed through positive interactions and are a leading indicator of student success (Fite et al., 2021). The data collected in this research will assist in determining if there is an uneven distribution of teacher engagement with students in the classroom, based on gender.

Getting the Jab:
Good Habits and COVID-19 Vaccination

Amber Oliver
Sponsor: Dr. Hans E. Schmeisser
Abraham Baldwin Agricultural College

Despite the rapid development and distribution of vaccines, many remain hesitant, skeptical, or outright opposed to these medical breakthroughs. Two groups have emerged: those who have taken the opportunity to receive the vaccination and those who have refused it. This divide can be observed within the student community at Abraham Baldwin Agricultural College (ABAC). Using survey analysis, this paper measures what factors might contribute to the voluntary action of receiving the vaccine. This work uses Aristotle's concepts of "Good Habits" and "Good Citizenry" – in which Aristotle argues that individuals and societies that develop habits attuned to virtue will achieve their telos (that is, their end or purpose) of a flourishing life – as a theoretical framework to consider if "good" academic habits predict an increased probability of voluntary vaccination in college students. To define "good" academic habits, we draw upon several measures from the literature: engagement (Assunção, Hugo, et al., 2020; Araujo & Murray, 2010), GPA (Komarraju, Meera, et al., 2008), environment (Austin, Alexander W., 1999), and other indications of academic success are considered. Survey data will be analyzed using statistical methods. To access the predictive relationship between Aristotle's "Good Habits" and vaccinated college students, this paper will consider other characteristics including party ID, political partisanship, trust in government, socioeconomic status, and other relevant demographic data. It is expected that good habits in other situations (in this case, quality academic behavior) will translate into good habits in other situations (in this case, being voluntarily vaccinated); however, it is quite possible that we will find that ideology and other political factors better predict which students choose vaccination.

How Does Gender and Birth Order Affect Family Responsibility in Latinx Immigrant Families?

Anahi Santiago
Sponsor: Dr. Anne Price
Valdosta State University

My research focuses on the sense of responsibility/duty that someone may feel as a first-generation, Latinx immigrant based on their gender and birth order. I am interested in how gender determines how much responsibility is placed on individuals and if birth order also influences how much responsibility one has towards their family. I hypothesize that females will report that they have a higher sense of responsibility than males. I also hypothesize that the oldest will have a higher sense of responsibility compared to the middle or youngest children. The sampling method that was used for my Qualtrics survey was a non-probability convenience sample of 45 Latinx individuals. My hypothesis that women would feel a greater sense of responsibility than men was supported, with 35.3% more women saying that they felt a great deal of family duty than men. My hypothesis that the oldest children would feel a greater responsibility than middle or younger children was also supported. This is in line with previous research that has found differences between the responsibility placed on a Hispanic female and a Hispanic male; they both have a duty but the burden is definitely different.

Individual Differences in COVID-19 Perceptions and Risk-Taking

Graison Conn
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The spread of COVID-19 impacted many people around the world. In the United States, over 92,000,000 individuals have been infected with COVID-19 (CDC, 2022). Because COVID-19 is a relatively new disease, published research on the topic of individual differences among preventive measures such as wearing face masks is limited. The purpose of this study was to examine a newly developed scale that measures face mask attitudes and investigate individual differences. Participants (N = 355) responded to an online survey consisting of questions and statements measuring demographics, attitudes toward face masks, and levels of masculinity and femininity. Participants also completed the Game of Dice Task (GDT) and a R-SPAN task online through Inquisit. A number of significant individual differences were found among attitudes toward face masks. Males reported more negative attitudes compared to females. Caucasians reported more negative attitudes compared to other ethnicities. Republicans reported more negative attitudes than other political affiliations. Additionally, the more liberal an individual was the more positive their attitudes were toward masks. For sexual orientation, those identifying as LGBTQ+ reported more positive attitudes compared to heterosexuals. Finally, those who received the COVID-19 vaccine and booster reported more positive attitudes towards masks compared to those who did not receive a vaccine or booster. Attitudes toward face masks were not correlated with the GDT or R-SPAN scores. Implications and future directions for research are discussed.

Inhalation Method for Treatment of Lung Cancer

Taylor Macera
Sponsor: Dr. Thomas Manning
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Lung cancer is the leading cancer-causing death in the United States. It has an 80% mortality rate. It is the second most diagnosed cancer in men and women in the United States. Paclitaxel is a chemotherapy drug that is used to treat lung cancer. It is currently one of the most widely used chemotherapy drugs. The primary goal of this study is to identify innovative ways to treat lung cancer. A novel vaporization method is used to reduce resistance and increase efficacy. Solvents were used with a vaporizer to produce nanodroplets that would be used to treat lung cancer deep within lung tissue. Inhalation of nanodroplets into the lung allows for direct contact with lung cancer. Ethanol and an ethanol mixture are tested separately as potential carriers for the cancer drugs. Taxol is used, as it is a well-known cancer drug that is already on the market. This method provides an innovative and effective method for treating lung cancer.

Investigating Moral Judgements of Consensually Non-monogamous Relationships

Traveres Cox
Sponsor: Dr. Mark Whatley
Valdosta State University

The present study examines consensual non-monogamous relationships and if the sexuality of the participants has any effect on the moral outlooks of the relationship. Participants (N = 79) were randomly assigned one of four relationships where couples were either in a heterosexual relationship but engaged in monogamous relationship behavior or CNM (consensual non-monagamous) relationship and vice versa for homosexual couples. Participants then completed scenarios and were given six moral statements to rate the scenario they were given. We found that respondents judge the relationships more harshly based on the relationship if the participants were in a monogamous relationship or consensual non-monogamous relationships. There was not a significant difference in moral outlooks for relationships based on their sexuality.

Investigating the Effects of Microplastic Contamination on Maternal Health and Newborn Neurodevelopment Through Unsupervised Machine Learning

Adrian Bozocea, Emmy Peach, Charles Easley, and Lisa Renzi-Hammond
Sponsor: Dr. Renzi-Hammond
University of Georgia

Plastic usage has become ubiquitous in everyday life. This usage has caused foods, water, and air to become contaminated with microplastics, leading to their ingestion and accumulation in our bodies. This is worrying as animal studies indicate that microplastics disrupt the maternal-fetal immune system and lead to toxicity in all 11 organ systems. In humans, microplastics have been shown to be absorbed by the placenta, enter fetal body systems, present at levels 5-15x higher in newborns than adults, and act as vectors of environmental pollutants. These early indicators are highly concerning and with a current lack of research in the field, it is imperative to investigate these underlying connections and consequences further. By utilizing developmental health markers and machine learning, it was sought out if current levels of microplastic contamination were having observable effects on contaminated communities.

Using the per-and polyfluoroalkyl substances (PFAS) contamination site tracker compiled by Northeastern University, 1782 sites were identified nationally. After identification, 100 random sites were selected, and a literature review identified 23 neurodevelopmental and general health markers connected to microplastic contamination (e.g. birth weight, neurological disabilities). Using state public health data, the 23 markers were collected and matched to each contamination site. This is currently undergoing analysis through an unsupervised machine learning algorithm based on the Apriori structure to identify new trends between microplastic contamination and health markers. Results: We anticipate that there will be higher incidences of neurodevelopmental defects, delayed general development, and neonatal challenges in communities with higher microplastic exposures. We hope that our findings will aid in the development of plastic usage guidelines and serve to highlight how everyday plastic use can impact maternal and newborn health and development.

Implementation of a Hairpin Model Based Passive Microwave Tag Using Microstrip Structure

William Logan Spooner
Sponsor: Dr. Shantanu Chakraborty
Valdosta State University

Microwave tags are a combination of circuits that utilize microwave energy to transmit and receive signals. These signals are used in passive identification systems for things such as theft prevention and asset tracking. The goal of our research was to design a low-cost model using a microstrip structure effective at a frequency of 7 GHz that can be easily manufactured using widely available materials. Our first step was to calculate the dimensions required to make the tag resonate at our target frequency. The length of the strips on the tag must be half the wavelength of the frequency resonating through the circuit. To determine the actual wavelength of the signal inside the materials, we had to calculate the effective dielectric constant since its speed would change once it enters the circuit. Based on this information, we could determine the dimensions of the hairpin-like structure. We have used an electromagnetic simulation software, Sonnet Lite, to design and to simulate the reflection and transmission behaviors of the circuit. It allowed us to generate the power loss over a wide range of frequencies, which lets us make minor modifications to perfect the design for our target frequency. Our final design had a resonating frequency of 7.1 GHz. Once we had a final design, we used copper PCB and conducting tape to create the microwave tag. Finally, we used a VNA (Vector Network Analyzer) to test the efficiency of our design at 7.1 GHz. The performance of the final prototype was very similar to the simulated one. The only difference we saw was a minor drop in Q-factor.

It's Just Pop Culture: The Appropriation of Black Aesthetics in the Music Industry

Dominique A. Pollard
Sponsor: Dr. M. Denise Lovett
Valdosta State University

Black culture has become a topic when discussing different facets of society; one being its re-packing through non-Black music artists and labeled "pop culture." In this study, I will be examining the concept of cultural appropriation as well as its negative aspects in the music industry as it pertains to not only Black artists, but non-Black artists and Black-influenced genres. I will take a closer look at the incorporation of Black aesthetics appropriated by non-Black artists as well as non-Black people, and their reasoning behind doing so. A content analysis involving 12 non-Black artists from two genres (R&B and Hip Hop) will be spanning from 2000-2009 and 2010-2019. With this content analysis, I will be identifying changes between their initial start in the industry and their image later in their careers, noting changes in their physical appearance, lyricism, and music styles. The results of the content analysis indicate that the appearance of some of the artists examined changed due to a push to their record labels, and others because of personal growth. Most of the artists used Black people as props in music videos. The lyricism as well as the music styles in some artists changed again because of record label obligations while others have been consistent with the use of AAVE and other Black-centered production methods.

Laboratory Activities with a Forensic Chemistry Focus

Denetria Thomas
Sponsor: Dr. Linda de la Garza
Valdosta State University

From the abundant laboratory experiments published for upper-level laboratory courses, a selection of engaging laboratory activities with focus on Forensic Chemistry has been selected and tested. The laboratory activities include "crime scene" materials to be analyzed by several chromatographic techniques such as thin-layer chromatography (TLC), High-Performance Liquid Chromatography (HPLC), Gas Chromatography (GC) and Gas Chromatography-Mass Spectrometry (GCMS) and spectroscopic techniques with a UV-VIS spectrophotometer and Fourier-Transformed Infrared spectrometer (FTIR). The preliminary analysis of analgesics and other drugs, essential oils, fibers, and pigments with VSU Chemistry Department instruments will be presented. The experimental part can be completed within three hours for a teaching laboratory, with students working in small teams.

LGBTQ Television Creator Chris Nee: One Women's Efforts to Diversify Characters on the Small Screen

Gabrielle Jones
Sponsor: Anna Weinstein, MFA
Kennesaw State University

A 2008 study published in the Future of Children journal (Princeton University) found that the type of media content children watch affects their well-being and social-emotional development. In 2019, the Geena Davis Institute on Gender in Media announced the historic achievement that female leads and co-leads had "reached gender parity in top children's television programming," including the "25 top Nielsen-rated children's television programs watched by kids ages 2-13" and the "100 most popular children's films rated G, PG, and PG-13." Through my work on Professor Anna Weinstein's Women Writers of Film & Television research project in the English Department at Kennesaw State University, I have identified a female children's television creator who is leading the charge to create programming that intentionally integrates diversity and more accurately represents a cross-selection of children and their experiences. In this presentation, I examine the work of female LGBTQ television writer and showrunner, Chris Nee, who created series such as Doc McStuffins 2012-2020) and Ridley Jones (2021--). Doc McStuffins was the first children's program to feature an African American female lead with LGBTQ parents, and Nee's collaboration with Barack and Michelle Obama led to her animated short, We the People (2021). Her most recent effort to bring diverse voices to the small screen is a new, yet-to-be-released series, Spirit Rangers, created by Karissa Valencia, which Nee is producing through her company Laughing Wild. Nee and Valencia have committed to staffing the show with an entirely Native American writer's room. This presentation will explore Nee's work to create new voices for children's television programming, diversifying the characters onscreen as well as the writers developing these characters behind the scenes.

Measuring Reproductive Quality in Wild-Caught Dwarf Seahorses (*Hippocampus zosterae*)

Taylor Taylor
Sponsor: Dr. Emily Rose
Valdosta State University

Dwarf seahorses are an excellent flagship species for identifying the impacts of disturbances in seagrass ecosystems. While multiple studies have examined different laboratory settings and stresses on seahorse reproduction and juvenile seahorse growth, there has been little data collected on wild-caught reproductive quality. This study focuses on measuring brood size and offspring weights and lengths at the birth of wild-caught pregnant male dwarf seahorses. Pregnant males were collected in Tampa Bay and transported to Valdosta State University in June and July. At birth, brood size was calculated, and the father and offspring were weighed and photographed for body lengths to be measured using ImageJ. Across the study, dad sizes and brood sizes did not differ between the months, with an overall average of 0.2295 ± 0.0144 g for dad weights and 39.5 ± 3.9 offspring per brood (n=20). However, average baby weights were significantly higher in July at 0.0021 ± 0.0001 g than in June at 0.0016 ± 0.0001 g (n=10). Brood sizes were positively correlated to dad size. However, brood size and dad size had no relationship to average baby weights. These results allow examination of initial relationships between offspring length and weight, as well as offspring size, father size, and brood size. The data can be used to further compare field and laboratory brood qualities. Understanding the differences in seahorse reproductive qualities between these two settings will allow for a better interpretation of lab-bred juvenile studies. Reproductive rates of pregnant males collected in the field will better inform predictions of recruitment patterns of wild populations and allow detection of the effects of potential environmental disturbances or habitat loss of seahorses.

Mechanics of Inductive and Capacitive Sensors

Roberto Montiel
Sponsor: Joshua Whittington
Wiregrass Georgia Technical College
Valdosta State University

A poster presentation on the inner workings and applications of types of sensors used both in and outside of the industrial field. Many types of sensors are applied in industry and everyday use, and the most notable ones are proximity sensors; the two main types of proximity sensors are inductive and capacitive which are capable of detecting the makeup of an object. Inductive sensors use a coil to create a magnetic field and when a metal object gets close, it will charge the field, and this change will let the sensor know an object made out of metal is in the area and will send a signal. Capacitive sensors send an electric field and when an object disrupts the capacitance created by the field, the sensor detects that and sends an alert. Inductive sensors are commonly used in industrial assembly lines to check if a metal object like a spring is in the right place. Capacitive sensors are often found in many touchless applications like the “wave to open” button for doors because of their ability to sense any object. Proximity sensors are just one of many sensors that makes processes more efficient in and out of the industry, and inductive and capacitive sensors have different uses based on their unique properties.

Momentary Assessment of Research Learning Experiences Project (MARLE)

Tionee Adams, Amber Bullock, and Mariel Pfeifer
Sponsor: Dr. Erin L. Dolan
Fort Valley State University

Undergraduate research experiences are an important way for many students to access research training. Traditionally, undergraduate research experiences are offered as an internship-style program, in which an individual student or a small group of students are mentored in a faculty member's lab. However, due to a relatively low number of faculty compared to the number of undergraduates looking for research experiences, these types of internship-style experiences are not widely available. Moreover, student access to these types of internship-style experiences may be affected by racial and gender biases. One way we can enhance the number of students accessing undergraduate training experiences is by offering course-based undergraduate research experiences. CUREs are where the students do research in a classroom and interact with the students and the professor and UREs are internship-style experiences. Previous research has shown that CUREs help students develop science self-efficacy (an individual's perception of their ability to complete a specific task or reach a specific goal) and science identity (an individual's perception of themselves as a scientist). We hypothesized that one feature that could affect student outcomes is the types of research decisions they make in their undergraduate research experiences. In this study, we investigate the types of research decisions students make in undergraduate research training experiences. Our results show that overall students made a variety of decisions in their undergraduate research experiences. Students in CUREs/UREs can increase their science self-efficacy (an individual's perceptions of their ability to complete a specific task or reach a specific goal) and science identity (an individual seeks to be a scientist, which is constructed through iterative interactions with scientific social and material contexts). We can also see the difference in decision based on the individual's race and ethnicity, which may give insights into how we can better design research training experiences like to increase equity.

Monitoring the Mortality of Gopher Tortoises (Gopherus polyphemus) and the Reliability of Passive Integrated Transponders (PIT tags)

Jazmin Borges and Nicole Woolridge
Sponsor: Dr. J. Mitchell Lockhart
Valdosta State University

Gopher Tortoise (*Gopherus polyphemus)* populations have declined significantly in the past hundred years. This decline is due to multiple factors including but not limited to; predation (animal and human consumption), habitat destruction (degradation, fragmentation, climate warming, sea-level rise), human activity (urban expansion, tree harvest, gasoline in burrows, and poor habitat management) and introduced diseases. The Gopher tortoise is considered a keystone species as they create burrows that house over 300 different species of wildlife and play a vital role in the pollination process via scat dispersal. Therefore, it is imperative to encourage the recruitment and survival of Gopher tortoise populations.

The purpose of this project is to conduct a demographic survey on a 2-year cohort of 174 Gopher tortoise hatchlings marked and released during 2008-2009 at Reed Bingham State Park in Adel, Georgia. The survey will be conducted primarily in the Gopher Tortoise management area and the Pioneer site. Documentation of all burrows and Gopher Tortoises encountered will be recorded for data purposes. Since Hatchlings were implanted with Passive Integrated Transponders (PIT) tags before release. The results of this survey could provide demographic information on the growth and survivability of Gopher tortoises and justify the reliability and usage of Passive Integrated Transponders over time in population monitoring.

Observations of Verrucose Hyphae of *Nothopassalora personata* and Its Pigmented Phytotoxin

Atalya Manchester
Sponsor: Dr. Emily Cantonwine
Valdosta State University

Late leaf spot causes millions of dollars in losses of peanut plants every year for the Georgia agricultural community. The cause of this disease is the fungus *Nothopassalora personata,* a plant pathogen that falls within the Cercosporoid family. In culture, N. personata produces different morphological forms, with some forms secreting more dothistromin pigment than others. Dothistromin is difuroanthraquinone with phytotoxic properties. It is thought to aid in fungal virulence. Observations of a red-pigmented form using light microscopy showed concentrations of dothistromin pigment near verrucose (bumpy) hyphae. Verrucose hyphae was uncommon in an original form of the fungus. This experiment was conducted to test the hypothesis that there is a positive relationship between the frequency of bumps seen and the amount of dothistromin secreted. There were two parts to this experiment to determine a relationship between the bumps and the amount of pigment produced; characterization of verrucose hyphae and estimation of dothistromin quantity. Three N. personata forms were used; Original brown, Red, and White. For part A, forms were grown on media for 9 days and evaluated using Scanning Electron Microscopy to estimate abundance of verrucose bumps. For part B, each form was inoculated to solid and liquid media and grown for two weeks. After the two weeks, acetone was used to extract dothistromin and a spectrophotometer was used to quantify. Verrucose hyphae were observed more frequently with the white form (100%) than the brown form (13%) ($p<0.01$). The frequency was intermediate for the red form (60%). Rankings for bump density were numerically higher with the white and red forms, 2.7-2.8, compared to the brown form, 2.0, but were not statistically different ($p=0.2$, 2= moderate, 3= many). Estimates of dothistromin are in progress. These findings will improve the knowledge of this plant pathogen's biology.

On-Campus Greenspaces in Aiding Student Mental Health

Nicole Woolridge
Sponsor: Dr. Shelly Yankovskyy
Valdosta State University

In 2021, the Center for Collegiate Mental Health at Penn State reported that 72.4% of students stated their mental health was negatively affected due to COVID-19 and up to 44% of college students described having symptoms of depression and anxiety. Amid rising mental health concerns, self-care and natural solutions that provide relief have become increasingly important to students and the general population. Engaging with greenspaces, especially when used in conjunction with other mental health therapies could increase student success by reducing mental health issues which are increasingly common among college students. Qualitative research was conducted in the Spring of 2022 on a university campus in South Georgia to assess whether greenspaces were being utilized, as well as the self-reported impact on mental health. Interviews were conducted with students 18 years and older, in person as well as via online survey. Questions focused on how students spend their down time, as well as how often they visit campus greenspaces and if there was a difference in pre COVID and during COVID. The majority of students did utilize the greenspaces often and found the on-campus greenspace had a positive effect on their mental health. This study could prove to be very significant when it comes to designing campus spaces.

Optimization of DNA Extraction for Genome Sequencing of the Invasive Mussel *Mytella charruana*

Jacob C. Adams
Sponsor: Dr. Cristina Calestani
Valdosta State University

Mytella charruana is an invasive marine mussel found along the southeastern US coastline. To date, the genome of M. charruana has not been sequenced. The purpose of this project is to optimize the DNA extraction procedure to obtain high molecular genomic DNA for sequencing with the Oxford Nanopore Technologies system. One of the advantages of this sequencing technology is that longer DNA fragments can be sequenced at once. Longer DNA reads will make the following genome assembly easier. The two DNA extraction methods include the Qiagen protocol for the DNeasy Blood & Tissue Kit and a modified protocol with the goal of minimizing DNA shearing. Tissue was disrupted with a micro pestle to facilitate homogenization and samples were always mixed by inversion, instead of vortexing. Starting with gills tissue, we were able to obtain sequence reads on average 2.5 times longer than with the manufacturer's method. To date, we were able to sequence 47.5 million bases (Mb) of the M. charruana genome. The sequencing of the genome of M. charruana will facilitate the development of molecular markers to track different populations, both in their native and introduced environment. It will also help the study of gene expression related to the survival and reproduction of this invasive mussel in the new environment. Ultimately, all these studies will help environmental managers and agencies plan strategies to fight the invasion of this mussel species.

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Pain Related Depression of Behavior in Mice following a Frontal Traumatic Brain Injury

Dylan MacLean
Sponsor: Dr. Michael R. Hoane
Augusta University

Traumatic brain injury (TBI) is a significant health concern in humans. This research aims to further examine the pain-related depression of behavior in mice following a traumatic brain injury. This study used twenty adult mice divided evenly into two groups of ten each individually housed throughout the entirety of testing. The experimental group received a controlled cortical impact (CCI) injury using a 3.0mm impactor tip at bregma and was given time to recover while the control group received a sham surgery including everything done to the experimental group except the controlled cortical impact injury and given the same time to recover. The behavior that will be examined is the nestlet shredding behavior seen in mice. This is achieved by suspending a pre-weighed nestlet from the top of each cage where the mice can remove pieces of the nestlet to build a new nest. Thus, the remaining nestlet can be weighed at various time intervals to provide an indication of the rate of the behavior. This behavior was also tested prior to the surgery as a control. Following the behavior analysis, the mice will be euthanized, perfused with formalin, and have their brains removed. The removed brains will be processed for histology which will include a microscopic examination of the brains to determine the extent of the brain injury. It is expected that the mice that received a controlled cortical impact injury will show a slower rate of nestlet shredding than those that did not and that the more severe the CCI the slower the rate of nestlet shredding. If the results are as expected this animal model of traumatic brain injuries could be used as an effective and more affordable option for doing preclinical testing of novel therapeutics for TBI.

Past SKIN Deep:
Pressure Injuries

Anna Cannarella, Jacqueline Dugger,
Bailey Christian, and Bryce Schmitz
Sponsor: Dr. Laura Kim Gosa
Georgia Southwestern State University

Almost 11% of long-term care residents in the US develop a pressure injury (PI) during their stay (Stone, 2020). As defined by the National Health Service (NHS), pressure injuries to the skin and underlying tissue are primarily caused by prolonged pressure on the skin (NHS website, 2022). This research was conducted using a mixed-method approach. Those most at risk for developing a pressure injury include those over 70, those confined to bed, those who are paralyzed, obese, urinary incontinence, bowel incontinence, smoking, physical restraints, altered mental status, a poor diet, and some medical conditions like diabetes, peripheral arterial disease, kidney failure, heart failure, multiple sclerosis and Parkinson's (NHS website, 2022). The cost to treat pressure injuries can be expensive; the Healthcare Cost and Utilization Project (HCUP) study reported an average cost of 37,800 dollars per injury. It has been estimated that the cost of treating pressure ulcers is 2.5 times the cost of preventing them (Lyder, Ayello, n.d.). The aim of the project is for nurses to be able to identify, prevent and or treat pressure injuries. Studies have proven bundle care can help prevent pressure injuries and improve health outcomes for patients that have already acquired the injury. The SKIN bundle has been developed and implemented into long-term care environments aimed toward pressure injury prevention: Surfaces, Keep moving, Incontinence, Nutrition, and hydration (Lavallée, 2019).

Peptide Drug Delivery of Didanosine, Emtricitabine, Lamivudine, Letermovir, Nitazoxanide, and Tenofovir Disoproxil for Treatment of COVID-19: A QSAR Study

Taylor Macera
Sponsor: Dr. Thomas Manning
Valdosta State University

COVID-19 is responsible for 1.59 million deaths in the United States. There is currently no treatment for COVID that allows patients complete and full recovery. I am seeking to find an antiviral that is capable of binding to the spike protein of COVID. The spike protein sequence used is the last two proteins of 7BZ5. It is a viral protein for severe acute respiratory syndrome coronavirus. I chose this spike protein sequence because it can bind to the antivirals and change the geometry. The values of physical and biological values were analyzed before and after the spike protein was added to the antivirals. All of antivirals showed activity changes in multiple categories upon adding the spike protein. Through this project, I was able to assess if any of the antivirals chosen would be able to treat COVID-19. Log P, Protease Inhibitor activity, Kinase activity and Enzyme Inhibitor activity were the main focuses of this study.

Personality, Perceived Stress, and Resilience

Samantha Taylor
Sponsor: Dr. Carmen Brown Farrell
University of South Carolina-Beaufort

Stressful situations are a normal part of life. Some stress is good, but significant stress can cause health problems. This study aimed to explore if perceived stress was affected by a person's resilience and if personality had a relationship to resilience and perceived stress. Stress is detrimental to physical and emotional health (Fuente et al., 2021). Perceived stress has been found to have a negative relationship with resilience (Tung et al., 2014; Willis and Burnett Jr, 2016) Openness, conscientiousness, extraversion, and agreeableness have a positive relationship with resilience, while neuroticism has a negative relationship (Ercan, 2017). Perceived stress is also found to have a relationship with neuroticism and extraversion (Şahin and Çetin, 2017). The present study's hypotheses were: 1. There would be a negative relationship found between resilience and perceived stress, 2. Openness, conscientiousness, extraversion, and agreeableness would have a positive relationship with resilience and a negative relationship with stress, and 3. Neuroticism will have a positive relationship with perceived stress and a negative relationship with resilience. A convenience sample of 55 participants was presented with a link containing three surveys, BFI-S (Lang et al., 2011), BRS (Smith et al., 2008), and PSS (Cohen & Murmelstein, 1993). The results revealed resilience could predict perceived stress, while extraversion, conscientiousness, and neuroticism could predict resilience and perceived stress. No correlation was found between openness or agreeableness in relation to perceived stress and resilience. This study contributes to the literature in that it is one of the first studies in this area that examines all of the big 5 personality traits in relation to both perceived stress and resilience in one study. Having a more complete picture of these relationships is valuable for anyone who has to navigate various stressors and show resilience in their everyday life.

Power Supply Utilizing Seebeck Effect Generators and Thermal Batteries Developed from Lunar Materials

James O'Hara
Sponsor: Dr. Valentin Soloiu
Georgia Southern University

The vast majority of power systems used in space make use of photovoltaic cells to harvest sunlight, while this system works well for operations in Earth orbit where sunlight is generally constant, applications on the overwhelming majority of the Lunar surface require an ability to provide power for several days without any available sunlight. While the most common response to this is to send additional batteries and larger solar panels, this system adds considerable mass to a potential mission or outpost. Costs for such missions are considerably increased as a result, as the batteries for these systems must be lofted into orbit from Earth's gravity well.

In this study, we examine a series of cases in which Seebeck effect generators may be used in the development of in-situ constructed power systems to supply a Lunar outpost in place of a photovoltaic array, which has the potential to mitigate the issue of requiring large battery arrays to maintain a constant power supply makes use of a thermal battery composed of materials available in the Lunar environment in order to store heat for later use, and Seebeck effect thermoelectric generators to convert the stored heat into usable electricity.

We determine the power output of two types of Seebeck effect generator, including both Bismuth-Telluride (BiTe) and Calcium-Manganese Oxide (CMO) under various thermal conditions designed to simulate the transient heat flow out of a large mass used as a thermal battery for use during the Lunar night. The thermal battery materials we examine in this study include materials commonly available at or near the Lunar surface, including compacted regolith and basalt, as well as processed materials such as aluminum, iron, and titanium, which can be extracted from the Lunar soil in relatively high quantities. Using the thermal properties of these materials and the Seebeck coefficients of the TEGs, we can determine the required mass of both the TEGs and the thermal battery to provide a useful power supply to a Lunar colony during an entire Lunar day.

Prevention of Hospital Acquired *Clostridium Difficile*

**Sarah Smith, Brianna Boone,
Dane Stirrat, and Hannah Harbage
Sponsor: Dr. Laura Kim Gosa, DNP RN, PTA
Georgia Southwestern State University**

Clostridium difficile, otherwise known as C. diff., is a common bacterium that is naturally found within the colon. However, when there is an over-colonization of this bacteria, it can lead to inflammation within the intestinal tract that causes diarrhea and enteric upset. It can be spread through direct contact, making it a substantial problem within the healthcare community. It is most commonly seen among those immunocompromised or receiving antibiotic treatment. Other risk factors include advanced age, inflammatory bowel disease, and recent surgeries. Dehydration and electrolyte imbalance are some of the few effects of contracting this bacterium, and it can have devastating effects on the body. Therefore, preventative measures are necessary to reduce the risk of patients contracting C. diff. In this study, preventative measures are evaluated in their effectiveness to decrease the rate of developing this disorder. Our methodological evaluation will be conducted by viewing each of these preventative measures and determining which one is most effective in decreasing the spread of C. diff. Methods include probiotic use, personal protective equipment, handwashing, and the utilization of effective antibiotics. Each of these will be investigated through statistical analysis of four peer-reviewed journals. The outcome of this examination will decrease the risk of contracting C. diff within the hospital setting as it continues to be a major threat to the health of the population

Purification of Aquaporin Protein from the Sea Lettuce *Ulva lactuca*

**Shelby Raybon
Sponsor: Dr. Donna L. Gosnell
Valdosta State University**

In many places across the globe, fresh water is in short supply. Desalination of seawater and brackish water can aid in boosting the fresh water available. An approach that is in the early stages of development is to use aquaporin proteins embedded in membranes to effect desalination. The current project is part of an ongoing overarching project to develop novel desalination membranes that employ aquaporins from sea plant sources. The specific goal of the current project is to purify aquaporin from *Ulva lactuca*, which is grown and maintained in the laboratory. Membrane proteins in general can be difficult to purify and analyze. Here, a two-phase partitioning technique is used to isolate the plasma membrane. This is followed by a urea-NaOH treatment to recover the hydrophobic aquaporins.

Role of Regulatory mRNA Structures in the Expression of Cancer-Related Genes

Alexandra Furney, Brittany Benner, Jin Yeong Kim, and Arnab Sengupta
Sponsor: Dr. Arnab Sengupta
Georgia College and State University

Messenger RNA (mRNA) translation, the synthesis of proteins based on genetic code, is an essential process in gene expression. Translation is often inhibited when cells are under stress, but there are mechanisms that allow certain genes to bypass stress-induced inhibition. Prior studies have identified a list of genes that disregard stress signals to continue mRNA translation using regulatory RNA structures to hijack the translational machinery. We hypothesize that stress signals must alter the RNA structure to trigger structure-mediated mRNA translation. Our target genes include oncogenes HIF1A, FGF2, and tumor-suppressor gene TP53. We aim to amplify regulatory mRNA regions previously reported for each gene from A549 lung carcinoma cell lines. Next, we will build and compare structure models for regulatory regions under three conditions: (a) cell-free, (b) in-cell unstressed, and (c) in-cell stressed. For structure modeling we use SHAPE-MaP, a chemical-probing strategy analyzed using next-generation sequencing (NGS). We have successfully extracted, probed, and amplified the target regions using gene-specific primers, reverse transcription (RT), and polymerase chain reaction (PCR). We analyzed PCR products using gel electrophoresis. Here we describe our experimental workflow along with data from NGS library preparation. Applying NGS using the Illumina MiSeq platform on target mRNAs, we will build RNA secondary structures with Shapemapper2 and SuperFold software packages. Our long-term goal is to describe structure-based mechanisms by which translation of cancer-causing mRNAs can be blocked, and how translation in cancer-fighting mRNAs can be re-engaged.

Role of Translational Regulation (Messenger RNA to Protein) in the Plant Defense Hormone, Salicylic Acid Signaling

Daniel Rincon Diaz
Sponsor: Dr. Ansul Lokdarshi
Valdosta State University

Plants represent the ultimate source of nutrients for many organisms including bacteria, fungi, insects, animals, and humans. Therefore, understanding how plants defend themselves from pathogens and herbivores is critical to a sustainable food supply. Although lacking a defined immune system as animals, plants have developed a remarkable array of structural and biochemical defenses that are designed to detect invading pathogens and neutralize them before they are able to cause extensive damage. One of the key plant hormones that is actively engaged in plant defense against different types of abiotic and biotic stresses is salicylic acid (SA). While the signaling events involved in SA-mediated defense responses have been centered around transcriptional management (DNA to messenger RNA), translational (messenger RNA to protein) regulation remains under-investigated. The work presented here provides fresh insights into the SA signaling at the level of translation, specifically by the protein kinase General Control Nonderepressible 2 (GCN2) and its target, eukaryotic initiation factor 2 (eIF2) alpha. The GCN2-eIF2alpha module is a highly conserved eukaryotic stress response node for regulating translation under different types of stresses in all plants. We show that eIF2alpha is phosphorylated in response to SA in a GCN2-dependent manner in the plant model, Arabidopsis thaliana. Interestingly, the gcn2-1 plants (knock-out mutant for GCN2 gene) show wild-type-like growth response under prolonged SA stress. Ongoing work is geared towards understanding the biochemical and molecular events leading to GCN2-eIF2alpha activation in response to SA, which will provide a deeper understanding of SA signaling and general plant defense response.

Sea Lettuce is a BLAST: Using Bioinformatics to Find Aquaporin Genes in *Ulva mutabilis*

Arbrianna Goolsby
Sponsor: Dr. Donna L. Gosnell
Valdosta State University

Aquaporins are integral membrane proteins that selectively transport water across the cell membranes in which they are embedded. This project focuses on finding potential aquaporin genes in the sea lettuce *Ulva mutabilis* using the BLAST (Basic Local Alignment Search Tool) program. *Ulva mutabilis* is often grown in marine aquariums and is the only species of macroalgae in the genus Ulva whose entire genome has been sequenced to date. The BLAST algorithm is a bioinformatics tool that finds homologous proteins by comparing (aligning) their amino acid sequences. The National Center for Biotechnology Information (NCBI) contains over forty known algal aquaporin gene sequences. These sequences were used in a BLAST analysis to find potential aquaporin genes in *Ulva mutabilis*. Two sequences were identified that align closely with known algal aquaporin sequences.

Sepsis Care

Tristee Pickle, Alexa Montalbano,
Cole Maxwell, and Lauren Mcclure
Sponsor: Dr. Laura Kim Gosa
Georgia Southwestern State University

Sepsis is a potentially fatal condition that has increased in recent years. Sepsis is the body's exaggerated response to a systemic infection. As the infection impacts the body, many physiological changes occur. It is imperative for early identification of these changes because when left untreated it can lead to multiple organ failure as well as mortality. This project aims to analyze early identification, risk factors, and preventative measures for managing sepsis in the hospital setting. Proper management of sepsis will improve patient outcomes to help prevent organ failure and mortality by implementing protocols for early identification. The methods used were through a systematic review by four researchers searching scholarly electronic articles and data published within the last three years. Three hospitals were researched based on their implemented protocols and how patient outcomes are affected. The aim of the study is to identify proper interventions to recognize sepsis and reduce sepsis-related complications. Overall, sepsis should be recognized as a medical emergency that needs prompt treatment and stronger management strategies.

She Said WHAT?
The Effects of Confessor Sex and Breakup Reasons on Public Judgement

Jose A. Palacios Gonzalez
Sponsor: Dr. Mark A. Whatley
Valdosta State University

Society has progressed at a rapid pace to be more inclusive of those who do not subscribe to traditional gender norms, and the support these populations receive continues to grow. There still exists a prejudice against individuals who decide to go against the grain of society in pursuit of living an authentic life. I examined how one's gender identity can impact justification, sympathy, and blame in a simulated "date gone wrong" scenario. A sample of 160 female participants were asked to read a scenario where a couple on a date is arguing where the sex of the aggressor (male aggressor or female aggressor) and the victim's confession (reconciling with an ex-partner or coming out as transgender) were manipulated. Participants then rated the amount of sympathy for the confessor and the justification of the aggressor's actions. As predicted, the least amount of sympathy was shown to the transgender male, compared to the transgender female. When the confessor was female, the sympathy was higher than the ex-partner's confession. As predicted, participants believed male aggressors were more justified in their reactions in both confession scenarios. The results are discussed in reference to intimate partner violence within the transgender community and its theoretical implications.

Simulation Experiments of a Distributed Fault Containment Algorithm Using Randomized Scheduler

David Tan
Sponsor: Dr. Anurag Dasgupta
Valdosta State University

Fault containment is a critical component of stabilizing distributed systems. A distributed system is termed stabilizing if it exhibits two properties – a) convergence: a finite sequence of moves leading to a stable configuration, and b) closure: the system remains in that legitimate state unless another fault hits. Currently, the likelihood of several failures is quite low, and a single fault occurs more often than other types of faults. The results of the simulation experiment we did for single failure instances are presented in this study. For node selection, we employed a randomized scheduler. The results show that the fault containment mechanism we used restores valid configurations after a transient fault. The studies considered variations in the number of nodes and the degree of the malfunctioning node. The results were graphically and numerically presented to provide relevant information. The expected recovery time of the implemented algorithm is $O(\Delta 3)$, where Δ is the degree of the faulty node, and is independent of the network size. Our fault containment algorithm is a probabilistic algorithm and the simulation results support and match with the complexity analysis of the algorithm.

Sociability and the Drosophila Microbiome

Peyton Panos
Sponsor: Dr. Emily McLean
Oxford College/Emory University

The composition of microbial communities in the gut influences many complex behaviors in humans and other mammals, but we do not fully understand how this relationship is preserved across social relationships and across species. In this study, we analyzed the interaction between the gut microbiome of fruit flies, Drosophila melanogaster, and their sociability. We also studied the potential effect of genetic variation on this relationship. We predicted that the presence or absence of a gut microbiome would affect sociability as in previous literature it has been shown that the presence of a gut microbiome affects aggression in fruit flies. In the context of fruit fly behavior, sociability is characterized by voluntarily spending time with each other in a group rather than isolating themselves. The apparatus by which we measured fruit fly sociability is a petri dish that has been segregated into four parts so that we can categorize the sociability score. We measured sociability in different genotypes ofgerm-free and control flies. The procedure by which we generated germ-free fruit flies involves bleaching fruit fly eggs and raising the larvae in a sterile environment with sterile food. Here we present our methodology and the results from comparing the sociability of germ-free and control flies across multiple genotypes. Our results illustrate the continued potential for Drosophila melanogaster to inform our understanding of the gut microbiome and its role in mediating complex social behaviors

Social Experience and Mating Success across Genotypes in *Drosophila Melanogaster*

Ian Goldman
Sponsor: Dr. Emily McLean
Oxford College/Emory University

An organism's fitness is shaped by its genotype, environment and the interaction between genotype and environment. The goal of this study was to determine how developmentally social environments and genotypes shape mating success in male Drosophila melanogaster. Specifically, we investigated the question: is there a relationship between social experience and mating success that varies by genotype? The answer to this question could provide valuable insight into the influence of genetics and development on adult behavior and individual fitness. In this experiment, many virgin fruit flies from multiple genotypes of the Drosophila Genetic Reference Panel were used. The males were divided into two treatment groups: isolated or socialized in groups of four virgin male flies. Virgin females were also isolated and the flies were aged for a short period of time, 3 days. Mating trials were then conducted and filmed. These trials consisted of one virgin female, one isolated male, and one socialized male from the same genotype. From these trials, we collected information about mating success, mating duration, and latency to mate. The results of this study illustrate the relationship between genotype, developmental social experience, and mating behavior. Our findings shed light on the role of genotype and social environment in shaping fitness related phenotypes in Drosophila melanogaster

Stability and Activity of Engineered Myoglobin Biocatalyst in Deep Eutectic Solvents at Different Conditions

Dipa Patel
Sponsor: Dr. Gopeekrishnan Sreenilayam
Valdosta State University

Deep Eutectic Solvents, also called DES, are sustainable solvents prepared by mixing two or more components. DESs have many desirable physicochemical properties such as high thermal stability, conductivity, easy recycling, negligible vapor pressure, little to no toxicity, and non-flammability. It is a new-generation method and is much better than traditional organic co-solvents used in biocatalysis. These solvents can be easily synthesized from cheap, commercially available, and naturally occurring renewable materials. Biocatalysis uses enzymes and proteins as catalysts. Biocatalysis is increasingly used in organic synthesis due to its environmental sustainability; excellent chemo-, regio-, and stereo-selectivity; improved productivity; simplified work streams; milder reaction conditions; and more significant economic saving potential. Organic/Aqueous cosolvent-based biocatalytic reactions suffer from disadvantages such as catalyst stability, lack of substrate scope and substrate solubility, catalyst recycling, low sustainability index, decreased reaction kinetics, and high toxicity. One way to overcome these limitations is to perform biocatalytic reactions in an aqueous/DES solvent mix or in a pure DES solvent system. The objective of this research is to synthesize a set of 5-10 DESs and study the stability of engineered myoglobin biocatalysts (purified enzymes) in these DES using UV-Vis spectroscopy to identify the best catalyst-DES combinations. Afterward, the activity of the biocatalyst will be evaluated in the DES solvent system under aerobic, semi-aerobic, micro-aerobic, and anaerobic conditions, as mentioned above, to establish the best reaction conditions. Our initial results showed that DES solvents outperformed traditional organic/aqueous cosolvents, especially under aerobic reaction conditions.

Stigmatizing Sexuality: Public Support for Restrictions on Blood Donation for Men Who Have Sex with Men

Brandon Booker
Sponsor: Dr. Anne Price
Valdosta State University

Blood donation is an essential component in the health care system. Blood is needed to compensate for blood lost during surgery or for patients with serious health conditions. Potential donors are asked questions to determine their donation eligibility; however, with the U.S. currently facing the biggest blood crisis the nation has seen in over a decade, people may begin to wonder why some people are being are being turned down on the opportunity to save another person's life. This research asks, "How do age, gender, sexuality, and political identity affect individual's attitudes regarding whether they support the right of sexually active gay and bisexual/pansexual men to donate blood?" I conducted survey research using Qualtrics. I used Chi-square tests to see if there were significant associations between identity characteristics and support for restrictions on blood donation for men who have sex with men. I found that that categories of political identity are associated with variation in support for blood donation restrictions. 18% of conservatives strongly agreed with restrictions on blood donation for sexually active gay men and 9% somewhat agreed. In contrast, 0% of liberals strongly agreed with restrictions, and 2% somewhat agreed. 10% of those identifying as some other political group strongly agreed and 0% somewhat agreed. Surprisingly, I did not find gender or sexuality to be significantly associated with support for restrictions on blood donation for gay, bisexual, or pansexual men.

Super Shellfish: How Oyster Restoration Can Help Save Our Oceans

Madeline Pond
Sponsor: Dr. Thomas J. Manning
Valdosta State University

While many people associate oysters with butter sauce, these incredible animals are so much more than a delicacy. Supplying erosion control, water filtration, a hub for biodiversity and so much more by simply existing make oysters an amazing species worth protecting. Green technology is an overarching term that describes the use of technology and science to reduce anthropogenic impacts on the natural environment. Green technology encompasses a large array of research, including but not limited to hydrology, agriculture, energy, material science, and atmospheric science. Our research utilizes renewable resources and natural chemical sources to create base structures to be used to rebuild oyster bars. It demonstrates a biodegradable, mobile, and affordable way to reconstruct a base for a key stone species that is suffering massive habitat loss. Oyster bars serve as natural erosion control, water filtration, and food and shelter for hundreds of species. Following the 12 principles of green tech, our research shows a sustainable way of helping preserve this species. This presentation discusses results from the "Living Dock" by Jack Rudloe and the UGA Marine Lab (Skidaway Oceanographic Institute) involving novel materials and methods produced by VSU students and faculty, past and present.

Synthesis and Characterization of a Furfural Derived Semi-Rigid Diol

Mason Jones
Sponsor: Dr. Rahul Shahni
University of North Georgia

A Semi-rigid diol monomer that bridges the gap between flexible aliphatic chain and rigid aromatic counterparts replaces BPA in the production of polyesters and polycarbonates with outstanding thermal and mechanical properties. Furfural and malonic acid have been utilized as abundant non-petroleum-based feedstocks towards biomass derived compounds. In this study, 2-furanarylic acid (FAA) was synthesized from furfural and malonic acid via Knoevenagel condensation; and is followed by an environmentally friendly [2+2] solid-state photocyclization to afford rctt-3,4-di-2-furanyl-1,2-cyclobutanedicarboxylic acid (CBDA-2). The resulting dicarboxylic acid (CBDA-2) was further reduced using sodium borohydride in the presence of an electrophile to the corresponding semi-rigid 3,4-(furan-2-yl)-cyclobutane-1,2-diol (CBDO-2). The structure of FAA, CBDA-2, and CBDO-2 were characterized using spectroscopic techniques. CBDO-2 exhibits the potential to function as a semi-rigid building block for polymeric materials with desired thermal and mechanical properties.

Synthetic Studies to a Novel Pyrimidodiazepine-based Anti-folate as a Potential Anti-cancer Drug

Christian McDowell
Sponsor: Dr. Partha S. Ray
University of West Georgia

Glycinamide ribonucleotide formyltransferase (GARFT) catalyzes the reaction between 10-formyl-5,6,7,8-tetrahydrofolic acid and glycinamide ribionucleotide (GAR) to give Nformylglycinamide ribonucleotide (FGAR). The formyl carbon of FGAR is destined to become the C-8 carbon atom of inosine monophosphate from which all purine nucleotides are derived. Thus, the above folate requiring enzyme (GARFT) is an attractive biochemical target site for cancer chemotherapy. Based on the structure activity relationships of know anti-folate drugs, we have designed a novel pyrimidodiazepine-based anti-folate which we hope will inhibit GARFT and thus act as an anti-cancer agent. Our synthetic strategy to our designed target is based on a successful approach to the pyrimidodiazepine heterocyclic system which we have developed in our laboratory. We report on our synthetic progress to our desired target which involves a couple of key steps; an intramolecular nucleophilic aromatic substitution reaction and the formation of an amide from a aryl halide via palladium catalyzed carbon monoxide insertion in the presence of an amine.

Taking on Monkeypox with a Novel Anti-Viral Strategy

Madelyn Adair, Sara Taylor and Daniel Rincón
Sponsor: Dr. Thomas Manning
Valdosta State University

Monkeypox has spread quickly over the past few months with almost 24,000 cases nationwide. The viral disease is similar to smallpox, and thus some of its potential medications are also similar. In particular, the antiviral medication tecovirimat (TPOXX) is approved by the Food and Drug Administration (FDA) to treat smallpox, a disease which was eradicated in the late 1970s. The smallpox/monkeypox vaccine, named JYNNEOS, can protect against smallpox, monkeypox, rabbit pox, and other diseases caused by the orthopoxviruses, including vaccinia virus. We have proposed two new molecular entities that can help in the fight against these diseases. One promising alternative involves a metallic-sugar complex that can adhere to the virus' outer proteins, then release the toxic metal. Fatty acids are also promising in that they have antiviral behavior and are also bound to a toxic metal (cation), which is used to fight the virus. This presentation will focus on physical and medicinal data we calculated to justify the use of this entities. Below is a drug that contains several levels of efficacy against viral infections we designed.

The Design and Activity of a Novel Antimicrobial Hairpin Peptide

Ian Bercerra, Sara Collins,
and Barrette Jackson II
Sponsor: Dr. Jonathan M. Meyers
Columbus State University

Antibiotic Resistance is a common issue, which is an incurring result of the overuse and hyper-prescription of various drugs for a multitude of reasons. This issue poses a great threat to the future health and wellbeing of mankind if more antibiotics are not engineered. As a biochemist, it is important to identify and confront these issues head on as this matter is highly probable to create catastrophe, due to bacterial illnesses being easily transmitted. The idea to combat this issue is to begin with testing the effectiveness of pre-existing antibiotics. Recent studies have been composed that show promising results in the area that multiarm peptides have been more successful at contradicting the membrane of bacterial species versus the previously single armed peptide. This project is done with the intention of producing a functional hairpin hexapeptide bonded by an APGY beta-turn. The structure of this molecule should make it possible for both arms to simultaneously penetrate the membranes of the bacteria, producing a more effective and less resisted drug than the independent monomer.

The Dynamic Formation of Nuclear RNA Foci in Proliferating Fibroblast Cells Derived from ALS Patients

Robert Garrard
Sponsor: Dr. Yao Yao
University of Georgia

Amyotrophic lateral sclerosis (ALS) is a progressive and fatal neurodegenerative disease characterized by the death of motor neurons. RNA foci are a phenotypic hallmark of ALS caused by the accumulation of repeat containing RNAs transcribed from the expanded GGCCCC (G2C4) hexanucleotide repeats in the chromosome 9 open reading frame (C9orf72). However, the formation and toxicity of ALS-relevant RNA foci are still largely unknown. A recent study observed dynamic changes of myotonic dystrophy type 1 (DM1)-related RNA foci during the cell cycle, with a significant accumulation in early prophase and interphase, but a dramatic dissociation during mitosis. In our previous studies, we normalized ALS fibroblast cells in proliferating and non-proliferating conditions via Mitomycin-C (MMC) treatment and examined RNA foci via immuno-FISH staining. Our results indicated that MMC treatment can optimize a stable cellular condition to detect RNA foci in ALS fibroblast cells for therapeutic efficacy evaluation and are dependent on three key parameters. In this study, we plan to examine the potential changes of RNA foci in number and size between cells in G0 and interphase (G1/S/G2 phases) of the cell cycle and elucidate the mechanism behind the foci characterizations by looking for differences in TDP-43, p53, FUS, and TBK1 protein level expression. These findings will lead to a further understanding of RNA foci formation which is essential to learn disease mechanisms and uncover novel therapy for ALS. We also plan to extrapolate our stable cellular readout to detect RNA foci after delivering antisense oligonucleotide (ASO) mediated therapy via extracellular vesicles (EVs) to ALS fibroblasts to obtain a more accurate readout of the therapy's performance.

The Neural Circuits Underlying Evasive and Scavenging Behaviors in *Eisenia fetida* in Oxford, Georgia: The Effects of Interneuron AIB on the Reversal-Omega Turn Behavior

Rebecca Urato
Sponsor: Richmond Thompson
Oxford College/Emory University

In archerfish, the reticulospinal Mauthner cells facilitate the C-start motor response to external stimuli. While other organisms, particularly invertebrates with bilateral symmetry demonstrate similar motor behaviors in response to stimuli, the neurological mechanisms underlying such behavioral repertoire are largely unknown. Using *Eisenia fetida*, a species of redworm, neuroethological analysis was performed to analyze behavioral patterns and deduce neural circuitry behind the omega turn: an evasive maneuver analogous to the C-start turn in fish. Findings show that although more complex than the Mauthner-modulated C-start circuit in fish, the omega circuit present in E. fetida facilitates the omega-turn via similar mechanisms: reversal through a feedforward excitation paradigm involving both interneurons and motor neurons.

The Risk at Birth: Racial Health Disparities Among Pregnant Black Women

Doreen Okeh
Sponsor: Dr. Jenny Mischel
Emory University

The aim of this study was to examine health disparities amongst pregnant Black women and other racial ethnicities. The leading choice of research was descriptive research using quantitative data. Data were collected by scouring medical databases ranging from 2008-2021. Sources revealed that Black women are 3-4 times more likely to die in childbirth than white women. Interestingly, it was discovered that 60% of pregnancy-related deaths were preventable, and there were no significant differences in preventability by race/ethnicity. The largest discrepancies were found with cardiomyopathy and pre-eclampsia conditions.

The Use of Behavior Specific Praise in a Secondary Math Classroom

Caroline Ray and Macee Chappuis
Sponsor: Dr. Kymberly Harris
Georgia State University

Two student researchers were interested in determining the effects of Behavior Specific Praise (BSP) on students in a secondary classroom. Data were collected on students with disabilities in a secondary resource math classroom by observational data collection. These disabilities of the students included autism spectrum disorder and learning disabilities. Simonsen et al. (2016) define Behavior Specific Praise as "a positive statement delivered contingent on desired behavior that names the desired behavior" (p.38). Research on BSP in students with disabilities does not show clear outcomes, however, we anticipate that BSP will increase participation and assignment completion by students with disabilities. This is aligned with the current research on students without disabilities which indicated higher rates of student engagement related to higher rates of BSP (Simonsen et al., 2016). It is important to note that teachers are more likely to use general praise rather than BSP and general praise does not have the same positive impact (Floress et al., 2022). Student researchers observed how many times BSP was implemented in a ninety-five-minute Algebra 2 resource class period and the positive effects on student behavior.

"Tick-Tock!" for Women, Gender Expectations in Marriage as Presented by *Company: The Musical*

Ella Risa Marroquin
Sponsor: Chalise Ludlow, MFA
Valdosta State University

The story of *Company* follows Bobby, a newly turned 35-year-old man, who celebrates his birthday surrounded by his married friends, but still single and on his own. I was inspired by the revival of Stephen Sondheim and George Furth's *Company: The Musical,* a feminist retelling of the same exact story, except changing the gender of the main character Bobby to Bobbie. This led to the question, how does the simple change of gender in character effect the themes presented in this play and how does this effect the perception of gender expectations in marriage from this time period (1970)? To answer these questions, I analyzed the time period and historical context from which *Company* first made its appearance, namely the year 1970. Along with that, within *Company* there are several references to magazines and their influence to entertainment and household culture. The goal of looking at these magazines, namely *Life Magazine* and *Good Housekeeping*, is to see what they might have to say about women's role in marriage. Through this analysis of historical context and resources, the objective is to understand and analyze the changes and effects to the themes of marriage, relationships, and commitment presented within the 2018 revival of *Company*. With the recent trend of revivals and adaptations within the large commercial theatre field, this has presented an interesting opportunity to utilize a similar analysis of plays to elevate new themes from old favorites. While in my research I focus only on *Company*, it is only the beginning of a new wave of theatrical analysis on the Broadway stage.

Tracer Dilution Studies in Coal Creek, Colorado, to Predict Metal Transport

Jenelle Cockerham, Kenneth Swift Bird, and Dayana Arrue
Sponsor: Dr. Kamini Singha
Fort Valley State University

Metal fate and transport is controlled by many interconnected physical and biogeochemical processes, and stream chemistry can be used as a window to quantify these processes. Metal fate and transport could occur from natural processes, or due to legacy mining impacts. The focus area of this study is the Coal Creek watershed in Crested Butte, Colorado. Coal Creek is an alpine, snowmelt-dominated watershed that serves as the drinking water source for the town of Crested Butte. Naturally occurring metal deposits and anthropogenic activities such as mining have exacerbated the amount of metal transport seen in this watershed. Climate change and its overall effect on snowmelt and the hyporheic exchange pathways are also predicted to affect metal fate and transport. Tracer dilution studies were performed to quantify how stream flow and hydrologic events (i.e., snowmelt and monsoon rains) impact surface water-groundwater interactions and metal loading. Field measurements collected included discharge, temperature, electrical conductivity, pH, cations, and anions concentrations from five locations along Coal Creek. These data were analyzed using breakthrough curves and temporal moments, and cations via ICP-OES, anions via IC (ion chromatography), and alkalinity via gran titration. We hypothesize that under high flow conditions, faster groundwater flow paths and higher stream discharge promote the dilution of metal concentrations. Under low flow conditions, streamflow is expected to be controlled by groundwater sources. Under this scenario, we hypothesize that surface water chemistry and groundwater chemistry will become more similar and metal concentrations will increase in the stream. This work will quantify how changes in stream flow and surface water-groundwater interactions influence metal fate and transport, which has key implications for water quality, watershed health, and remediation of legacy mining impacts.

Using Deep Learning to Develop an Android App for Image Segmentation

Alessa Castillo
Sponsor: Dr. Ahana Roy Choudhury
Valdosta State University

Segmentation is widely used in many disciplines such as in medicine to detect tumors in patients and in autonomous cars to detect objects on the road. This project is an implementation of image segmentation using the PascalVOC 2012 dataset which includes 21 classes of objects, such as bikes, dogs, and people, in a large set of images. Convolutional Neural Networks (CNNs) were used in this project because they give superior results in image segmentation. These models specialize in predicting an object for every pixel in each image. Because of the amount of data needed to train the CNN models, Google Colab's GPUs were utilized for more efficient training times. After training, the models' accuracies were computed using the Intersection over Union (IoU) method, which quantifies the degree of overlap between the object segmented by the model and the actual object in the image. Class balancing adjusts the weight of objects based on their frequency in the training dataset. Its incorporation in training resulted in an increase in accuracy for classes with low frequency and a reduction in accuracy for classes with high frequency. An epoch is the process of passing the entire dataset once through the model. Models trained on 200 epochs had a higher accuracy than models trained on 100 epochs. The graphs generated showed a trend indicating that higher accuracies could be achieved with more epochs, but there was a constraint of time and resource availability. Image augmentation was incorporated to increase the generalization of the training data by performing random flips or rotations on the images. Three models (resnet50_fcn, resnet50_deeplabv3, and resnet101) were combined in a separate experiment to perform majority voting in determining which class to assign to each pixel. Project acknowledgments include Noah Crumpton, Humberto Ontiveros Garcia, and Alondra Gonzalez.

Voices from Tohoku:
Oral Narrative Video Translation Project

Kirstie Carson
Sponsor: Dr. Robin O'Day
University of North Georgia

This public anthropology project uses multimedia video presentations to communicate research in an engaging way to a general audience. The project uses oral narrative research from the survivors of Eastern Japan's Triple Disaster (earthquake, tsunami, nuclear accident) that occurred on March 11, 2011—drawn from the experiences of survivors from the town of Yuriage, a major port town in Miyagi prefecture that suffered heavy damage from the tsunami. Their narratives provide detailed insight into community experiences of post-disaster reconstruction efforts. The data for the presentation was provided by the digital archive project, Voices from Tohoku, which includes over 500 hours of oral narrative interviews with members from seven different communities in Japan affected by the disaster. The interviews were conducted in 2014, roughly three years after the disaster, by students from Sophia University as the town struggled to recover and rebuild. The narrators are community members from all walks of life who provide multiple perspectives on living through the disaster. By translating the interviews from Japanese into English and applying qualitative research methods to identify lessons learned from the disaster, these videos use the voices of ordinary community members to bring awareness to the human dimensions of disaster recovery. Through these methods, I have produced a poster presentation that incorporates a 6-minute video presentation that operates as a publicly engaged anthropology project to bring research insights to a public audience beyond Japan.

Visual Presentations

Black Madonna: Alexander Baumgarten's *Aesthetica* and Contemporary Application

Darrin Johnson
Sponsor: Laura McCloskey Wolfe
University of West Georgia

Aesthetics and critically recognizing beauty informs the creation and consumption of art. My topic is exploring the ways German philosopher Alexander Gottlieb Baumgarten approached aesthetics in his treatise *Aesthetica*. Being the orphaned child of a minister, he was surrounded by theologians like his older brother Jacob Sigismund and became enthralled in philosophy and theology in his formative years. He went on to write philosophical texts that would be used by other renowned academics like Immanuel Kant. Baumgarten set the precedent for what aesthetics means and how its definition can transcend artistic mediums through sociological and psychological analysis of the audience. Along with that, I thought about how we can build upon his ideas of participation in the experience of art and carry effective criticism further in contemporary works and the current art world. In understanding his ideas, I created a painting that uses Christian iconographic aesthetics and a modern figure to portray the similarities between secular icons and those within the church like saints or the Virgin Mary. The painting sits in a gold-colored picture frame shaped like a lancet window or ogival arch and depicts contemporary music artist Lil Nas X in the style of a Renaissance icon. My goal with this is to conceptualize Baumgarten's ideas in *Aesthetica* through a piece that responds to present pop culture, religion, and race by taking the image of one of the most controversial celebrities and making him a figure for rethinking aesthetics.

Drawing a Dot:
Can a Community Create an Exhibition?

Lara Henry, Courtney Robinson,
and Kaylin Kretzschmar
Sponsor: Dr. Jenny Evans
Valdosta State University

Our video presentation documents the development, creation, and installation of the Fine Arts installation for International Dot Day in the Fine Arts building on Valdosta State University campus. Dot Day is a celebration of creativity and art. Dot Day is based on the book The Dot by Peter H. Reynolds which follows a young student developing their love for art and celebrating self-expression. It is a story of confidence building, teaching, and various studio techniques. It is also a celebration of students and faculty connecting. The celebration connects teaching, creating, self-discovery and self-expression. The premise is art advocacy, encouraging those that may not believe they are artful or creative to be artful and creative. The celebration happens globally around September 15th. The goal of the installation is the endeavor to build community art, and include all that walk through the fine arts building.

The pedagogy behind the project comes from John Dewey and the Theory of Knowledge. Students/participants learn experientially, after having the experience and a bit of reflection on the experience. We are hoping that by making a dot with the crayons and colored pencils available that participants will build artistic confidence and see themselves as artists.

Additionally, we are wondering if the academic community will participate. Will visitors to the Fine Arts Gallery or the Theatres for performances or shows actively participate? How can we engage this project with the community more? Our results will show engagement numbers, variation in artistic creations, but most importantly highlighting reflected conclusions on the experience and improvements for the project in the future. Our video presentation includes images of the process, artists making dots, imagery from the exhibition and the results along with ideas for the future.

Cultural Research Strategies for Contemporary International Advertising

McKenzie Simpson
Sponsor: Evelyn Davis-Walker, MFA
Valdosta State University

This paper explores cultural differences, specifically color connotations within advertising between eastern and western cultures. The case study explores the stark contrasts between the two largest gross domestic product (GDP) countries in the world, the United States and China. GDP measures economic growth, which correlates with the amount of money spent on advertising. My research focuses on color perception in both countries to gain insights into consumer trends and marketability. Using the Design Council's double diamond research methods of discovery, definition, development, and delivery, I was able to collect qualitative data for my guide. Shortly after starting my research, I identified a need for a comprehensive guidebook targeted toward freelance graphic designers whose clients advertise internationally and would utilize the information and data collected to avoid cultural faux pas and missteps. My future research plans are to write additional volumes on typography and imagery as well as expand my research to include more countries.

“4 of Costs” Alternative Altar Project: Plastic Pollution and Its Impact On the Environment

Ari Saucier
Sponsor: Kaleena Stasiak, MFA
Valdosta State University

My artwork, *4 of Costs Altar*, involves both the process and construction of an altar designed to draw attention to plastic pollution. This altar will be made of found and collected items including plastics and old magazines, as well as specifically constructed ceramic and printed elements. It is important for me to incorporate materials such as ceramic and paper to highlight the alternatives to plastic, both ephemeral and lasting, and to make the case that we should be using these materials instead. The main focal piece of the altar will be the “4 of Costs” card, a screen print modeled after the 4 of Pentacles card from the Rider Waite-Smith tarot deck, which is associated with wealth of some sort, especially when accompanied by a mindset of scarcity. The tarot for me is about the rituals we look to for guidance, as well as how we put those into practice, which is why it is at the core of this project. This entire artwork is about holding on to practices that are harmful, such as creating and throwing away plastic. Since plastic does not biodegrade, the only option is to recycle or repurpose plastic items, which is an important part of my artistic practice and this project. I made it a ritual to collect, clean, and repurpose plastic items so that I might inspire change within others around me. I think this is especially important within the field of art because the amount of waste produced by the art process can be staggering but is often overlooked. This project is designed to get people to think more deeply about the aspects of modern life they take for granted, such as that of plastic pollution, and to inspire them to take more positive action(s) going forward.

How They See Us:
Violence and Harm Depicted against Black and Queer Bodies in Mass Media

Shanya Jackson
Sponsor: Dr. Theresa Thompson
Valdosta State University

The fight for marginalized people, specifically black and queer people, to see themselves represented on screens, in books, and other forms of media is one that is often met with much backlash and controversy. In recent years, there has been progression. Black and queer people have gone from the underdog characters to the plucky sidekick to the main character, even. Many people view even the existence of these characters as a win, the accomplishment of seeing someone who looks or feels like us in the media. This sort of "anything counts" representation, though, can lead to problematic depictions. More often than not, these characters are written by non-black or non-queer writers who create caricatures of who they claim to try to represent. These characters then tend to amalgamate harmful stereotypes, untrue or biased opinions and characterizations, or they are stripped of all thought and autonomy and are there just to serve as a tool. When this happens, queer and colored bodies leave the realm of representation and become weaponized tools of prejudice, more harmful to the viewer than simply not being seen. This presentation explores different ways various news outlets, film and television adaptations, book narratives and other forms of media violate and cause harm to the communities they "represent" while profiting off of them. This presentation will also explore the effect such representations have on both black and queer people, as well as those who outlay those communities.

Producing Educational Videos to Help Local Educators and Schools in the Coastal Plain RESA

Chontele Abney, Avery Barnett, Jamie Collins, Nathan Harrell, Ethan Lowe, Brooke Meindl, Kaya Purcell, and Brianna West
Sponsor: Dr. Colin M. Walker
Valdosta State University

During the Spring 2022 semester, Chontele Abney, Avery Barnett, Jamie Collins, Nathan Harrell, Ethan Lowe, Brooke Meindl, Kaya Purcell, and Brianna West worked together in an experiential, non-profit service-based course to create educational and interactive videos and social media posts. The group worked closely with the Harley Langdale Jr. Foundation (HLJF), a non-profit organization, to create educational videos to help local educators and schools in the Coastal Plains RESA. These videos were all filmed at the Grand Bay Wildlife Management Area and focused on the natural sciences. We made video lessons for two different target audiences. Our animal-centered videos were created for students in kindergarten through 5th grade. Some of these videos included lessons on raccoons, swallow-tailed kites, and armadillos. The lab lessons videos were targeted toward students in 6th through 12th grade. In these videos, the Wetland Education Specialist facilitated lessons for a pH Lab, Dissolved Oxygen Lab, and Methane Lab. We also created social media posts catered to parents and educators for each lesson. The social media posts contained information and announcements for parents and teachers to generate excitement about specific topics. We also incorporated animations and an animated puppet character in each lesson to further engage the target audiences.