Georgia Undergraduate Research Conference

ABSTRACTS

Learning Through *Research*

Symposium on undergraduate research

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Student union Ballroom & Theatre

Valdosta State University
Undergraduate Research Council

Georgia Undergraduate Research Conference

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Abstract Book

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Oral Presentations

Accommodation Not Assimilation: Independent Living and Its Role within the Disability Rights Movement

Samuel Chernoff
American Studies and Disability Studies

Oxford/Emory
Sponsor: Dr. Eric E. Solomon

Major social movements share the common characteristic of an easily identifiable focal point that encompasses their core mission, values, and beliefs. This paper argues that for the United States disability rights movement, independent living is that focal point. Independent living promotes the movement's mission to shift societal attitudes away from interpreting disability through a medical model and redevelops it into a more humanist approach. The movement additionally empowers people with disabilities with the agency to engage with their community however they see fit. Through this vision, the disability rights movement brought Americans with disabilities out of dehumanizing institutions and directly into their local communities. Independent living's model of self-sufficiency, community engagement, and societal integration for people with disabilities not only enhanced these efforts, but also provided the catalyst for advocates to fight to enshrine disability rights into law through strict enforcement of Section 504 of the Rehabilitation Act of 1973 and later the Americans with Disabilities Act of 1990. This paper supports the connection between independent living and the larger disability rights movement through scholarly review of documented interviews with independent living pioneers, disabilities studies literature and rhetoric, and documentary films. This paper then uses this review to link the rise of independent living with subsequent landmark achievements of the disability rights movement as a whole and argues that the core values of independent living continue to be instrumental in how both scholars and society define disability today.

A County-by-County Analysis of Prison Admissions Rates in Georgia

Niels Armbruster
Economics and Statistics

Oxford/Emory
Sponsor: Dr. Sarah Higinbotham

The state of Georgia ranks in the top ten of American states with the highest incarceration rates. In fact, the state of Georgia's incarceration rate is greater than any other foreign entity. Previous research has demonstrated the relations between prison admissions in Georgia and other American states, but little analysis has been done to understand differences across Georgia counties and their possible causes. In this study, I pulled data from the Georgia Department of Corrections, US Census Bureau, and Georgia Governor's Office of Student Achievement to find Georgia counties with high and low rates of incarceration from 2006 to 2022, in addition to generating a heat map of average incarceration rate per Georgia county over the same period using Python and Excel. Analysis on student results compared to incarceration rates per county finds no significant correlation. I have submitted these results and they have been published by Common Good Atlanta; a Georgia based non-profit focused on education in prison.

A Criminal Justice Internship as Fieldwork: My Experience with the Jacksonville Sheriff's Office

Jameshia Dover
Anthropology, Sociology, and Criminal Justice

Valdosta State University
Sponsor: Dr. R.K. Prine

Law Enforcement is described as agencies and employees responsible for enforcing laws, maintaining public order, and managing public safety. This includes the investigation, apprehension, and detention of individuals suspected of criminal offenses. Over the summer, I had the opportunity to complete an internship at the local law enforcement agency in Jacksonville, Florida, The Jacksonville Sheriff's Office. This agency serves a jurisdiction with a population of over 900K. In doing so, I was able to conduct ethnographic research regarding my experiences. So, over two and a half months, I was able to observe and interact with many employees from various departments under the Sheriff's Office. This research is qualitative in nature based upon my weekly reports and the term paper required for the internship. This study will help to provide insights into the day-to-day operations of a large urban police department.

A Modified L-Shamped Band stop Filter for Industrial, Scientific, and Medical (ISM) Applications

Marissa Norlund and Jordan Hewins
Applied Mathematics and Physics

Valdosta State University
Sponsor: Dr. Shantanu Chakraborty

Rapid rise in wireless communication through Wi-Fi and Bluetooth technology have heavily burdened the frequency channels near 2.45 GHz. We have developed an effective and simple band stop filter to avoid the interference of 2.45 GHz channel with its neighboring frequency bands used for Industrial, Scientific, and Medical (ISM) applications. The proposed design involves a modified L- shaped resonator based on microstrip structure with a very narrow bandwidth. We have explored the effects of resonator width variation and cascading of filters on the performance of the band stop filter.

Analysis of Trends in the Projection of Research in Relation to CRISPR

Kristal Depass and Vanessa Brignolle
Biology

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Sponsor: Dr. Jonghoon Kang

The purpose of this research is to give insight from a quantitative perspective on the upsurging emergence of research in relevance to CRISPR. Primarily serving as an adaptive immune system response in bacteria against invading viruses, CRISPR functions as a gene editing system that can efficiently create alterations by targeting and editing specific genes in an organism's genome. CRISPR-Cas9 contains two systems, clustered regularly interspaced short palindromic repeats (CRISPR) and Cas proteins. The increased use of technology has accompanied an unavoidable interest in its nature and potential. Considering its versatility and growing development, a variety of scientific disciplines are discovering further adoptions for the technology. We anticipate that our results can be viable in assessing the future of research and applications of CRISPR.

An Analysis of the Prevalence of Potentially Zoonotic Diseases in Wild-caught Freshwater Fish in Georgia

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Fort Valley State University
Sponsors: Dr. Oreta Samples and Gregory Dykes

This research project is an analysis of the prevalence of potentially zoonotic diseases that will affect humans' food safety and biosecurity in three specific ponds at Fort Valley State University. The number of zoonotic diseases found in wild-caught freshwater fish accounts for more than 18 million diseases that affect humans from contact. These pathogens are found through environments, climate change, and urbanization [2]. To identify the presence of zoonotic bacterial infections found in wild-caught freshwater fish, testing the selective ponds was essential. Water samples and fish were taken from each site to determine if the pH levels affect the fish and their overall health. Results from testing the fish indicated a high presence of zoonotic diseases while water samples reported low pH levels. Extremely high or low pH level will cause damage to fish gills, tissue, and cause hemorrhages [1]. Looking into the water samples there was little to no Bromine or Chlorine found at either cite. Both elements could improve the fish's overall environmental health. A thorough examination of testing results is necessary to understand how zoonotic diseases are transmitted and how the possible manifestations toward human illnesses can occur. Examples of human manifestations from zoonotic infections can include urinary tract infections, nausea, fever, endocarditis, meningitis, cellulitis, and pneumonia. This research will assist in identifying the number of zoonotic diseases found in wild-caught freshwater fish while decreasing the effects these zoonotic diseases have on humans. Overall, zoonotic diseases are found in the wild-caught freshwater fish located in Georgia however, an addition of Bromine and/or Chlorine will affect wild-caught freshwater fish positively. Based on the findings in this report, further research on this topic is needed.

Baldwin on Intersectionality

Aanya Sethi
English

Oxford/Emory
Sponsor: Dr. Eric E. Solomon

The concept of intersectionality, which suggests that each individual's unique experiences in a society are shaped by all aspects of their identity, has gained prominence in recent years and warrants further discourse and inquiry. In this paper I discuss what we might call James Baldwin's concept of intersectional work, as illustrated in If Beale Street Could Talk, Another Country, Blues for Mister Charlie, and "Going to Meet the Man." I specifically underscore Baldwin's distinctions between white and black masculinity and femininity. In Baldwin's depiction, white masculinity is predicated on the destruction of black masculinity, and the lengths white men are willing to go to preserve their masculinity is evident in his works. Baldwin emphasizes that a man's sense of self is dependent on the maintenance of his masculinity, a woman's sense of self is also dependent on her femininity; however, according to Baldwin, femininity cannot exist without masculinity. With his characters and stories, Baldwin implies that a woman's identity is dependent on a man's perception of her. An exploration of Baldwin's writings help readers gain a greater, more nuanced understanding of America and American identities in a time of ongoing (in)securities.

Cloning of an Aquaporin Gene into Yeast

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Sponsor: Dr. Donna L. Gosnell

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. In prior work, an algal aquaporin gene was cloned into bacteria (E. coli). The current project cloned the same gene into yeast. The ultimate goal is to produce aquaporin in sufficient amounts to make a desalination membrane. Later experiments will quantify the expression of aquaporin in both the bacterial and yeast systems to determine which system is best. There is a strong possibility that the yeast will better express the gene because it is a eukaryote, making it better suited for expression of a eukaryotic gene. Prior bioinformatics research found an aquaporin gene in a micro alga called Trebouxia. 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.

Community Perception on Tobacco use and Secondhand Smoke Exposure in Rural Georgia

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Sponsor: Dr. Damian K. Francis

INTRODUCTION: Tobacco use and secondhand smoke exposure negatively impact the health of individuals and disproportionately so in African Americans and rural communities. We aimed to examine stakeholder perception on tobacco use and secondhand smoke exposure.

METHODS: A listening session following CDC guidelines was used to document residents' views on tobacco use, secondhand smoke and policy aimed at reducing exposure in public places. Residents 18 years and older were invited to participate through flyers, emails, and social media. Additional key informant interviews by phone call/zoom. The discussion guide collected data on 1) attitudes of participants toward tobacco use and secondhand smoke, 2) barriers, and enablers to smokefree policy implementation, and 3) strategies to implement smokefree policy. Recorded dialogue along with meeting notes were transcribed and assessed using a thematic analysis. Codes and themes were used to create word maps to display findings.

RESULTS: We conducted 3 key informant interviews, and 15 stakeholders attended the listening session ranging from government, non-profit, faith-based organization, community members, and the department of public health. Three themes emerged around community perceptions of tobacco use, with an overall negative perception. Stakeholders expressed concern with health consequences and control measures being implemented. When discussing perceptions of barriers and enablers to smokefree policy implementation, themes identified challenges in implementation related to the imbalance of marketing power and equitable enforcement of existing policies. Stakeholders were motivated toward finding strategies to implement smokefree policies. Emerging themes around policy implementation were "improvement in the delivery of health information related to tobacco use and secondhand smoke exposure" and "building community trust".

CONCLUSION: Stakeholders in this rural community perceived tobacco use and secondhand smoke as a public health hazard. The balance of marketing power, equity, improving message delivery and building community trust represents opportunities for intervention by local government and public health bodies.

Creative Writing in the K-12 Curriculum

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Sponsor: Dr. Asha K. Warren

Creative writing pedagogy describes the methods by which educators teach creative writing. In this sense, creative writing refers to works of fiction, non-fiction, and other forms of writing that may not adhere to a standard academic and business structure. Creative writing pedagogy can include providing tips for writing, exploring different forms and genres of creative writing, and how to utilize the time and space to actively practice writing. Although studies on creative writing show that there are major academic and personal benefits, it is an underused and underserved discipline in the K-12 classroom. This study reveals the barriers K-12 teachers face when integrating creative writing pedagogies into the English Language Arts (ELA) curriculum in the United States. Additionally, this research uses a historical literature-based analysis to examine the evolution of the academic discipline of creative writing in the K-12 classroom from the 1950s to today. Furthermore, this study identifies barriers that educators faced to teaching creative writing and assesses their impact on the K-12 classroom from 2000 to 2020. The research identifies three main barriers educators experienced to integrating creative writing pedagogies including funding, curriculum structure, and cultural context. The goals of this study are to increase awareness around the importance of creative writing pedagogy in the K-12 classroom, to identify the barriers that prevent the full benefits creative writing can provide, and to provide policy recommendations for how to increase creative writing in the K-12 ELA curriculum in the United States.

Deep Eutectic Solvents: An Efficient Green Approach to Carotenoid Extraction

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Sponsors: Dr. Gopeekrishnan Sreenilayam and Dr. Ligia Alexandrina Focsan

Carotenoids are naturally occurring pigments found in plants, algae, and some bacteria. They are responsible for the red, orange, and yellow colors in many fruits and vegetables. Health, food, and pharmaceutical industries all around the world utilize carotenoids due to their antioxidizing properties and the fact that humans cannot synthesize these pigments naturally. For these reasons, 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 being 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, three different ionic DES were utilized due to their low eutectic points. These DES will be used to extract carotenoid pigments from spinach leaves. The extracts will then be analyzed using the HPLC instrument with a YMC C30 carotenoid column and compared to several spinach samples extracted using ionic and non-ionic solvents.

Designing an Undergraduate Forensic Chemistry Experiment on the Levels of Amphetamine in Urine using Two Methods

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Georgia College and State University
Sponsor: Dr. Wathsala Medawala

Amphetamine is used to stimulate the central nervous system in patients with ADD/ADHD (Attention Deficit Disorder/Attention Deficit Hyperactivity Disorder). This drug benefits those who need it, but according to FHE Health, it is widely abused by 11.1% of all college students. The aim of this procedure was to design a teaching lab on determining amphetamine in urine samples. For the first part of the experiment amphetamine was evaluated in synthetic urine samples through an Enzyme-Linked Immunosorbent Assay (ELISA kit) that commercially available and is widely used in drug labs to qualitatively analyze whether amphetamine is present in a sample. This experiment determined whether the ELISA kit would be able to be used to find accurate quantitative results. The ELISA kit operates based on competition between the drug in the urine sample and the drug enzyme conjugate for antibody binding sites on the 96-well plate. The absorbance values were obtained with a microplate spectrophotometer. Once the values were obtained from the spectrophotometer, the data was analyzed to find the concentration of the drug in an unknown sample. Samples containing between 30.0 ng/mL and 300. ng/mL of amphetamine were analyzed using this method. The percentage error for the calculated concentrations was 90.2% for the lowest concentration values, and around 13.9% for the high concentration, showing that the kit is unreliable at lower concentrations. The second part of the experiment involved the use of Gas Chromatography/Mass Spectrometry to compare the two methods and for better quantification of the concentrations of amphetamine that are detectable in methanol. Amphetamine is extracted from urine and then evaluated using the GC/MS. Both of these experiments were designed to be used as lab classes for the forensic concentration program. The experimental procedures and results obtained using the two methods will be discussed in the following presentation. Developing algorithms to manage group interactions and prioritize responses is an ongoing challenge. In conclusion, this research not only sheds light on the technical capabilities of the NAO robot but also highlights the challenges and opportunities associated with its utilization, particularly in the area of facial recognition. Our future endeavors will involve a more in-depth exploration of these challenges, coupled with a broader utilization of NAO's walking and object handling capabilities. This expanded utilization will encompass dynamic tasks, such as retrieving objects and engaging with its environment. These efforts aim to enhance robot safety and foster improved interactions between humans and robots.

Determining the Divisive Nature of the Second Amendment in Education: House Bill 1084

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Sponsor: Dr. Karen A. Terry

The following research is an examination of the Second Amendment in education, but further than that, it is a close look at the divisiveness that the topic as a whole brings. Every American has their own views on the Second Amendment and guns in particular for a number of different reasons. To understand the need for this research, we must first take a close look into what House Bill 1084 is and how it directly affects teachers when discussing certain topics in the classroom. For this research, however, we will be taking a look into how it affects the discussion of guns and gun rights in America specifically. In recent years there have been a number of events and legislation that has led to split views on the discussion of firearms. The goal of this research is to take a close look at House Bill 1084 and see how it affects education culturally, socially, and politically and how it can change the way teachers approach topics. Another goal of this research paper is to discuss how the topic of the Second Amendment became as divisive as it is and how dangerous a topic it can be for teachers in the classroom due to House Bill 1084. This research aims to open up a discussion about the Second Amendment and how it needs to be discussed in a safe environment and should not be something that educators should have to avoid entirely. It is also to give a clear picture of challenges that are brought about for a history teacher that has to teach about the Bill of Rights but is not allowed to discuss topics such as guns and the history of the Second Amendment without fear of losing his or her job.

Developing a Hybrid Model for Advancing Medical Diagnosis of Respiratory diseases: Integrating Expert Systems and Machine Learning Algorithms

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Medical diagnosis plays a critical role in providing appropriate treatment and care for patients. Accurate and timely diagnosis of respiratory diseases, such as flu, cold, COVID-19, bronchitis, and pneumonia, is essential for effective disease management and prevention of further complications. However, distinguishing between these diseases based on symptoms alone can be challenging due to overlapping clinical presentations. The primary objective of this research is to develop an innovative algorithm capable of diagnosing these respiratory diseases based on symptoms by harnessing the capabilities of both expert systems and machine learning algorithms. Expert systems alone often struggle with capturing the complex relationships between symptoms and diseases, especially in scenarios where symptoms overlap across multiple diseases. On the other hand, machine learning algorithms may struggle with understanding the underlying meaning or context of the data, as well as with providing reliable predictions when the amount of data is not sufficient. This combination of expert systems and machine learning not only leverages the clinical knowledge of experts but also harnesses the data-driven power of machine learning. To achieve this goal, we employed a unique approach, where we synthesized data derived from research on the typical symptomatology and frequency associated with each disease. Subsequently, we developed a Python program capable of generating 10,000 random samples, each representing a patient's symptom profile.
Then constructed an expert system, establishing a rule-based framework founded on expert knowledge, which utilizes patient symptom data to provide diagnoses. Concurrently, we designed a machine learning algorithm and trained it using synthetic data, enabling it to make predictions based on a patient's symptoms. The integration of these two distinct programs was facilitated through a probabilistic methodology, allowing them to collaboratively produce diagnostic outcomes based on a patient's symptom presentation. Preliminary results are promising, indicating an approximate accuracy rate of 85% in correctly predicting the underlying disease. In conclusion, our approach could effectively generate diagnostic outcomes based on symptomatology. Through ongoing refinement and enhancement, this program has the potential to significantly contribute to improved patient care and treatment outcomes.

Developing Facial Recognition and Conversational Scripts for NAO Robot

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The past decade has witnessed remarkable advancements in robotics, with a growing focus on the potential of humanoid robots. These robots offer the ability to perform a wide range of tasks, including those that may be hazardous for humans. Among these humanoid robots, the NAO robot, developed by Aldebaran Robotics, stands out for its impressive ability to mimic human-like activities such as walking, talking, and object recognition and manipulation. This research investigates the technical aspects of the NAO robot, with a specific emphasis on its facial recognition and detection capabilities, while also addressing some of the associated challenges. To achieve our research objectives, we employed the power of NAO's proprietary software, Choregraphe—a built-in interface that allows users to control the robot's actions and behaviors through pre-built modules. These modules, based on Python scripts, provide users with the flexibility to modify and create custom behaviors, offering extensive opportunities for exploration and innovation.

Using Choregraphe's modules, we developed a facial recognition system that utilizes NAO's prebuilt camera and deep learning capabilities. This system enabled the robot to learn and store facial features along with relevant information within its memory. Subsequently, we implemented scripts that facilitated personalized interactions, enabling NAO to deliver simple conversions based on facial recognition.

Our findings demonstrate NAO's abilities in successfully executing these tasks, validating its potential as a versatile and socially interactive humanoid robot. However, we also encountered several challenges in utilizing NAO's facial recognition capabilities. For example, NAO's facial recognition system, while capable, may still encounter challenges in accurately identifying individuals under varying lighting conditions, facial expressions, or when individuals wear accessories like glasses or hats. Improving the system's accuracy and robustness remains a critical area of development. Also, running deep learning algorithms for facial recognition can be computationally intensive. This poses constraints on the robot's processing capabilities, potentially limiting real-time applications and interactions. Additionally, interactions with Multiple Individual simultaneously and differentiate between them can be challenging.

Dominance of US Dollar Threatened by BRICS Nation's Proposed Gold-Backed Currency

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Economics

University of North Georgia
Sponsor: Dr. Ruohan Wu

The US dollar has been the global reserve currency since the 1944 Bretton Woods Conference in New Hampshire when the World Bank was established. At the time, the US dollar was gold-backed at $35 an ounce. The dollar's convertibility was subsequently dismantled in 1971 under the Nixon Administration. The dollar held its world dominance however due to the US's deal with Saudi Arabia to provide military aid in exchange for billions of petrodollars being thrown back into treasuries to finance US spending. The dollar is now the standard currency for buying the world's most coveted trade commodity – petroleum/crude oil. The US's "exorbitant privilege" is an economic weapon. This is because the US can stop the ability of other nations to transact in dollars. In early 2022, the US froze Russia's $33 billion in reserves due to the invasion of Ukraine. This has in turn caused Russia (a major OPEC+ country) to criticize the dollar's dominance. Russia is part of a group called the BRICS nations. They consist of Russia, Brazil, India, China, and South Africa. In August of this year (2023), a summit was held in which a proposal for a BRICS gold-backed currency was discussed. For the BRICS nations to accomplish this, it would fundamentally change world trade. At the summit in August, Saudi Arabia was invited to join. If they were to accept the invitation, both the OPEC+ nations would be pitted against the US which would economically cripple the country. My research has consisted of conducting a historical analysis of trade regarding crude oil within the BRICS nations and Saudi Arabia in comparison to the US. Along with that, I am looking at other commodities involved in bilateral trade between the BRICS nations that have bypassed the need for the US dollar and are based on their specific currencies. The purpose of the investigation is to identify trends in trade flows regarding the use of the US dollar in recent years. This is how we can evaluate the dollar's current dominance as well as predict its ability to stay the world's leading reserve currency.

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Dual Inhabitation of ALDH1A and MEK 1/2 causes synergistic cell death in High Grade Serous Ovarian Cancer

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Biomedical Sciences

Mercer University
Sponsor: Dr. Ilana Chefetz Menaker

High grade serous ovarian cancer (HGSOC) has a high recurrence rate and acquired chemoresistance which leads to poor prognosis. MEK1/2-ERK1/2 signaling pathway is hyperactive in HGSOC despite lack of mutations in upstream BRAF/KRAS genes and inhibition of MEK1/2 pathway with specific inhibitor trametinib revealed arrest in cell proliferation in HGSOC. However, trametinib treatment in HGSOC cells has no cytotoxic effects and promotes cancer stem-like characteristics, specifically enriching bright aldehyde dehydrogenase (ALDH)+ cells. In our previous work we demonstrated that ALDH1A inhibitor (ALDH1Ai) 673A specially targets CD133+ ovarian cancer stem-like cells (CSCs) triggering necroptotic cell death. As such, we decided to combine ALDH1A and MEK1/2 inhibitors to evaluate their effect in ovarian cancer. Trametinib+673A (Combo) treatment caused decrease in viable cell number as well as cell percentage ($p<0.001$) and exhibited cytotoxic properties ($p<0.05$) in OVCAR8 and PEO4 HGSOC cell lines. Combo treatment significantly reduced ALDH+/CD133+ positive subpopulations ($p<0.001$) as assessed by flow cytometry analysis. Interestingly, combo treatment triggered time dependent DNA damage as assessed by ϒpH2AX Western blot analysis whereas DNA damage repair (DDR) was diminished as assessed by breast cancer gene 2 (BRCA2) protein level. Time dependent combo-induced DNA damage was also validated by single strand and double strand comet assay. Furthermore, combo treatment enhanced ϒpH2AX foci and reduced BRCA2 protein as assessed by immunofluorescence in OVCAR8 cells observed by confocal microscopy at 24h. To summarize, a novel combination therapy consisting of ALDH1A and MEK1/2 inhibitors causes a highly synergistic effect due to dual effect on the DNA damage and repair pathways. This treatment is effective across primary tumors and ovarian cancer cell lines specifically targeting chemo resistant CSC that can initiate and propagate ovarian cancer.
Keywords: Trametinib, ALDHi, 673A, Combo, DNA damage, DDR, CD133.

Effective Classroom Management Strategies for Elementary Age Students

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Sponsor: Dr. Forrest R. Parker III

This oral presentation aims to explore the essential principles and strategies of classroom management tailored specifically for elementary age students. As educators, creating an optimal learning environment that fosters engagement, collaboration, and positive behavior is crucial for maximizing students' academic and social development. This presentation will delve into evidence-based techniques that empower teachers to establish a structured yet flexible classroom setting.

The presentation will begin by highlighting the significance of age-appropriate classroom management, emphasizing the unique developmental characteristics and needs of elementary age students. We will then discuss key theoretical frameworks that underpin effective classroom management approaches, including behaviorism, social learning theory, and self-determination theory.

The heart of the presentation will revolve around a comprehensive overview of practical strategies and tools that educators can implement in their classrooms. These strategies encompass establishing clear expectations and routines, employing proactive behavior interventions, fostering a positive classroom culture, utilizing effective communication techniques, and addressing diverse learning needs. Concrete examples, real-life case studies, and interactive scenarios will be utilized to illustrate the application of these strategies.
Moreover, the presentation will address the importance of teacher self-care and well-being in the context of classroom management. Educators often face various challenges in maintaining a balanced and harmonious classroom environment. Strategies for managing stress, promoting work-life balance, and accessing professional support will be explored, highlighting their essential role in sustaining effective classroom management practices.
The expected outcomes of this presentation include equipping educators with a solid understanding of evidence-based classroom management strategies tailored to elementary age students. Attendees will gain insights into fostering a positive classroom culture, enhancing student engagement, and minimizing disruptions. By incorporating these strategies, educators can create an environment where students thrive academically, socially, and emotionally, setting the stage for a successful learning journey.

In conclusion, this presentation seeks to empower educators with the knowledge and tools necessary to establish and maintain effective classroom management strategies specifically tailored to the unique needs of elementary age students. Through the application of research-based techniques, teachers can create a nurturing learning environment that sets the foundation for lifelong learning and success.

Effective Classroom Management Strategies for Students with Dyslexia

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Dyslexia, a neurodevelopmental disorder characterized by difficulties in reading and language processing, poses unique challenges within the classroom setting. This oral presentation aims to provide educators with a comprehensive understanding of effective classroom management strategies tailored to support students with dyslexia. Drawing upon a synthesis of current research, best practices, and practical insights, this presentation will address the key principles and techniques that foster an inclusive and supportive learning environment for these students. The presentation will begin by outlining the neurological underpinnings of dyslexia, shedding light on the cognitive processes affected by the disorder. By understanding the specific challenges faced by students with dyslexia, educators can better empathize and strategize for their needs. Subsequently, the presentation will explore a range of evidence-based classroom management strategies that enhance engagement, participation, and learning outcomes for these students.

Participants will gain insights into the importance of multimodal teaching approaches, which leverage visual, auditory, and kinesthetic learning modalities to cater to diverse learning preferences. The role of assistive technologies, such as text-to-speech software and speech-to-text tools, in mitigating reading and writing difficulties will also be highlighted. The presentation will delve into the significance of creating structured routines, clear instructions, and individualized learning plans, fostering a sense of predictability, and reducing anxiety for students with dyslexia.

Furthermore, the presentation will underscore the significance of cultivating a supportive classroom culture that promotes self-esteem, resilience, and self-advocacy. Strategies for fostering peer empathy and promoting positive peer interactions will also be discussed.
In conclusion, this oral presentation aims to equip educators with a comprehensive toolkit of effective classroom management strategies tailored to the unique needs of students with dyslexia. By fostering a learning environment that accommodates their challenges while capitalizing on their strengths, educators can empower these students to reach their full academic and personal potential. Through the integration of these strategies, classrooms can become spaces where all students, including those with dyslexia, thrive and flourish.

Effects of Anthropometry and Agility on Player's Performance in the National Basketball Association (NBA)

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Mathematics

Georgia College and State University
Sponsor: Dr. Jebessa B. Mijena

The National Basketball Association (NBA) hosts an event known as the Combine each year where college and international basketball players come to show off their skills/strengths to the coaches so that the coaching staff can strategically plan which player(s) they will pick at the NBA draft. There are numerous things that are measured in each player, including some measurements that seem unnecessary, but can actually play a role in the success of an NBA player. This project will be a deep dive into how the anthropometric characteristics and agility statistics of players entering the NBA affect player performance at the professional level. The predictors used in my analysis will not only include players' height (which its advantage in basketball is quite obvious), but also their wingspan ratio, vertical reach, weight, body fat percentage, hand width/length, vertical leap, and 3-quarter court sprint. A player's "per game" statistics including points, rebounds, assists, blocks, and steals will be used to determine the necessity and strength of certain predictors, along with number of championships, All-Star game appearances, and drafted status. This project will also divide the players into the five major positions of basketball in order to observe trends within each position.

Effect of Silver on A. Tumefaciens

Layla Watkins
Animal Science

Fort Valley State University
Sponsor: Dr. Robin Bright

The purpose of this experiment is to determine which silver; silver colloids, silver dendrite, or silver nitrate is most effective against the growth of Agrobacterium Tumefaciens (A. Tumefaciens). A. Tumefaciens is a soil-borne pathogen that is widely studied for its genetic transformation capabilities. Although it is studied for its positive aspects, A. Tumefaciens causes a neoplastic disease, Crown Gall Disease on various plants. This disease is transferred from the bacterias Ti (tumor-inducing) plasmid, TDNA, into the host plant. A. Tumefaciens manipulates its host by altering the plant's DNA by adding new instructions that keep the bacteria alive. Plants infected with Crown Gall Disease receive less nutrients to thrive. For this experiment, A. Tumefaciens was used in liquid and gel form. Nutrient broth agar plates were made to apply the two forms of A. Tumefaciens onto separate plates. Concentrations of silver colloids, silver dendrites, and silver nitrate were kept consistent with both forms of bacteria. It was found that the silver nitrate was most effective against A. Tumefaciens in the gel application. Silver colloids and silver dendrite were partially effective against A. Tumefaciens. In an effort to protect plants from Crown Gall Disease, farmers may now have the opportunity to use silver such as silver colloid, dendrites, and nitrate.

Engaging with the Unspoken

Phylisicia J. Lundy
Art and Design

Valdosta State University
Sponsor: Glenda Swan

As part of my Women in the Visual Arts course in Spring 2023, I observed how artworks by female artists more often depicted traditionally marginalized groups and controversial events than the elite male artists who dominate the canon of Art History. Although I researched a variety of female African American artists as part of the final research project for that course, I found myself most personally impacted by Catlett's *Negro Woman Series* from 1946. Catlett's narrative prints were filled with powerful graphic depictions of what it was like to be black in segregated America. I was especially struck by how Catlett's art was both political and personal. Ultimately, my experience studying Catlett's life and work inspired me to develop my own series of artworks. *Unspoken Truths* (c. 2023) is about my own experience of growing up as an African American woman in Americus, Georgia. I use images and symbols to explore this content within multimedia photomontages. These visual narratives are intended to explore the experience of past events while also revealing the ingrained distrust that so often characterizes interactions between dominant and minority groups. In this presentation, I will explain the symbolic language I employ in these artworks so that others might connect their own experiences with that imagery.

Establishment of Invitro Cultures of Rhizoma Peanut Plant

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Biology

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Sponsor: Dr. Samuels

The Rhizoma peanut plant (RPP), also known as Arachis glabrata, is a warm-season perennial legume that is native to South America (Williams, 1999). This includes places like Brazil, Paraguay, Uruguay, and Argentina. RPP is a highly valued crop due to its high nutritional values and due to its persistence under different environmental conditions. However, it has a low establishment rate within countries that the RPP plant are not native to. The purpose of this research project is to establish RPP plant in the nontraditional environment of middle GA, and as in vitro tissue cultures, which are used to establish a plant within a controlled environment. Field trials will evaluate 4 cultivars: Florigraze, Arbrook, Ecoturf, and Tito. Plot sizes consists of two 65 x 35-meter plots that are divided into 192 2 x 5-meter treatment beds. Fertilizer treatments consists of many different variables which include Nitrogen(0,55,110,220kg/ha), Potassium{K} (0,37.5,75,150kg/ha), a N/K mix (0,55,110,220kg/ha N and constant 75kg/ha K), and lastly a K/N mix (0,37.5, 75, 150kg/ha K and a constant 110kg/ha N). Tissue cultures were established within Murashige and Skoog with vitamins supplemented with different Thidiazuron(TDZ) concentrations: .04, .13, and .17 mmol/l using RRP leaves as explants. Following sterilization using 3, 4, or 5% sodium hypochlorite (SHC), leaves were divided into 6 pieces and cultured on the above TDZ media concentrations. The Rhizoma peanut plant has a variety of positive impacts on not only the environment but animals as well. The significance of this research is that properly established RRP will not only benefit the soil health and conservation, but also the nutrimental values within animal feed. The anticipated conclusion is that 3% SHC will successfully clean the plant without killing the plant leaf tissue and 5 % concentration will successfully produce living embryos for plant establishment.

Evaluating the Movement of Entomopathogenic Nematodes in Wood with and without the Presence of a Pheromone

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Biology

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Sponsor: Dr. Dwayne L. Daniels

Entomopathogenic nematodes are valuable as biological control agents. Pheromones, such as ascarocides, influence nematode behavior and development. Previous research has shown that exposure to pheromone extracts improves IJ efficacy and dispersal, but we don't know how pheromone affects IJ dispersal in certain mediums such as wood. Understanding movement of nematodes in wood and the influence of pheromones on promoting dispersal in wood can be useful for managing wood-boring insects such as ambrosia beetle, flat-headed apple borer, and lesser peach tree borer. In this project, we examined the movement of entomopathogenic nematodes in wood with and without the presence of a pheromone. Fresh wooden bolts (3 inches long) were cut from pecan trees to set up arenas for testing wood movement. To keep moisture out, parafilm was wrapped around both cut ends of the bolt. *Steinernema carpocapsae* and *Steinernema feltiae* IJs were condensed down to 5000 IJs/ml. Bolts were placed in a 25° C incubator for the incubation time assigned to each bolt group (2, 3, and 4 days). We discovered that the EPNs did not move well in the wood; we were able to get them in but not out. We ran three preliminary tests, each slightly different from the original steps. We believe the EPNs have gotten themselves entangled in the wood. Further work needs to be done to figure out a better way to extract nematodes from wooden galleries.

Examining Maternal Childhood Maltreatment Correlates of Maternal-Infant Emotional Connection in a Community Sample of Black Mothers and Infants

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Neuroscience and Behavioral Biology

Oxford/Emory
Sponsor: Dr. Abigail Powers Lott

Black women with limited socioeconomic resources experience high levels of childhood maltreatment (CM), which can have adverse effects on their offspring, potentially through poor maternal-infant emotional connection (EC). Maternal-infant EC is an essential part of healthy socioemotional development and appears to protect against early emotional problems in children. Yet, there is little known about the unique effects of various CM types(i.e., sexual, physical, andemotionalabuse,andphysical and emotional neglect)on maternal-infant EC. The goal of this study was to examine the differential influence of CM types on mother-infant EC in a community sample of Black mother-infant dyads. The sample included 31 Black mother-infant dyads (Mage=25.53, SDage=4.62; infant age 6weeks). EC was assessed using the Welch Emotional Connection Screen (WECS), which includes subscales of attraction, vocal exchange, facial affect, and sensitivity/reciprocity. A higher WECS score indicateshigher emotional connection in the dyad. CM was assessed using the Childhood Trauma Questionnaire (CTQ)total score andfive subscales:emotional and physical neglect, and emotional, sexual, and physical abuse. Other trauma exposure was measured using the Traumatic Events Inventory (TEI). Bivariate correlations were conducted to examine associations between CM and EC,and follow-up hierarchical linear regression analyses were conducted based on correlational results. There was not a significant association between CTQ total and WECS total, although results were trending in the expected direction ($r= -0.34$, $p= 0.063$). When examining CTQ subscales, there were significant correlations between physical neglect and WECS total($r= -0.54$, $p< .002$) and physical abuse and WECS total ($r= -0.40$, $p= 0.045$). Follow-up linear regression results revealed that physical neglect remained a significant predictor of WECS total, even after controlling for the presence of other trauma exposure ($F_{change}= 5.83$, $R^2_{change}= .20$, $t(23)= -2.41$, $p= .025$); the same model with physical abuse was not significant ($p = .102$). Overall, physical abuse and neglect were negatively related to maternal-infant ECat 6 weeks postpartum, suggesting these types of CM may have a particularly adverseeffect on EC in Black mother-infant dyads and may be relevant when considering preventive interventions to promote EC in the first year of life.

Effect of Hypoxia on the Structure of HIF1A mRNA 5' Untranslated Region

Alexandra Furney
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Sponsor: Dr. Arnab Sengupta

The HIF1A gene is a transcriptional activator that regulates cellular responses to hypoxia by inducing transcription in many other genes, and plays an essential role in embryonic vascularization, tumor angiogenesis, and ischemic diseases. Overexpressed HIF1A gene has been found to be linked to many forms of carcinoma, breast, ovarian, and lung cancer. The gene is reported to exhibit internal ribosome entry site (IRES) activity. IRES activity uses regulatory structures located in the 5′ untranslated region of the mRNA allowing cap-independent translation. In the case of the HIF1A mRNA, IRES activity must be specifically activated under hypoxic stress. The mechanism of this process is unclear. To address this, we are interested in measuring changes in the structure and interactions of the regulatory region subjected to chemically-induced hypoxia. We have applied SHAPE-MaP to investigate the secondary structure of the regulatory region of the HIF1A mRNA in human cell lines to better understand the mechanisms of stress-induced initiation. We compare SHAPE data collected using gene-specific targeting of the HIF1A mRNA under (a) cell-free, (b) in-cell normoxic, and (c) in-cell hypoxic conditions. Our cell-free structure model reveals a highly structured 5′ UTR with multiple short hairpins motifs. Next, we closely compare live cell SHAPE data identifying regions that are affected by hypoxia. In addition to changes in SHAPE reactivity, we have detected changing patterns of protein interactions within the 5′ UTR under varying conditions. Future directions include utilizing RNP-MaP, a UV-crosslinking strategy to examine specific protein-motif interactions affecting hypoxic translation, along with DMS-MaP, a direct base-pair detection strategy. Lastly, we identify strategies to validate the HIF1A mRNA structure using reporter assays.

Effects Perfluorooctane Sulfonate (PFOS) on Gene Expression of DJR-1.2 in Caenorhabditis elegans

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Fort Valley State University
Sponsor: Dr. Celia Dodd

Introduced in the 1930s, Per-and polyfluoroalkyl substances (PFAS) have widely been used in industry for their waterproof properties in household products (carpets, clothing, non-stick pans, paints, etc.), personal care products (shampoos, dental floss, cosmetics), food packaging and fire extinguishing foams. Exposure to PFAS poses a major health concern due to their long biological half-lives. Human exposure can occur through consumption of contaminated drinking water, house dusts, food, and food packaging. Recently in vivo studies have shown that Perfluorooctane sulfonate (PFOS), a type of PFAS chemical, can be neurotoxic, specifically targeting dopaminergic neurons. However, the mechanism of neurotoxicity remains unknown. Increase in oxidative stress is one possible mechanism for neurotoxicity. PARK 7 gene, is expressed when oxidative stress is present, producing the DJ-1 protein that plays a role in protecting the cell from oxidative stress. Altered expression of this gene has been linked to Parkinson's disease known to manifest following a decline in dopamine neurons. For this study we hypothesize that PARK 7 gene expression will be altered following exposure to PFOS. We utilized Caenorhabditis elegans (C. elegans), a well characterized animal model useful because of its rapid life cycle. C. elegans contain the DJR -1.2 gene which is homologous to PARK7 in humans. The goal of the study is to determine if PFOS alters gene expression of DJR 1.2 in C. elegans at multiple laval stages (L1, L3, and L4). L1 N2 wildtype C.elegans were treated with 0 (control), 50, 100, and150 µM concentrations of PFOS. Total RNA was collected for Real-Time PCR analysis of DJR-1.2 at 3 time points corresponding to the L1 (30 minutes), L3 (24 hrs.), and L4 (48hrs). Data collected so far indicates that PFOS exposure decreases the expression of DJR-1.2 at the L4 stage. These findings contribute evidence to the hypothesis that PFAS exposure can increase oxidative stress which may lead to neurotoxicity.

Emotionally Suppressive Metaphors in Children?

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Psycholinquistic

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Sponsor: Dr. Sarah Higinbotham

When emotional children are told to “shove it down,” “bottle it up,” or “swallow it,” they are confronted with metaphors that aim to suppress their feelings rather than process them. How do such emotionally suppressive metaphors influence children for the remainder of their lives? In this webinar presentation, I will examine the consequences of employing metaphorical language connotating the suppression of emotions against children. Previous studies have shown that metaphorical language is the very gateway for youth conceptualizing the world. Beginning at the age of 4, toddlers start to categorize the world using “child metaphors.” Children could point at a yellow plastic baseball and exclaim, “corn,” refer to a winding river as a “snake,” or say that a floating cup in a bathtub is a “swimming cup.” These networks grow in complexity as the child matures. They are the medium in which humans develop opinions, deal with intense emotions, and dictate personality traits. At a young age, it can be assumed that these mental frameworks are more susceptible to influences as they are not yet matured. As such, the powerful metaphors of “shove it down,” “bottle it up,” or “swallow it” create toxic knowledge structures, ones that children will refer to for the rest of their lives. Eventually, this destructive mental framework can cause deficits in mental health, decreased emotional intelligence, and an inability to process emotion. It is imperative that the correct type of language, especially metaphorical, is utilized with children who are still developing their knowledge structure. Through this presentation, I hope to bring awareness to this issue by expanding upon general psycholinguistic studies pertaining to metaphors as well as outline potential experiments to take this project to the next level.

Examining the Omission of Slavery's Origins in Georgia's Educational Standards: A Critical Analysis of House Bill 1084

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Education

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Sponsor: Dr. Karen A. Terry

This research delves into the perplexing omission of slavery's historical origins from Georgia's educational standards, specifically scrutinizing the implications of House Bill 1084. This bill, enacted in 2022, aimed to restructure the state's curriculum framework. However, it conspicuously avoided any comprehensive discussion of the roots and early manifestations of slavery in the region. This study employs a multifaceted approach, encompassing legislative analysis, historical examination, and educational policy assessment, to elucidate the underlying factors contributing to this omission. By examining the historical context surrounding the drafting of House Bill 1084, this research uncovers political, cultural, and social elements that may have influenced the decision to exclude this pivotal aspect of Georgia's history. Furthermore, it elevates the potential consequences of the omission on students' understanding of the complex legacy of slavery and its enduring impact on society. Through a critical lens, this research seeks to stimulate discourse on the necessity of comprehensive and inclusive educational standards, highlighting the importance of acknowledging uncomfortable historical truths. By shedding light on this issue, this research aims to contribute to a broader conversation about the responsibilities of educational institutions in fostering a more informed and empathetic citizenry.

Exploring Hidden Talent:
Identifying and Supporting "Hard of Hearing" People's Talent Development

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Sponsor: Dr. Ophélie A. Desmet

A substantial number of children (ages 5-17) in the United States are deaf or hard of hearing yet75%of these students attend general education without Individualized Education Plans (IEPs, NAD, 2020). As such a majority of hard of hearing children's needs are not being met as they should be, thus hindering their academic successes. Children who live with deafness and are hard of hearing often face obstacles that can hinder their emotional and physical ability to perform well in school. This is often seen as a deficit rather than an intellectual strength (Paterson, 1998). Talent development as well as developing support systems for the hard of hearing is an under studied topic. Therefore, I conducted a case study focused on a retrospective exploration of the talent development among hard of hearing people. Through a series of interviews, I investigated what helped and hindered these individuals as they grew up in the education system. I also reviewed multiple pieces of literature to further extend the research and analysis on talent development as well as support systems for the hard of hearing. By exploring the talent within these individuals and ways to build a structured support system, the affected students, peers, parents, teachers, and education system as a whole can better support them in guiding them through a general education classroom.

Exploring the Efficacy of Differentiated Instruction Strategies in Enhancing Student Learning: An Undergraduate Research Study

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Sponsor: Dr. Forrest R. Parker III

Differentiated Instruction (DI) theory is an educational framework that seeks to meet the diverse learning needs of students by tailoring instruction to individual strengths, interests, and readiness levels. This oral research presentation delves into the multifaceted landscape of DI theory, shedding light on its origins, core principles, and the transformative impact it has on student learning and engagement.

The presentation will commence by providing a historical overview of DI, tracing its roots back to the work of educational pioneers such as Carol Ann Tomlinson and Benjamin S. Bloom. It will explore the theoretical underpinnings that ground DI in the realm of constructivism, cognitive psychology, and brain-based learning, highlighting the alignment of DI with contemporary educational theories.

The core principles of DI, including assessment-driven instruction, flexible grouping, and ongoing formative assessment, will be dissected to unveil the practical strategies that empower educators to implement DI effectively. Through case studies and real-world examples, the presentation will showcase how DI can be adapted across diverse subjects, grade levels, and student populations.

Furthermore, the impact of DI on student learning outcomes and engagement will be rigorously examined. Research findings, both quantitative and qualitative, will be presented to elucidate the academic gains achieved by students when exposed to differentiated instruction. Additionally, the presentation will delve into the psychological and socio-emotional benefits of DI, including increased motivation, self-efficacy, and a more inclusive classroom environment.
To conclude, the presentation will address common misconceptions and challenges associated with implementing DI and propose practical solutions for educators. It will emphasize the role of professional development and ongoing support in fostering a culture of differentiation within educational institutions.

This research presentation offers a comprehensive exploration of Differentiated Instruction theory, underscoring its potential as a transformative approach to education. Attendees will leave with a deep understanding of DI's theoretical foundations, practical application, and its profound impact on both student learning and teacher pedagogy.

Evaluation of the Antibacterial Properties of Ethnomedical Plants

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Valdosta State University
Sponsors: Dr. Gopeekrishnan Sreenilayam, Dr. Tolulope O. Salami, and Dr. Xiaomei Zheng

The importance and application of natural products has increased in recent years due to increased curiosity about the matter. To explore their potential, several plants, harvested in Africa, were tested for their antibacterial properties against Bacillus Subtilis, Serratia Marcescens, E-coli, and Micrococcus Luteus bacteria and for their biofilm inhibition against Streptococcus mutans. The Ethnomedical plants play a major role in the communities across Africa where they were harvested. They are known for their antiseptic and anthelmintic properties and traditionally used for treating ulcers, diabetes, jaundice, and microbial infections. Their natural products were extracted using organic and DES solvents, using sonication and rotavapor, to determine which yielded the most product. Antibiotic disk assays and biofilm crystal violet methods were utilized to perform the experiment. Extracts with promising activity will be purified by chromatography and the fractions will be tested again for antibacterial activity.

Family Values and Mental Health Implications for Immigrant Young Adults

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Psychology

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Sponsor: Dr. Tsu-Ming Chiang

Family values have different impacts on one's life and development. However, culture plays a pivotal role in forming family values. For example, some family values incorporate family closeness by eating dinner together every night. Others instill independence. Alternatively, several family values place a strong emphasis on prioritizing family. According to a study among Asian American adolescents, results showed that familial pride correlated with fewer depressive symptoms and better self-esteem. Another study showed the family functioning was negatively related to behavior problems, directly and indirectly, through identity processes among early adolescents of Hispanic immigrants (Schwartz et al., 2005). Overall, family values seem to serve as a psychological protection against negative emotional experiences (Patel et al., 2022) and have a positive impact on one's mental health. On the other hand, family values may also have a negative influence. A study conducted on college students in the Southwest found that a lack of social support was a strong predictor of depression and anxiety in mental health outcomes (Watt et al., 2022). A relationship between perceived familial criticism and depression was found among Caucasian adults (Puff et al., 2016). It is thus valuable to examine the relationship between various family values and its mental health implications. This project is aimed to explore the relationship between family values and mental health in emergent adults from multiple ethnic groups including immigrants. The survey consists of different familial values and self-reported measures of various levels of social emotions and depression. This study expects individuals with stronger family closeness in immigrant families to be less susceptible to experiencing depression than those of Western culture. Detailed results will be shared and discussed at the conference.

Film vs. Reality:
The Perspective of the Western Film The Undefeated from a Historic Lens

Isabelle Reimer
History

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Sponsor: John Dunn

The production of *The Undefeated* by Andrew V. McLaglen in 1969, alters the recollection of Confederate migration from the South to Mexico and can be seen through the perception of indigenous and native people, Southern colonization, and the history of Confederate General Joseph O. Shelby. John Wayne starred in the film as General Thomas, a character heavily influenced by General Shelby; it followed a group of Union soldiers' journey to Mexico after the surrender of General Lee in 1865. The migration of Confederate soldiers to Mexico following the French intervention in the early 1860s directly correlated with the loss of the Civil War and the idea of reconstruction within the United States. Many of the Confederate soldiers lived in fear of what the United States would become under Union rule and how it would affect them both economically and socially. The migration to Mexico starting in 1865, was notable due to things such as an immigration commissioner, incentives given by King Maximilian, and newspapers publishing the new Confederate colonies abroad. Through both the film and the impressive persona created by the media, General Shelby was established in American pop culture as an undefeated Confederate general who was consistently seeking out new adventures and adding to his heroic image. The film prioritized and dramatized the white and European perspectives of history to create a plot that antagonists the natives of Mexico.

Fostering Creative Thinking in K-8 Enrichment Classes

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Sponsor: Dr. Ophélie A. Desmet

The classroom should be a place where creative thinking is encouraged. Yet research has shown that many teachers have misconceptions around how to best foster creative thinking. Enrichment programs for gifted, creative, and talented students often offer educators more freedom to include activities and teaching strategies that can foster creative thinking. Therefore, the present study explored how enrichment teachers perceive and foster creative thinking in enrichment classrooms designed for gifted, creative, and talented students this, 11 enrichment teachers were interviewed and observed. Via inductive qualitative analysis of interviews, observation field notes, and lesson plans it was determined that most teachers believed creativity involved new and original ideas, leading them to foster creativity through mostly open-ended idea generation tasks.

Formulation for Novel Approach to Treat Pancreatic Cancer

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Chemistry

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Sponsor: Dr. Thomas Manning

Pancreatic cancer is highly malignant with a 95% mortality rate despite clinical research and medical efforts. Various treatments for pancreatic cancer range from Whipple Surgery (pancreaticoduodenectomy), Palliative Surgery and chemotherapy drugs like nab-Paclitaxel and gemcitabine. Over the past 14 years, our group has been developing a new type of cancer treatment called Nutrient Enriched Chemotherapy (NEC). A total of twenty-four novel compounds that we have developed have been accepted into pre-clinical trials at the National Cancer Institute. The trials were conducted against nine types of cancer to include prostate, lung, melanoma, ovarian, CNS, leukemia, renal and colon cancer. One of the main distinctions between cancer cells and healthy cells is the necessary amount of energy they require in order to reproduce and survive. Cancer cells rely on aerobic glycolysis to acquire their energy, which can be up 15 times more than a healthy cell. We use molecular species to accelerate cellular processes and growth rate in cancer cells and use this situation to increase the uptake rate of our multi-prong drugs. These medications also provide several ways (Mechanism of Actions, MOA's) to attack and weaken the cancer cells. We will report on our results to date.

From Ambassadors to Outcasts: How the Sephardim Changed Spain Before and Since Their Exile

Lauren Mariah
Modern and Classical Languages

Valdosta State University
Sponsor: Dr. Grażyna Walczak

Although the Jews of Spain had inhabited the Iberian Peninsula long before the Roman Era, their culture and influence reached its zenith in the Middle Ages. Despite their ever-fluctuating conditions as a useful and despised subculture beneath the rule of the Muslim Arabs and Christian Visigoths, the Jewish communities facilitated the academic, intellectual, and linguistic evolution of Spain. As subjects of and go-betweens for the dominating kingdoms, the Sephardim participated in the cultures, economies, and conquests of each. Conversely, the influence of the Visigoth and Arab cultures on the Iberian Jews led to its own form of Judaism as the Sephardim absorbed and refined the accomplishments of their overlords, adopting new information and technologies as their political and legal status became increasingly tenuous. After the 1492 fall of Granada, the expulsion of the Sephardim fostered the spread of Spanish culture throughout the world, while the resulting economic turmoil joined rampant antisemitism and fear of the Inquisition to significantly change the lives of the people who remained in Spain. This project elaborates on the lessons that can be learned by exploring the collaborations of different communities sharing the same geographic location and the importance of understanding how cultures enrich each other.

From Patterns to Polygons: A Recontextualization of Historic Foundry Patterns through Digital Technologies

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School of Art and Design

Kennesaw State University
Sponsor: Page Burch

Bridging the divide between industrial history and modern technology is what this research project aims to achieve. Under the direction of our sponsor, we worked with the Sloss Furnaces National Historic Landmark in Birmingham, Alabama. In this collaboration, we digitally archived wooden foundry patterns from the early 20th century. This was accomplished using our knowledge of, and proficiency in, 3D technology such as scanning, virtual reality, and 3D printing. This interdisciplinary collaboration allows for the preservation of historic relics, and educational outreach on many fronts. During our research trip to Sloss Furnaces, we used an EinScan 3D scanner to digitally scan twelve wooden patterns. Upon returning to KSU, we began restoring the patterns through digital modeling practices in virtual reality, and then 3D printing them. The immediate outcome of this project will produce files of the scanned wooden patterns that will be digitally archived, printed, and used to create objects for education, art, and commerce by Sloss Furnaces. Digitally restoring these wooden patterns that have aged and degraded over time using advanced technology like mesh repairing in virtual reality, gives Sloss Furnaces the opportunity to preserve, use, and bring awareness to irreplaceable pieces of history. Since the making of these wooden patterns is a lost art of a bygone industrial era, the patterns are in states of disrepair and are no longer made. Our efforts to preserve them digitally allows for them to be used for educational programs, metal arts and foundry programs, and historical record keeping. To our knowledge no one else is archiving these objects, and through this research and output, we hope to create new appreciation and learning opportunities for all visitors to Sloss Furnaces.

Genome Sequencing of the Invasive Mussel Mytella charruana

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Sponsor: Dr. Cristina Calestani

Mytella charruana is an invasive marine mussel found along the southeastern US coastline. Besides threatening the survival of native mussel species, M. charruana is also compromising the aquaculture of oysters and clogging power plant water intakes. To date, the genome of M. charruana has not been sequenced. The sequencing of the genome of M. charruana will facilitate the use of eDNA and the development of molecular markers to monitor and track this invasive mussel. In this study, we first optimized the DNA extraction procedure to obtain DNA of high integrity and purity, suitable for sequencing using the portable Oxford Nanopore Technologies system. To extract DNA, we used the DNeasy Blood & Tissue Kit (Qiagen) and a modified protocol with the goal of minimizing DNA shearing. We compared the two methods starting from gills, foot, and mantle tissue. The tissue was disrupted with a micro pestle to facilitate homogenization; samples were always mixed by inversion, instead of vortexing. The genomic DNA size and integrity was analyzed with the Agilent Technologies TapeStation. The best results were obtained using the modified method, starting from mantle or foot tissue. To date we sequenced 1.128 Gb of the genome (approximately 1X genome coverage). Ultimately, the availability of genomic sequence will help environmental managers develop strategies to monitor and possibly fight the invasion of this mussel species. It will also provide the groundwork for gene expression studies related to the survival and reproduction of this invasive mussel in their introduced environment.

House Bill 1084 and Critical Race Theory: An Abstract

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House Bill 1084, a legislative proposal introduced in 2021 and passed 2022, has generated significant controversy and debate due to its potential impact on the teaching of Critical Race Theory (CRT) in educational institutions. CRT is a multidisciplinary framework that emerged in legal scholarship in the late 20th century. CRT aims to examine the role of race and racism in society, particularly within legal systems and institutions. This abstract provides an overview of the key provisions of House Bill 1084 and its implications for the discussion and teaching of CRT. House Bill 1084 seeks to restrict the incorporation of CRT and related divisive concepts into K-12 curriculum and state-funded educational programs. While many argue that the bill is intended to maintain objectivity in classrooms and prevent the imposition of a particular ideological perspective, critics contend that it stifles important discussions on racial inequality and historical injustices. The bill's language often intersects with broader debates surrounding free speech, academic freedom, and the interpretation of history and social studies.

This abstract analyzes the core provisions of House Bill 1084, focusing on its definitions of CRT, racial and gender stereotyping, and divisive concepts. It also discusses the potential consequences of the bill, such as limiting educators' ability to address systemic racism and hindering the development of a more inclusive and equitable educational environment.

In conclusion, House Bill 1084 and the broader debate surrounding CRT in education highlight the tension between academic freedom, the right to education, and the desire to foster a diverse and inclusive society. This abstract provides a foundation for further exploration of the bill's implications on educational policies, freedom of expression, and the ongoing dialogue about race, racism, and social justice in the United States.

How the Migrant/Refugee Crisis of 2015 Fueled the Rise of Anti-Musim Right-Wing Politics in Europe

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Oxford/Emory
Sponsor: Dr. Anouar El Younssi

The Syrian Refugee Crisis of 2015 stands as the largest movement of civilians in the 21st century.1 Remarkably, even after eight years, its momentum shows no signs of waning. This crisis has significantly impacted the politics of the surrounding regions, particularly the countries adjacent to Syria and Iraq. What often remains understudied is the crisis's influence on European politics and its role in strengthening the prevailing wave of right-wing populism and politics. In recent years, for example, parties opposing immigration and the hosting of refugees from the Middle East, have experienced substantial growth in Germany, France, United Kingdom, Spain, and Italy. This paper seeks to shed light on the 2015 Refugee Crisis by drawing parallels between contemporary displacements and historical instances of migration out of Europe such as the Reconquest of Spain. This comparison highlights the fact that Europe has not always been the coveted destination it is today. Furthermore, this paper delves into the reactions that historical migrations out of Europe prompted, with the goal of identifying patterns that might elucidate the surge in reactionary politics seen across much of Europe today. By categorizing people into specific groups on the basis of nationality, race, and religion, right-wing populists garner support by casting refugees in a negative light and playing on fear of difference. Much of the reaction to refugees in Europe stems from histories of white supremacy and violence against Arabs and other marginalized groups. This is exemplified by the European reaction to the Ukrainian Refugee Crisis, where parties from all sides of the spectrum accepted Ukrainian migrants and Fear of difference drives politics and the rise of right-wing populism following the 2015 refugee crisis shows how politics take priority over genuinely protecting people.

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How the Politicalization of COVID-10 Contributes to Social Determinants of Disability in the United States

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Political Science, Anthropology, Sociology, and Public Health

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Identified in December 2019 and declared a global pandemic in March 2020, Coronavirus Disease (COVID-19) is an airborne infectious disease caused by the Severe Acute Respiratory Syndrome Coronavirus 2 virus (SARS-CoV-2). The prevention and containment of ongoing COVID-19 outbreaks in the United States has been met with divisive politicization of pandemic safety measures and patient care through misinformation, disinformation, xenophobia, ableism, ageism, and disregard for medical and public health ethics. Politicization catalyzed harmful policies in multiple sectors which directly produced millions of deaths, mass disability of millions of survivors, and global economic crisis. These factors and events impact Social Determinants of Health (SDOH) regarding quality and accessibility of education, healthcare, food, economic stability, neighborhood and physical environments, and social and community engagement. This extensive literature review utilizes root causal analysis to explore the political ontology of how the COVID-19 pandemic: (a) has been politicized in the United States; (b) directly impacts the community, governmental and institutional responses to the pandemic at the macro level therefore influencing individual behaviors at the micro level; (c) further exacerbates the marginalization and exclusion of disabled and medically vulnerable populations through SDOH criteria; (d) increases susceptibility of disability due to post-acute sequelae SARS-CoV-2 infection (PASC or "Long COVID"); and (e) increases existing and historically established intersectional disparities for multiply marginalized people along axes of disability, race, ethnicity, gender identity, sexual orientation, and/or poverty. As an emerging topic with limited previous research, this grounded theory approach acquires information via scholarly publications, journalistic reporting, governmental data, and new media; existing research often excludes disabled researchers and participants, so this research emphasizes first-person disability narratives from social media and articles. Forthcoming mixed methods research will include surveys and patient self-reporting. Current conclusions show that COVID-19 politicization worsens SDOH outcomes and contributes to exponential growth of the disabled population.

Hypersonic-Borne HEMP Threat Analysis, Wargaming Scenarios, and the Breakdown of Mutually assured Destruction Doctrine

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Physics and Political Science

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Sponsor: Dr. James Boudreau

Borne by Chinese hypersonic glide vehicle, a High-altitude Electromagnetic Pulse (HEMP) weapon detonated in the atmosphere over the continental U.S. eviscerates the American electrical grid for 4-10 years, incurs trillions of dollars in damage, and results in the death of up to 90% of Americans within a year, all according to the Congressional EMP Commission's report and multiple DHS/DOD/DOE studies. As "competition below the threshold of war" which also happens to nullify America's war-waging capacity, Electromagnetic Pulse (EMP) assaults place the United States in an awkward quandary, without electricity, communications, or viable retaliatory options. Existing detection dragnets strain to track hypersonic glide vehicles and, due to various EMP scenarios, if the lights were to suddenly flicker off, there may remain uncertainty as to the perpetrator's identity. Even once America eventually attains hypersonic parity with China and Russia, due to the nuanced nature of hypersonic HEMP warfare (especially when launched from the Sino-Russian border), traditional mutually assured destruction and deterrence paradigms fatally fissure and ultimately implode. Ensuring an equitable outcome – where China's electrical grid is equally inoperable – is simply unfeasible considering the first-strike nation's intrinsic advantage, ambiguity in launcher's intent, the truncated timeline for response (when compared with traditional ICBMs), and China's unique manufacturing and policy positioning which allow them to weather EMP reprisal essentially unphased. In this exposition, the presenter unpacks the game theory and actor incentives surrounding asymmetric hypersonic HEMP warfare, detailing how mutually assured destruction paradigms fail, and offers a three-pronged solution to the existential threat facing America.

Identification and Characterization of a New Microbacterium Species from a Contaminated Chlamydomonas reinhardtii TAP Culture Plate

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Biology

University of West Georgia
Sponsor: Dr. Mautusi Mitra

The initial goal of our research project was to minimize bacterial contamination on the *Chlamydomonas reinhardtii* (a green micro-alga) **T**ris **A**cetate **P**hosphate (TAP) medium plates. Some bacteria are able to grow on the TAP medium plates as these strains can utilize acetate as an alternative carbon source like *Chlamydomonas*. We purified the a pale yellow-pigmented bacterial strain from a contaminated TAP plate of *Chlamydomonas*. This strain was named as Clip185 based on the *Chlamydomonas* strain it contaminated. We tested antibiotic-sensitivities of Clip185 to determine which antibiotic will inhibit Clip185's growth without affecting the *Chlamydomonas* growth on the TAP medium. Several microbiological tests including growth analyses on different growth medium, heavy-metal tolerance and spectrophotometric analyses of carotenoids were conducted to characterize Clip185 biochemically. Our lab has sequenced the whole genome of Clip185 using PacBio continuous long read technology and have submitted it to the National Center for Biotechnology Information to acquire an accession number (https://www.ncbi.nlm.nih.gov/datasets/genome/GCF_028743715.1/). Our current results show that Clip185 is a new *Microbacterium* species. Clip185 is sensitive to vancomycin but resistant to other antibiotics, produces decaprenoxanthin and can tolerate toxic concentration of heavy metals. We will be presenting our molecular, biochemical, and physiological results.

Increasing Biocrude Yield of Food Waste HTL via Combined Feedstocks

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Environmental Engineering

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Sponsor: Dr. Sarah K. Bauer

The U.S. discards approximately 120 billion pounds of food waste annually, with most of it going into landfills where it is the largest source of landfill methane. This research investigates diverting food waste from landfills via Hydrothermal Liquefaction (HTL), which converts waste with a high-water content (75-95%) into biocrude, aqueous co-products (ACP), bio-char, and gas through the unique properties of subcritical water. This research seeks to improve the biocrude yield of high-water content food waste by adding low water content food waste until the combined mixture has an 80% water content. The six single feedstocks were reacted individually to determine unadulterated biocrude yield. The three low water content feedstocks (spent coffee grounds, spent tea leaves, and spent grain) had water added until they were at 80% water content in order for HTL to occur, while the three high water content feedstocks (spent yeast, spent hops, and raspberry puree) were run as received. After the single feedstock HTL reactions were complete, 9 combinations at 80% water content were created, each consisting of one high water content feedstock and one low water content feedstock. All reactions were run in triplicate to avoid any statistical anomalies. All HTL reactions had the biochar, ACP, and biocrude separated and measured, in order to determine the yield of each. Of the single feedstock reactions, spent yeast, raspberry puree, and spent tea had the highest oil yield. The combined feedstock reactions had more complicated results, as there was a range of synergistic and antagonistic reactions, but generally the mixture of spent tea and spent yeast had the highest yield. This research is important if HTL is to be adopted on an industrial scale, as it will be infeasible for any large operation to use a single feedstock.

(In)Evitable? Perspectives on Marriage chez the 18th Century French Heroine

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Sponsor: Dr. Kelly Frances Davidson

From a modern perspective, marriage was not only inevitable to women of 18th century France, it was the sole respectable mode of life outside of a convent. We often think of the 18th century woman as a victim of her time, society, family, and her own social conditioning while too easily forgetting the little choices and questions, the living intellects and unwritten voices that made her real—a travesty that even contemporary 18th century authors began to challenge. Although beginning from a factual, historical basis, this illusion of the inevitability of marriage has been a leading preoccupation of the great French authors and was frankly disputed by l'Abbé Prévost through his scandalous, avant-garde heroine in *Manon Lescaut*, and by Marivaux in his great comedy *Le jeu de l'amour et du hasard*. Prévost's young beauty of the third estate determinedly evades marriage even to the young nobleman she loves, while Marivaux's aristocratic heroine subjects her betrothed to an Enlightenment-inspired examination of character before she will accept him and her fate. In doing so, these heroines turn the perceived social order on its head, laying the conversations, prejudices, and workings of their society bare for observation. This project combines readings of the original works and subsequent literary criticism to analyze the way in which these authors challenged the accepted mode through their heroines' views on marriage, their depiction of the societal, familial, and economic pressures that these women confronted, and their differing methods of resolving this dilemma. In an era of increasing recognition of the role of women, a greater understanding of these heroines, and through them, the unnamed women who inspired and are represented by them, is essential to understanding our own historic and literary past as well as our present selves.

Institutional Investment Strategies: Theory of Risk, Decision, and Probability Analysis

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Philosophy

Valdosta State University
Sponsor: Dr. Lavonna Lovern

Risk Theory, as proposed by Daniel Bernoulli in 1738, can be conceptualized into three core components which are utility, regression, and diversification. While considered an outdated form of risk theory, Bernoulli's foundational assumptions play a vital role in modern institutional investment strategies. To better understand current trends, it is important to revisit Bernoulli's theory and unpack its content. The Paper will begin with an evaluation of the core elements within a globalized market system, establishing the implications of historical strategies within the equities market. These evaluations will be defined within the philosophical frameworks of logic and probability in order to establish the legitimacy of risk and leverage. The paper will conclude with a discussion of how these concepts impact behavioral economics to provide perspective on the motivations of buyers and sellers; thus, establishing a validity matrix to quantify probability judgements within institutional investment strategies.

Investigating Potential Sperm Size Dimorphism in Bluehead Wrasse (Thalassoma bifasciatum)

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Biology

Agnes Scott College
Sponsor: Dr. Lock Rogers

Bluehead wrasse *(Thalassoma bifasciatum)* are a species of protogynous marine fish endemic to the tropical western Atlantic Ocean. Individuals typically measure between 5 and 10 cm in length. The species is defined by two distinct color phases: initial phase (IP), which have a yellow, brown, and white coloration, and terminal phase (TP), which are larger, with a blue head and yellow body. IP individuals can begin life either as male or female and are sexually mature, but can transform to TP males if they grow large enough. TP males typically mate using resource defense polygyny, while IP males use group spawn, sneaker, or streaker strategies for mating. This research project aims to investigate if there is a potential difference in sperm size produced by IP and TP males. There may be a difference in sperm size due to different levels of sperm competition involved in different mating strategies. This question has potential applications to better understanding reproductive energy allocation in bluehead wrasse. Collection sites were patch reefs off the eastern coast of Key Largo, Florida. Sperm samples were collected during midday spawning period and preserved in glutaraldehyde solution. Half the samples were from initial phase males and half were from terminal phase males. Extractions of the samples were viewed under a light microscope and photographed, then the photographs were analyzed using ImageJ analysis software. Length of sperm was measured and analyzed using nested analysis in SYSTAT. Our analysis did not find a statistically significant difference between sperm lengths in IP and TP males when using nested analysis. Sample size was small (26 individuals, 13 IP and 13 TP). It appears that although there is evidence that IP and TP males allocate energy differently to reproduction, sperm length may not be as much of a factor.

Is Homosexuality a Choice: An Examination of Social, Historical, and Biological Factors Contributing to Homosexuality

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Sponsor: Dr. A.J. Ramirez

Members of the LGBTQ+ community have often faced criticism and discrimination for their sexuality, with many people believing homosexuality is a choice. There seems to be a prevalent idea that homosexuality is a deviant act that participants willingly commit. Opponents of this viewpoint argue that Genetic and Sociological factors play a majority role in deciding who experiences same-sex attraction. Although directly participating in sexual acts with members of the same or opposite sex is a willing occurrence, the presence of interest for either sex is being questioned. This research focuses on the question, "Can a person willingly control the presence of homosexual attraction?" Social and Historical factors play a crucial role in influencing the acceptance and involvement in homosexual activities but do not determine the nature of one's attraction. Based on genetic research conducted by several accredited institutions, it can be concluded that there is no single gene linked to the causation of homosexuality. Still, similar genetic markers can be found in male and female populations identifying as homosexual. Additionally, correlations can be found in the analysis of monozygotic and dizygotic twins that suggest a hereditable aspect of homosexuality. These findings insinuate that there is, to some degree, genetic involvement in homosexual attraction. Genetic factors are out of the control of the individual, meaning individuals with a genetic predisposition to homosexuality are likely unable to control their attractions.

Isolation of Secondary Metabolites in E. Serotinum

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Chemistry

Columbus State University
Sponsor: Dr. Daniel W. Holley

Phytochemistry, a subset of natural products chemistry, pertains to the study of chemically derived products from natural substances. New research in this field has a potential impact on the progression and advancement of medicinal chemistry. Our project works with Eupatorium Serotinum (Common name: Late Boneset). This is an herbaceous plant found in the Eastern United States and was used by early Appalachian settlers to reduce fevers. Isolation of the secondary metabolites found in Eupatorium Serotinum reveal compounds with supposed correlation to the plant's medicinal properties. Dry Column Vacuum Chromatography (DCVC) separates the secondary metabolites of interest using solvents of various polarity. The resulting fractions are then analyzed for structural characterization through chromatography and spectroscopy. Fractions are also tested for growth inhibition against E.coli bacteria strains.

It is an Attack on Education: The Removal of Diversity, Equity, Inclusion and AP Classes in Florida and Georgia

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Education

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Sponsor: Dr. Karen A. Terry

House Bill-1084 prohibits educators from teaching or discussing topics related to systemic racism or racial bias. However, such training is essential for fostering a safe and inclusive learning environment. Several states, primarily Florida, have already taken steps to eliminate certain courses they consider divisive or objectionable due to their content: AP African American Studies and AP Psychology. These subjects encompass issues like race, oppression, sexual orientation/identity, and are often criticized for their perceived lack "of educational value and historical accuracy." The Georgia Professional Standards Commission, that oversees teacher licensure, has also made many changes to remove certain words like 'diversity,' 'inclusion,' and many more from teacher training. Despite these changes, teachers are still expected to teach to these groups, however they are unable to effectively address the needs of all students nor provide a supportive learning environment. Historical accuracy is a key focus of this research, as we examine the controversy surrounding the "Cocking Affair" in Georgia in 1941. The Cocking Affair was an attempt for Georgia governor, Eugene Talmadge, to exert direct control over the educational system and upheld white supremacy in the schools during integration.
Through this historical lens, we can make connections between what happened in Georgia in 1941 and its present-day legislative policies and practices, and Florida's decision to ban AP courses as a misguided and a direct assault on our educational system. Although teaching accurate history in an inclusive environment has always been challenging and uncomfortable for some groups, it is absolutely crucial for cultivating a safe and robust learning space.

Kinked-Tailed Mice:
Quantifying Severity of Vertebral Tail Deformities in a Transgenic Mouse Line

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Sponsor: Dr. Victor A. Ruthig

Oct4 is a transcription factor that maintains pluripotency in embryonic stem and germ cells. We intended to utilize stem cell specific expression of Oct4 to create an induction system for germinal stem cell research. A novel transgenic mouse was produced expressing the tetracycline transactivator (rtTA) inducer linked to Oct4 (Oct4-rtTA). Unexpectedly, the transgenic mice developed kinked tails. In embryonic development, the trunk-to-tail transition represents a transition from primary body to secondary body patterning. Genetically, this transition can be considered Oct4-dependent (trunk) and Oct4-independent (tail) and also influences hindlimb and pelvic organ induction. Therefore, we began to hypothesize that our transgene was disrupting Oct4 expression and causing the deformed tails. If this genetic modification is controlled and characterized, Oct4-rtTA mice could potentially model human spinal disorders such as scoliosis, which affects 2-3% of the US population. To further understand the molecular mechanisms controlling vertebral development, our objective became categorizing and quantifying tail and vertebrae deformities to investigate potential genetic links between Oct4 and the "kinky" tail phenotype. Skeletal-stained tails from control and Oct4-rtTA mutant adult mice were imaged. Open-access image processing software (Fiji) was utilized to measure the length of the tails and a subset of caudal vertebrae. Statistical analysis compared mutants to wild types, transgenic females to males, and moderate to severe phenotypes. The findings revealed that the transgenic mice had significantly shorter proximal caudal vertebrae than the wild types. We also observed that mice with severe tail deformities had significantly shorter tails with fewer caudal vertebrae than those with moderate deformities. Our results on the Oct4-rtTA transgenic mice could contribute to future morphogenetic studies of embryonic body plan patterning regulated by Oct4.

This study was supported by the NIH-NIGMS Grant #F32GM129956, Duke Regeneration Center, Frederick J. and Theresa Dow Wallace Fund of the New York Community Trust, and The Lalor Foundation to VAR; & Weill Cornell Medicine Advancing Cornell Career Experiences for Science Students (ACCESS) to KBK

Linguistic Transfer and its Application in Learning American Sign Language

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Sponsor: Dr. Jennifer S. Beal

Jim Cummins' proposed a theory in the late 1970's that language learners can transfer knowledge from their first language, L1, to their second language, L2. L1 can also be referenced as the strongest language, meaning L1 status can change. Learners can use abilities they have accumulated in their L1, such as reading, writing, and expressive skills, in their L2. This theory proposes the question, if languages do not have reading or writing and rely on signed linguistics, such as American Sign Language, do these skills still transfer and in what way? By surveying a cohort of American Sign Language learners, these effects are measured. Participants are surveyed on comprehension, experiences, skill, learning methods, motivation, and other factors to determine if and how skills from L1 can be transferred to learning American Sign Language as additional language.

Marketing Strategies to Increase Sales and Revenue for Small Business in Middle Georgia

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Accounting

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Sponsor: Dr. Josephine Dibie

This project explores the marketing strategies employed by small businesses around Middle Georgia to maximize sales revenue. Since the incidence of Covid 19 in 2020 and the subsequent economic downturn and reduction in face-to-face activities, consumers and businesses have adopted new ways of buying and selling. Small businesses need to attract customers to increase sales and profit. This research uses a survey of retail businesses in middle Georgia to determine the strategies used to market their business and to examine if the use of social media is dependent on the sex of a manager. Secondary data is obtained from relevant academic literature and online sources. The survey result indicates that 90% of the businesses surveyed use social media for marketing while the use of social media does not depend on the gender of a manager. 80% of companies increase sales and revenue by selling and re-targeting to existing customers within the business, 90% of companies keep up with market research, and 70% of small companies give incentives to former customers who refer new customers to the business.

Mathematical Model of West Nile Virus Dynamics: Study of Passive Immunity and Vertical Transmission

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Biology

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Sponsor: Dr. Abhinandan Chowdhury

In this project, a mathematical model is proposed to better understand the transmission dynamics of WNV in an entwined nexus of mosquito-bird-human-horse. These dynamics primarily rely on spreading through a cycle involving birds and mosquitoes, with mosquitoes transmitting the virus to people and horses through bites. Additionally, the virus can pass from infected female mosquitoes to their offspring (vertical transmission) and recovered birds can pass immunity to their offspring (passive immunity). The model studied is a Susceptible-Exposed-Infected-Recovered (SEIR) scheme of explicit type which depicts a system of first order nonlinear ordinary differential equations with twenty-four unknowns. Simulations are carried out to determine the effect of vertical transmission and passive immunity in the containment of WNV outbreak.

Measuring Perceptions of Creativity through Collaborative Experience

Logan Mossor
Visual Art

Kennesaw State University
Sponsor: Dr. Jonathan Fisher

Many consider the world of visual art to be a strictly individualistic field; an individual sculptor sculpting or an individual painter painting. In fact, community and collaboration often aid the creativity of those working in the visual arts. Large scale artistic endeavors such as Yves Klein's "Anthropometries" and Christo and Jean Claude's "Running Fence" required many people all working towards one artistic vision. My own experience as a collaborative artist has indicated to me that the creative efforts of a group of people can often be more inspired than that of a single artist. Having staged many collaborative art pieces, I have become curious as to exactly what impact collaborative art has on its participants. To investigate my inquiry, I plan to stage an ongoing exploration of participants' creative evolution while making collaborative art. Over a six-month period, I will stage and document a controlled collaborative environment in which subjects will participate in a shared artistic experience, expressive wall painting in a site-specific setting. Before the experience, they will complete a questionnaire to determine their own perceptions of creativity. After participating in the collaboration, the subjects will receive a post-survey of the same questions. The surveys will be written acknowledging Rita Irwin's essay "Communities of A/r/tographic Practice" and Allan Kaprow's essay "Manifesto." Using the pre and post surveys, I will track the subjects' creative growth after each collaborative experience. These results will determine how collaboration in the visual arts impacts creativity. Further outcomes may demonstrate how this creative evolution is mutually beneficial to both the facilitators and the participants of a collaboration. This valuable data will inform my future creative endeavors, and further establish the significance of collaborative art in the visual arts community.

Modeling Mandarin Loanword Adaptation of English Null Onset Personal Names

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Sponsor: Dr. Hongchen Wu

English proper nouns, such as personal names, must undergo a complex adaptation process when loaned into a tonal language like Mandarin Chinese. The present study performs a corpus analysis of borrowed English null-onset personal names, identifying the factors that contribute most significantly and broadly to the Mandarin loanword adaptation process and modeling it computationally. We collected English null-onset personal names from open-access sources, verified them using CMU Pronouncing Dictionary and Oxford Dictionaries API, and cross-validated their Mandarin counterparts with input from seven machine translation tools. The final dataset contains 908 English names, their Mandarin translations, and phonological features such as vowel/consonant qualities and stress. We calculated frequency and conditional probability statistics over the dataset for each English onset IPA, each Mandarin onset Chinese character (Hanzi), and each Mandarin onset tone. The full model is an ensemble of scikit-learn Decision Tree Classifiers, which was chosen for their ability to model the cognitive translation process. These classifiers predict the onset neither directly nor indirectly by predicting the onset Hanzi. Through iterative improvement, the model achieved an accuracy of 79%. The full model consists of 7 Onset Hanzi trees optimized for 13 Hanzi with around/over 75% precision. Conditional frequencies are the most important features, used in most decisions, followed by stress and some vowel qualities. Alongside our findings, we acknowledge the limitations of our study and plan to improve the work by (i) incorporating a more thorough human evaluation of the data and (ii) expanding the dataset, considering the historically varying loaning methods, and (iii) enhancing the model by emphasizing phonological features, including distinctive features and established phonological adaptation trends. The foundation laid in the current work also makes the model applicable to languages beyond Mandarin Chinese, offering an opportunity to unveil broader insights into loanword adaptation and phonological perception across a multitude of languages.

Myoglobin Non-Native Biocatalysis in Deep Eutectic Solvents

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Chemistry

Valdosta State University
Sponsor: Dr. Gopeekrishnan Sreenilayam

In recent years, Deep Eutectic Solvents (DESs) have proven to be safe and effective solvents in various enzymatic reactions, but no data has been collected regarding these designer solvents' viability in myoglobin-catalyzed organic reactions. DESs are sustainable, tunable solvents formed from a mixture of a hydrogen bond acceptor, typically a quaternary ammonium salt, and a hydrogen bond donor. Once formed, the resulting solvent has many favorable properties like low volatility, low flammability, a wide liquid state, low toxicity, ease of preparation, cost-effectiveness, and partial biodegradability. Due to these positive attributes, we are exploring DESs as an option for myoglobin biocatalysis. Biocatalysis employs enzymes to efficiently complete complex organic reactions under mild reaction conditions. Biocatalysis is a renewable and economical process with high regio-, chemo-, and stereo-selectivity, and it has many industrial and pharmaceutical applications. For this experiment, mutant Sperm Whale Myoglobin (MbH64V, V68A) will be used to facilitate two reactions: cyclopropanation with ethyl diazoacetate (EDA) and styrene and a C-N bond formation using EDA and aniline. Each reaction will be performed in 5 different DESs under aerobic and anaerobic conditions and analyzed using gas chromatography. Both aerobic and anaerobic conditions will be studied because myoglobin's active site contains an oxygen-storing Heme group, and the presence of atmospheric oxygen may limit the enzyme's ability to perform the desired reaction. The aim of this experiment is to find out if myoglobin-catalyzed reactions are possible in DESs and comparable or superior to aqueous solutions in aerobic and anaerobic environments.

Physics-Informed Machine Learning-Enabled Digital Twin Implementation for Power Electronic Converters

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Sponsor: Dr. Masoud Davari, ACUE, SM IEEE

This project presents the development of a synergetic system that incorporates machine learning techniques and digital twin technologies for parameter estimation in a power electronic converter, being demonstrated through a case study on a DC-DC buck converter. In the context of ever-evolving power systems, it is crucial to enable the possibility of effectively monitoring the condition and lifespan of a power system. One of the tools that facilitates the process of condition monitoring is that of a digital twin, which can be seen as the virtual replica of a real-world system running in parallel to its physical counterpart. However, creating a digital twin for a power system may pose challenges computationally and practically, as replicating a power system would require an array of sensors actively measuring the outputs of components within the circuit over time, given that component degradation is an inevitable occurrence that causes deviations in expected system outputs. Our approach to this problem was the implementation of Physics-Informed Machine Learning. This deep neural network combines traditional data predictions with the physical constraints of the power system; the dynamic model of the buck converter defines these constraints. The model predicts parameter values based on the inputs and outputs of the power converter and relays these predictions to reparametrize the digital twin to emulate the physical model's behavior successfully. Based on an offline simulated buck converter model, the neural network predicted the system's parameters with 99.4% accuracy. This neural network architecture will then be implemented on the DT platform NI CompactRIO to verify results in real-time parameter estimation. By combining the capabilities of digital twins and neural networks, we aim to improve the robustness of power systems in the future.

Optimization in Advanced Laser Materials: A Control Theoretical Approach

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Electrical and Computer Engineering

Mercer University
Sponsor: Dr. Makhin Thitsa

As AI and automation have revolutionized many industries, control algorithms have emerged as key enabling technologies in the production of laser materials. Control theory is a theoretical tool used in designing controllers for various dynamical systems, which can be represented as a system of coupled differential equations. This research aims to develop highly reliable feedback algorithms for 2.8 micrometer Q-switched laser of Erbium-doped YLF laser material. Pulsed laser of this wavelength is of high interest to industrial applications such as material processing and spectroscopy as well as medical and environmental applications. We utilize the well-established rate equation models from literature to mathematically derive the feedback control law. Since the dynamics of the Q-switched lasers are generally highly nonlinear, our approach draws from advanced nonlinear control theory. The Q-switched laser is considered the output of the system and the pump rate, the input to the system. The system as well as our proposed controller is simulated and tested in MATLAB. Both theoretical results and the results of numerical experiments will be presented.

Parasites Impacts on Largemouth Bass (Micropterus salmoides) Size and Age Structure in a Small Coastal Plain Impoundment

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Agriculture and Natural Resources

Abraham Baldwin Agricultural College
Sponsor: Dr. Wally Woods III

Due to growing angling efforts targeting largemouth bass (Micropterus salmoides), state and federal agencies along with private landowners want more angling opportunities. This study identified the impact of parasites (Contracaecum spp.) on the growth and age structure of largemouth bass in a small coastal plain impoundment. This research was conducted at Abraham Baldwin Agricultural College's private school forest, the John W. and Margaret Jones Langdale Forest. The study area, Allen Lake, is in Tift County, Georgia and is roughly 15 acres impoundment. Largemouth bass were collected via electrofishing and hook and line sampling. Each largemouth bass was measured and weighed at the time of capture in order to calculate relative weights. Otolith extraction and parasite load counts were also conducted onsite. Otoliths were then read in a lab setting with the help of a Georgia Department of Natural Resources professional. All data was entered into a computer program for quantification. Relative weight yielded an average of 82.1 % among the largemouth bass sampled. Parasite load counts yielded an average of 96.9 parasites per fish (± 20.7) and increased with the overall body size of an individual fish. Fish ages ranged from 1 to 5 years old. Maximum length of individuals sampled did not exceed 319mm and maximum weight did not exceed 366g. Relative weight did not change among age and remained poor, below the targeted 95% relative weight for a healthy largemouth bass. The parasites effect the largemouth bass' energy availability resulting in less-than-ideal spawn fecundity and fat content. Removal of largemouth bass with relative weights below 95% should be implemented as well as a liming and fertilizing regime. Redear Sunfish populations and relative weights should also be closely monitored due to their diet consisting of the intermediate host for the parasite.

Pheromone in Nematodes that Supports them in the Presence of Ultraviolet Light

Taylor Hodges
Biology

Fort Valley State University
Sponsor: Dr. David Shapiro-Ilan

Entomopathogenic nematodes (EPNs) can be highly effective biocontrol agents, but their efficacy can be reduced due to exposure to environmental stress such as from desiccation, temperature extremes, and ultraviolet radiation (UV). A pheromone is a chemical substance that releases into the environment as a signal. Signaler pheromones are mainly social chemo signals: they provide information on the hierarchy and the animal's place in it, and on the type of food recently consumed by other animals and thus the nearby availability of food. When using the pheromone which was provided by Pheronym Inc., it will show if there was effect on the number of nematodes that are living vs non-living after being exposed to ultraviolet light. Some of the findings could be the longer you use ultraviolet light the more of effect on the number of nematodes that are left living vs non-living. We can also find out in the future if this experiment will work if farmers were to use it on their crops. Some of the methods that we used for this research was the growing process of nematodes, the experimental Setup, and an ultraviolet light stress experiment. Our results showed that there were no significant differences between non-ultraviolet light for the 20 min treatments with pheromone and non-pheromone treatment with non-ultraviolet light. There were some significant differences with the 30 min treatments using pheromone and non-pheromone. Our p value showed that we had a lower number of dead nematodes. The results found match the hypothesis because it showed that using ultraviolet light for 30 mins it caused about a 30% death rate. There was 30% death rate that was found in the nematodes when using pheromone and ultraviolet radiation (UV). There was a 70% death rate when there was no pheromone or ultraviolet radiation (UV). The results that could be used for further research would be to use the solution on a set of crops and see how it would affect the process of growing because farms could potentially use this as a natural pesticide on your crops.

Photochemical Study of Vitamin D Field in Supramolecular Host Systems

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Chemistry

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Sponsor: Dr. Shipra Gupta

Vitamin D plays a central role in bone health and is an active component in many medical conditions, like inflammatory response, cell growth, glucose metabolism, etc. 1 Most recently its deficiency has been connected to clinical depression. 2 Vitamin D is usually synthesized upon exposure of Vitamin D precursor located under our skin, to sunlight. 3 For various reasons, the biological production of Vitamin D is not sufficient and oral dose of Vitamin D is prescribed to overcome the deficiency. Current industrial yield of vitamin D is less than 20%.4 These reactions are mechanistically extremely complex when carried out in regular organic solvents, and hence has been extensively investigated over past century. 5 Synthesis of Vitamin D from Pro-vitamin D, with Pre-vitamin D as an intermediate, have been achieved in organic solvent as well as in a frozen organic solvent. 5 These reactions often result in byproducts such as tachysterol, lumisterol, and toxisterol. The central idea behind this research project is to study the effect of water-soluble host in increasing the percentage yield and product selectivity of Vitamin D. In this regard, we have used Palladium Nanocage (PdNC) 6 as the water-soluble host. We have synthesized PdNC with previously published methods and studied its complexation with the guest Provitamin D. We aim to carry irradiation of the complex, extract the product/s and study the reaction kinetics to shed more light on the reaction pathway in the host-guest complex.

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Polynomial Codes over Finite Fields: BCH Codes

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At the core of all technological function is the task of relaying information from one location to another. It follows that efficient methods of accurately relaying that information are of the utmost importance. In the field of algebraic coding theory, these methods are called codes, and they are often generated from modern algebraic structures in order to embed error detection and correction capabilities. This project explores codes generated from polynomials over finite fields, in particular the Bose–Chaudhuri–Hocquenghem (BCH) codes. BCH codes are particularly important because they have the capability to correct multiple errors while still being relatively easy to decode, resulting in an increase in accuracy without a costly decrease in efficiency in systems that utilize them.

Post-hatching Development of the Male Reproductive Tract in Eastern Fence Lizards (Sceloporus undulatus)

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Biology and Environmental Sciences

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Sponsor: Dr. Matthew R. Milnes

The mesonephric kidney and duct are the embryonic structures that give rise to the excurrent spermatic ducts of the male reproductive tract in amniotes. More specifically, the mesonephric kidney tubules differentiate to become the efferent ducts, which receive sperm from the testes. The mesonephric duct gives rise to the epididymal duct and ductus deferens, which are involved in sperm storage and transport during mating. Descriptive studies of mammalian and chick development have revealed that differentiation of the mesonephric kidneys and ducts to male reproductive tract occurs during embryonic or early neonatal development, but few studies have examined the development and differentiation of the excurrent spermatic ducts in reptiles. In this study we describe the differentiation of the epididymis and ductus deferens in male Eastern Fence Lizards. Male lizards ranging from juvenile to adult were captured between February and November in the Oconee National Forest, GA, USA over a span of three years. The reproductive tracts were photographed at 1-5X magnification for gross anatomical observation and measurements. The left reproductive tracts were removed, sectioned, and stained with Masson's trichrome to study the microanatomical changes associated with maturation. In hatchlings up to ~38 mm snout-to-vent length (SVL), the mesonephric kidney and its associated duct are still present and show no signs of differentiation. As lizards mature, the mesonephros gradually condenses anteriorly as the mesonephric tubules give rise to efferent ducts and the mesonephric duct differentiates to epididymal duct and ductus deferens. Once lizards reach ~50 mm SVL, the epididymal duct has increased in diameter and length and is highly coiled in contrast to the relatively straight ductus deferens. Differentiation of the mesonephric kidneys and ducts occurs months after hatching; therefore, lizards may serve as a useful model for studying the genetic and hormonal control of development of the male amniote reproductive tract.

Proliferating and Differentiation of Primary Airway Epithelial Cells in an Air Liquid Interface (ALI) Culture Systems

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In respiratory diseases, epithelial cells which line airways are the first line of defense against bacteria, viral, and fungal infections. The airway epithelium is a pseudostratified columnar epithelium containing both ciliated in goblet cells. Studying this airway epithelia in vivo in these diseases are difficult to impossible. Utilizing an in vitro Air liquid interface (ALI) culture system in the laboratory, allows researchers to investigate the specific role of airway cells in their fully differentiated state into secretory and ciliated cells which reflect the mucociliary structure and function of differentiated epithelium as seen in vivo. The focus of this research project will be to successfully harvest, proliferate, and differentiate primary ferret and murine airway epithelial cells utilizing the ALI culture system. Specific aim #1 in this study will investigate the effects of passage of primary airway epithelial cells on transepithelial electrical resistance (TEER). Specific aim #2 will investigate the effects of passage on cellular differentiation. Cellular differentiation will be determined histologically by the presence or absence of a pseudostratified columnar epithelium containing both goblet cells and cilia. In this study primary cells harvested from laboratory animals will be expanded and passaged in T75 culture flasks for four passages (P2, P3, P4, P5). Each passage will then be differentiated in transwell culture inserts utilizing the ALI culture system. TEER data will be collected using an EVOM3 Epithelial Volt/Ohm Meter (World Precision Instruments, Sarasota FL, USA) for each passage. To determine cellular differentiation, passage samples will be fixed with 4% paraformaldehyde in phosphate buffered saline (PBS). Immunofluorescence staining and confocal microscopy will determine the goblet and cilia. cell populations.

"Proud to be Autistic": Greta Thunberg's Queering Rhetorical Genre in Climate Change Advocacy

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English

Oxford/Emory
Sponsor: Gwendolynne Reid

Greta Thunberg, a young, autistic climate change activist from Sweden, has generated mixed opinions about her rhetoric since her #FridaysForFuture climate movement starting in 2018. Many people have found her inspiring, leading global youth to protest political inaction about climate change. Many autistic people have also found power in Thunberg's fearless identification as autistic. However, there are people who stand strongly against her rhetoric and her autistic identity. Michael Knowles, podcast host from the Daily News, comments on Thunberg that she is "mentally ill", and former U.S. president Donald Trump tweets that Thunberg should enhance her "Anger Management". Previous literature has analyzed Thunberg's rhetoric, partially explaining the controversy and power from her rhetoric, such as works from Frey (2021), Shcroeder (2021), and Bach (2022). Nevertheless, they don't pay sustained attention to the role of Thunberg's autistic identity in choosing her rhetorical strategies. To address this research gap, my research thus focuses on the role of Thunberg's autistic identity in making her rhetoric controversial yet powerful. I base my research on the framework of genre as social action pioneered by Carolyn Miller (1984) and queering rhetoric by Remi Yergeau (2018). I have found that by both conforming to and queering (altering conventions with the rhetorician's unique identity) the genre of epideictic political speeches, Thunberg redefines the exigence of immediate climate change action for the audience. In her political speeches, Thunberg distances herself from her immediate audience instead of creating identifications with them to create the exigence of immediate climate change action. My findings raise future research questions about how to accommodate neurodivergent students in classroom settings and how to better teach the concept of rhetorical genre. It also provides more opportunities for climate change advocacy, especially for neurodivergent rhetors, expanding climate change awareness to more corners of the world.

Queer Worldbuilding and Role Playing as a Form of Security

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Sponsor: Dr. Eric E. Solomon

In scholarship, we often overlook the significance and impact of world building. Oftentimes, this concept is more aptly interrogated in the fields of literature or media studies and usually in reference to fictional narrative. Seldom do we confront the concept of world building as a real-life process, one which demonstrates not only the power of communal effort and solidarity for large-scale change, but also the insidious ways in which systemic power imbalances become codified to the point of warping reality to de/construct the world so it favors particular beliefs and identities. In the highly generative and collaborative spaces of tabletop roleplaying games, world building is common practice, and I argue that the methods used in these spaces to imagine the possibilities of worlds different from ours can and should inform the ways that we interact with one another to construct communities that fundamentally value care, visibility, and mutual respect with the goal of creating a queer ontology that permits and encourages identity exploration and re/formation. Beyond the fantastical fun they can offer, these play spaces can function as training grounds for practicing consensus decision-making, inhabiting identities different from our own, reclaiming agency and autonomy over the ways our stories are told, and more, all in safe environments where each voice is acknowledged and respected. In this presentation, taken from my honors thesis project, I explore all the ways in which tabletop roleplaying games offer individuals an opportunity to come together and dream of worlds they want to exist in and where they have the power to change the narratives and systems that harm them, both in the imagined space of the game and the real-world context in which it is situated. My project incorporates theories from prominent feminist thinkers as well as non-academic intellectuals to tangibly demonstrate how we can build better worlds, together.

Reducing Escherichia coli on Pecan Halves

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Essential oils (EOs) have been found to be effective in reducing pathogens including Escherichia coli (E. coli) on food surfaces. In this study, we evaluated the efficacy of clove bud EO against E. coli on pecan surface. Pecan halves were first inoculated with ≈ 6.0 log CFU/g of E. coli (ATCC 8739) culture and air dried for 30 min at room temperature in a biosafety cabinet. The samples were then treated with different concentrations of EO (1%, 1.5%, and 2 %, v/w) for 1, 3, and 5 min. Each pecan half was then homogenized in 10 mL of 0.1% sterile peptone water and serial dilutions were spread on Tryptic Soy Agar plates. Plates were incubated at 37 °C for ~18 h and colonies were counted, and log values were calculated. The ANOVA procedures of SAS were used to determine significant differences in the values among treatment times and concentrations. Clove bud EO concentration and treatment time had significant effect on the E. coli reduction ($p < 0.05$). The log reduction of E. coli increased with the increase in concentration and treatment time. At 5 min of treatment with 2% EO, the populations of E. coli were reduced by 2.93 log10 CFU/g (≈ 99.9%). While the result of this study suggests that EO can be effective in reducing E. coli on pecan halves, further research is required to evaluate the quality characteristics of treated nuts. The use of EOs may contribute to establishing improved practices for enhancing food safety measures in the pecan industry.

Role of FGF2 mRNA 5' UTR in Cap-independent Translation Initiation

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The FGF2 gene encodes the basic fibroblast growth factor which controls cellular growth, proliferation, and cell signaling. Under normal conditions, FGF2 mRNA is translated via cap-dependent translation. However, under certain stress conditions, an internal ribosomal entry site (IRES) reportedly bypasses typical regulation switching to cap-independent translation. Cancer cells overexpress FGF2 ultimately leading to tumor growth. Mechanistically, the reported switch from cap-dependent to cap-independent translation remains poorly described. In order to understand the regulation of the FGF2 IRES under cellular stress conditions, we investigate the secondary structure using the SHAPE-MaP chemical probing strategy under different chemically-induced stress factors. Here we describe our experimental strategy and present a secondary structure model of the FGF2 mRNA 5′ UTR built using gently extracted total RNA from the A549 human lung carcinoma cell line. We observe a complex arrangement of nucleotides throughout the targeted region (nucleotides 2-426). We compare the cell-free SHAPE reactivity profile with reactivity data from live cells using reagents 5NIA. Prior studies show that FGF2 uses four upstream CUG start codons which are activated in transformed and stressed cells. We present our initial reports on stress-induced cells, where we compare SHAPE profiles to identify the effect of stresses such as hypoxia, nutrient starvation, and heat shock. We aim to elucidate structural mechanisms corresponding to the effects of stress on FGF2 translation control. Lastly, we describe a workflow for future experiments involving DMS-MaP, a strategy for direct nucleotide base-pairing analysis, and RNP-MaP, an RNA-protein interactomics strategy to study the influence of IRES-transacting factors under stress conditions.

Sims:
In His Own Backyard

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Through direct examination of the work of Dr. James Marion Sims and his subsequent contributions to modern gynecology, I will discuss his impact and how his practices directly altered the ethics of human experimentation and the principles of patient care. My sources include the direct notes and work published by Dr. Sims including his books, clinical notes, medical journals, and published papers and opinions regarding the field of gynecology. His treatment of the Vesco-vaginal fistula and advancements in the field included the development of the Sims position to allow for easier access to the patient's internal organs, the first vaginal speculum device, antiseptic silver sutures to aid in surgical healing and prevention of infection, and expansive knowledge in the field of surgical anesthesia. Sim's medical practices have come under fire over the last two decades for questionable ethical practices regarding his medical experimentation on enslaved women without anesthesia or pain management medications and in direct violation of his victim's bodily autonomy under current medical ethics. My research includes a direct examination of Sim's notes concerning his treatment of his patients within his field hospital located in his own backyard of his Alabama home to discuss if his practices aligned with those of his time or if he violated medical standards in his treatment of the enslaved women under his care.

Simulating Interactions with Lunar Rocks

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Sponsor: Dr. Phillip C. Stancil

The moon, like all air-less bodies, is exposed to the harshness of the environment of space. The surface is bombarded by solar wind ions, cosmic rays, Ultraviolet, and X-ray radiation, which interact with the soil in a process referred to as space weathering. Further studies have found that micrometeorite impacts affect the moon's soil, and by studying micrometeorite interactions, we can learn about the early conditions and processes in the solar system's history. Knowing about the dynamics of the moon's regolith leads to a better understanding of the complex mineralogy on the moon. The purpose of this research is to simulate the lunar regolith and explore the dynamics of interacting particles. One of the main constituents of lunar rocks is the mineral forsterite *(Mg2Sio4*). We apply the public-domain $Mg2SiO4$.software package Large-scale Atomic/Molecular Massively Parallel Simulator (LAMMPS) to simulate a lunar rock and its interactions at its surface. A crystal slab of forsterite is created with the packages Vesta and Moltemplate. Classical trajectory calculations are performed with LAMMPS to relax the slab into an amorphous state. LAMMPS is then used to simulate particle collisions with the forsterite slab. Ultimately, we plan to study both solar wind proton and micrometeorite collisions, which are proposed as mechanisms for the production of water in the lunar regolith. The tool VMD is used to visualize time-dependent interactions.

So, Who's Bringing the Potato Salad?: Digesting the Black American Thanksgiving Table

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Thanksgiving is a celebratory feast steeped in tradition, culture, and a rich culinary heritage. In the Southern United States, Thanksgiving is more than just a meal; it's a time-honored gathering that brings families and communities together. Drawing upon a history that spans from the time of slavery, Black American Thanksgiving food traditions draw upon African influences and create a distinctive and soulful feast. Side dishes, namely potato salad, collard greens, mac and cheese, and cornbread, play a crucial role in Black American Thanksgiving meals. Sweet potatoes take center stage, with candied yams and sweet potato pie both serving as sweet and comforting delights, showcasing the mastery of Black bakers and their ability to transform simple ingredients into culinary masterpieces. Beyond the food itself, Black American Thanksgiving traditions reflect the importance of family and community and are a testament to the resilience and strength of Black American culture

Sky-High Spartina:
Atypical Growth due to the Noyes Cut within the Satilla River Estuary

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Biological Sciences

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Estuaries support a unique array of plant life due to their brackish water and soil composition. A common example of an estuarine-adapted plant is Spartina alterniflora, found throughout the Satilla River Estuary in southeast Georgia. Since 1910, the Noyes Cut has altered the water flow within the Satilla. With the disrupted water flow, sediment deposit patterns and metal accumulation have also changed, and a tidal node has formed at the Piney Bluff site downstream of Noyes Cut. Now, Piney Bluff and sites adjacent to Noyes Cut exhibit towering Spartina. From June 2014-2018, multiple sites throughout the Satilla River Estuary were surveyed monthly using 0.8m2 circular quadrats every 6m within the sites to record Spartina density, shoot height, and species richness. From 2016-2017, sites closest to the Noyes Cut (Piney Bluff, Parsons Creek, and Noyes Cut itself) exhibited Spartina with greater average heights compared to the control site, Todd Creek. Spartina was especially tall at the Noyes Cut and Piney Bluff sites compared to Todd Creek. However, Todd Creek exhibited the largest average density of Spartina when compared to all other sites. Throughout 2017, Parsons Creek had the greatest species richness with five different species observed. Overall, due to the Noyes Cut causing altered water flow - thus, altered soil and metal deposits - it was expected that average Spartina alterniflora heights would be greatest at sites closest to the cut (Noyes Cut and Piney Bluff). This prediction was supported by the data analyzed. Obsolete channels adjacent to Noyes Cut will be closed in January 2023, and will undoubtedly change the plant composition at these sites.

Social Media use and Mental Health during the Pandemic

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Sponsor: Dr. Tsu-Ming Chiang

The COVID-19 pandemic has disrupted the lives of people worldwide. It halted life into a sudden pause. College students were told to go home after campuses and residence halls abruptly closed. Many of whom were isolated for a long time away from their friends and families and thereafter. The use of media consumption began to rise rapidly. College students started seeking ways to cope with their anxiety, stress, and loneliness through online social communities. They often sought out various types of media-based coping. As a result, it impacted their anxiety and stress, in positive or negative ways, depending on the type of media they chose to consume (Eden et. al., 2020). Although it has been utilized for coping with negative emotions, media dependence and overuse have been linked with worsened mental health and have influenced college belongingness and psychological adjustment (Arslan et. al., 2022). Following a few years of the pandemic, this study aims to examine whether the relationship between the use of social media and feelings of anxiety, depression, and loneliness in college students has improved. A college life survey continues to collect data in different periods during the pandemic to examine factors contributing to college students' mental health. The current study explores the implications of social media use in college students' mental and physical health. The researchers are interested in learning whether social media use is related to feelings of loneliness, depression, and anxiety. We expect to find that more use of social media is associated with poor mental and physical health. Detailed results and their implications will be shared and discussed at the conference.

Spectators on the Venus Pudica

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Art and Women's Studies

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Sponsor: Sunita Manian

Female nudity in art has been around since figurative art began, but scholars generally view it as being for the male gaze and judgement. One of the best examples of the male gaze being prioritized when viewing female figures in art is the scholarship on the art of the goddess Venus. The pose she is always shown in is the Venus Pudica pose. Venus is shown here as covering her breasts with one arm and her pubis with the other. Most scholarship on the pose says that she is covering herself out of embarrassment and modesty. However, this claim that she is embarrassed makes little sense when taking into account her status as the divine goddess of sex and beauty. An argument can be made that the pieces of art featuring the pose were made not for men, but for the goddess's female worshipers. Multiple scholarly sources help provide evidence that female worshipers were the target audience for these pieces. Looking at the purpose and audience of these ancient works of art can help us better understand the roles of women in the civilizations in which they were made. Analyzing the pose that led to a legacy of art in many different contexts can also help us understand how women are seen and represented in art throughout the western art canon.

Standardized Tobacco Assessment of Retail Settings (STARS) in Urban Georgia

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INTRODUCTION: Conducting a Windshield Assessment is a critical component in identifying and addressing community needs around tobacco-related health outcomes.

METHODS: The standardized tobacco assessment for retail settings (STARS) surveillance tool was conducted on a random sample of active tobacco retailer to evaluate both interior and exterior marketing of tobacco products in an urban setting in Georgia. Specific criteria evaluated included visibility of products, display of graphic health warning signs, proximity to other non-tobacco related products, price promotions, type of products and pricing. Using Qualtrics, the 36 item STARS survey was administered and data exported to an Excel analysis template to produce graphs and figures.

RESULTS: A total 64 (31%) out of 195 tobacco retailers ranging from convenience stores, general merchandize stores to full-service grocery stores were surveyed. More than half (59%) of retailers evaluated did not display graphic health warnings for tobacco related products. The cheapest reported cigarette cost $4.35 prior to sales tax, and $4.70 after sales tax. The majority (81.3%) have a cheaper option of cigarettes for customers to choose from. Inappropriate advertisement included advertisement of tobacco products within 3 feet of the floor and/or within 12 inches of toys, candy, gum, slushy/soda machines or ice cream. 1 in 10 retailers had tobacco products within 12 inches of toys, candy, gum, slushy/soda machines or ice cream and 14.1% had E-cigarette ads within 3 feet of the floor. Two-thirds of retailers advertise price promotions and sold cigarillos as singles for less than $1.00. Most retailers (89%) sold Menthol cigarettes of which 50% had visible price promotions inside or outside the store.

CONCLUSION: The windshield assessment results suggest the need to address issues with access, marketing, and sale of tobacco related products. Targeted interventions aimed at compliance and education may reduce tobacco use and related health outcomes and disparities.

Stress-induced Changes in 5' end Regulatory Structures of the TP53 mRNA

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Tumor suppressor TP53 is responsible for multiple regulatory functions including DNA repair, apoptosis, and cell cycle control. Loss-of-function mutations of the TP53 gene have been found in about 50% of all human cancers. Expression of the TP53 gene is regulated using highly diverse mechanisms with 13 known isoforms. Interestingly, the TP53 mRNA reportedly uses internal ribosome entry site (IRES)-mediated translation under cellular stress. Previous studies have implicated the role of structurally stable motifs in the 5′ untranslated region for mediating cap-independent translation. We present a secondary structure model of the TP53 5′ regulatory region. This region includes an alternate downstream start codon. Our model, based on SHAPE-MaP data from gently extracted total RNA of the A549 human lung carcinoma cell line using 5-nitroisatoic anhydride (5NIA), confirms previously observed secondary structure motifs. We then apply 5NIA to probe RNA in-cell to detect changes in SHAPE reactivity in live cells and compare reactivities with the cell-free model. We observe that the IRES-related motifs remain stable in unstressed live cells. Next, we treat cells with etoposide, an oncogenic stress inducer. Our initial studies detect measurable changes in SHAPE reactivity in a short stem-loop motif downstream of the standard AUG start codon. Prior reports indicate the role of IRES-transacting factors (ITAFs) including Hdm2 interacting with this mRNA region, and in certain cases correlating with the translation of an N-terminal truncated TP53. We outline future directions investigating the TP53 mRNA structure under different stress conditions, and also aim to identify changes in ITAF-interaction sites using RNP-MaP.

Student Behavior Issues and their Impact on the Learning Environment

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Sponsor: Forrest R. Parker III

In an era marked by rising concerns about student behavior issues and their impact on the learning environment, this presentation delves into the promising realm of outdoor classrooms as a novel and effective strategy to address these challenges. Drawing upon a growing body of research and practical experiences, we explore how outdoor classrooms offer a unique and dynamic setting that can positively influence the behavior of students, particularly those struggling with behavioral issues.

This presentation will begin by outlining the prevalence and consequences of behavior issues in today's educational settings. It will then transition into an in-depth analysis of the key benefits that outdoor classrooms can provide for students, teachers, and schools as a whole. From improved focus and reduced stress to enhanced social skills and heightened engagement, we will uncover the multitude of ways in which nature-based learning environments contribute to fostering positive behavior.

Furthermore, we will discuss the practical aspects of implementing outdoor classrooms, offering insights into design considerations, safety measures, and curriculum integration. Real-world case studies will be presented to highlight successful examples of schools that have leveraged outdoor classrooms to effectively address behavior issues and create inclusive, nurturing learning environments.

By the end of this presentation, attendees will gain a comprehensive understanding of the potential of outdoor classrooms in transforming the educational experience and positively impacting the behavior of students. We will also address potential challenges and provide strategies for overcoming them, ensuring that educators and administrators leave with actionable insights to consider when contemplating the integration of outdoor classrooms into their own educational environments. Join us in this exploration of how the natural world can be harnessed to inspire positive behavioral change in our students and promote a more harmonious and productive learning atmosphere.

Synthesis and Characterization of Mellitic Synthesis and Characterization of Mellitic Triimiide Based Covalent Organic Frameworks

Megan Brenner
Chemistry

Columbus State University
Sponsor: Dr. Daniel W. Holley

As global warming becomes an increasing issue, scientists are creating and testing new and innovative ways to help the problem. Carbon-capturing polymers can be used to reduce and limit the harmful carbon gases being released into the atmosphere. Based on structure, organic frameworks have shown promise to capture carbon. In this work, novel triimide polymers are synthesized by heating insoluble organic salts of mellitic acid and various bi and tri-functional amines. Qualitative analysis using infrared spectroscopy has proven the polyimide material has been made in the process. Quantitative data about CO2 uptake capacity was also measured and correlated to the particle morphology and chemical structure.

Synthetic Studies to a Novel Pyrimidodiazopino-Based Anti-Folate as Potential Anti-Cancer Drug

Abigail Wester
Chemistry

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

Glycinamide ribonucleotide formyltransferase (GARFT) catalyzes the reaction between 10-formyl-5,6,7,8-tetrahydrofolic acid and glycinamide ribionucleotide (GAR) to give N-formylglycinamide 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. Thymidylate synthase (TS) catalyzes the reaction between 2'-deoxyuridine 5'-phosphate and 5,10-methylene tetrahydrofolate to give thymidine 5'-phosphate which is another building block for DNA. Consequently, both of the above folate requiring enzymes are attractive biochemical target sites 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/or TS 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 an intramolecular nucleophilic aromatic substitution and the formation of an amide via palladium catalyzed carbon monoxide insertion in the presence of an amine, as key steps in our synthetic strategy. The latter step has been problematic thus far and we report on how we are attempting to overcome this hurdle.

The Advance of Autonomous Self-Driving Vehicles

Grant Lopez
Computer Science

Valdosta State University
Sponsor: Dr. Chunlei Liu

With the growth in new technology, it is vital to recognize the potential as well as the issues with the advancements in autonomous self-driving vehicles. Refinement in technology has led to the improvement in safety and change in the system of travel within the United States as a whole. The government and populace have influenced what the future holds for a country by building up a complex yet universal system of travel that would virtually eliminate accidents and promote new standards of living in the United States and even the world.

The Connection between Chronic Kidney Disease (CKD) and Food Insecurity: Georgia v. Alabama

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Sponsor: Dr. Ellis Logan

Globally, Chronic Kidney Disease (CKD) is an increasingly prominent health issue, impacting approximately 37 million Americans. CKD is characterized by five stages where the glomerular filtration rate progressively decreases due to damage. The three primary physiological functions of the kidney include waste removal, blood pressure regulation, and maintenance of pH levels. Adverse impacts include hypertension, uremia, etc. Those at an increased risk of developing CKD are minorities and individuals with pre-existing health conditions. The development of CKD can be linked to socioeconomic status (SES) and food insecurity. Food insecurity is defined as the disruption of eating patterns due to insufficient funds or resources for food. About 34 million people in the US experience food insecurity. Due to the 2019 Coronavirus Pandemic, there was an increase in those who experienced food insecurity. Those who experience food insecurity tend to also have a lower SES. Aside from SES, there are notable trends between factors such as education level, race, age, gender, and geographical location. It is hypothesized that food insecurity may play a significant role in developing chronic kidney disease. The methodology includes using secondary data from sources such as the Centers of Disease Control and Prevention (CDC), Feeding America, and other viable sources. Specifically, the CDC will be used to assess county-level data via the Kidney Disease Surveillance System. The purpose is to identify a potentially significant contributor to the disease and raise awareness, aiding in the fight against CKD.

The Construction and Functions of Value Arguments in Scientific Literature of the SARS and COVID-10 Pandemics

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English

Oxford/Emory
Sponsor: Dr. Gwendolynne Reid

The scientific community is a unique rhetorical ecosystem which has been a longtime subject of rhetorical analysis. Scientists act as speakers by communicating their findings, as audience by judging the validity of new research published in journals, and as teachers by training students to write in ways considered acceptable by the larger field (Overington, 1977). Several scholars have investigated the ways scientists establish the value of their work through writing and argue for its inclusion in the body of knowledge accepted by the community. In particular, Fahnestock and Secor (1988) studied the uses of the stases, a technique in which rhetors focus their argument on a particular topic or question. Carter (2016; 2021) continued this work, defining three classes and seven functions of value arguments in the introductions of scientific papers and comparing the rhetorical moves favored by authors in a sample of publications in various fields and journals. This research investigates the effects of public crises on scientists' rhetorical strategies in the introductions of published papers. Value arguments in fifteen published papers each from scientific literature published during the SARS and COVID-19 pandemics were classified and compared to those analyzed by Carter (2021). Though both corpuses rely mainly on implicit value arguments, which connect the subject to a topic which is understood to be important, the pandemic literature uses more value arguments which situate the research topic within the larger crisis and rely on the audience's own understanding of the situation. In total, this investigation demonstrates continuity over a period of decades in scientists' rhetorical responses to crises and suggests that the nature of the rhetorical situation profoundly impacts scientific value arguments. These insights have the potential to further understanding of the ways scientific knowledge is constructed and improve the rhetorical education of novice and seasoned scientific writers alike.

The Copper-Sucrose Complex: A Unique Bioactive Excipient

Capri Persaud and Akshil Patel
Chemistry

Valdosta State University
Sponsor: Dr. Thomas Manning

An excipient is a chemical formulated with a medicinally active ingredient of a medication. In most cases they are incorporated into tablets. We have demonstrated that our unique excipient can increase the efficacy of cancer drugs, antibiotics and anti-viral medications in vitro, all independently tested at the National Institute of health (NIH). This presentation will focus on the unique chemical and physical properties this complex brings in terms of making the active medication more effective and on the process of turning data into a patent application. For antibiotics, it was tested against active and drug resistant strains of Mycobacterium tuberculous (Tb), against nine forms of cancer (breast, prostate, leukemia, renal, ovarium, CNS, melanoma, non-small cell lung cancer, colon) and two POX viruses (Cowpox and smallpox).

The Florida Panhandle: Costal Property Values

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Economics

Valdosta State University

The North Florida real estate market has seen record-high sale prices in the last couple of years. The purpose of this research is to analyze the relationship between property values and water-influenced properties in the Florida panhandle. In the year 2022, MLS data from eight counties spanning the northwest Florida coastline are studied to determine the market impact the water has on sale prices. Water influences include a residential property's water frontage and view type, which is broken down into 3 different subcategories: Gulf, Bay, and Canal/River. Of the eight counties in this region, there were a total of 12,313 sales or observations in the year 2022. The factors investigated in this study are the home's square footage, acreage, age of the home, the number of bedrooms in the home, the number of full bathrooms, the number of half bathrooms, and then the three categories of water influences. Additionally, in this study individual cities' water influences are analyzed. For example, the median price of a Gulf front home in Destin is $5.9 million and the median price of a home with a Gulf view is $2.3 million. The median sale price of a bay-front home is $1.6 million, and the median price of a home with a bay view is $1.2 million. Finally, homes on a canal in Destin are valued at $1.1 million. The data shows that in the Destin market, half the value of Gulf-influenced sales is dependent on if the home is on water. Conversely, the sale prices of bay-front, bay-view, and canal-front properties are very similar. These characteristics of water-influenced properties vary across the panhandle and are important for real estate professionals to understand in these coastal markets.

The Impact of COVID-19 on Young Children's Social and Emotional Behaviors

Natalie Clark, Josie Stover, and Kate Domaleski

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

The impact of COVID-19 on young children's social-emotional development has significant mental health implications. Studies currently show mixed findings. Studies in children aged 3-8 revealed that schooling disruptions have led to negative parental mood, worse child behavior, and increased loss of temper (Gassman-Pines et al., 2022). Additionally, young children missed essential experiences early in life relating to social, emotional, and language development due to COVID-19, which correlated with worsened adult-child relationships in children under six years of age (Erwin & Frey, 2023). Other studies indicated that lack of socio-affective and physical stimuli emerge as two of the main concerns for children aged 3-12 after COVID-19. This is particularly true in socioeconomically deprived children (López-Bueno et al., 2021). However, a potential positive emotional effect was found on mental well-being for children 7-11 due to reduced academic stress and increased attention from caregivers (Larsen et al., 2022). However, it also indicated significant somatic and cognitive reactions, like problems with focus and sleep, and worry reactions, especially in older children. The strongest predictor for all child reactions was family stress and instability (Larsen et al., 2022). Other studies found no significant behavior effect in financially stable parents of 3–5-year-olds. These parents indicated no change in children's emotional problems, conduct disorders, or peer problems. However, hyperactivity and loneliness ratings were slightly elevated (Linnavalli & Kalland, 2021). The current project aims to examine COVID-19's impact on social-emotional behaviors in young children (ages 3-4). Teachers were asked to rate children's behaviors in the classroom. The data collected following COVID-19 will be used to compare with the data collected before 2020 to document the potential differences in social-emotional behaviors. Results will be shared at the conference.

The Impacts of Adenovirus E4 11K on RIG-I Activation and Type I Interferon Expression at Various Infection Timepoints

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Biological and Environmental Sciences

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Sponsor: Dr. Kasey Karen

Adenoviruses are double-stranded DNA viruses that cause common upper respiratory infections. Early viral proteins will generate an ideal environment to promote viral replication. An early viral protein, E4 11k, has multiple functions, including the redistribution of PML nuclear bodies and cytoplasmic p bodies, leading to a potential alteration of their functions. The cell will attempt to respond to viral infection through nucleic acid sensors, such as RIG-I, that will induce type I interferon transcription, which can lead to an inhibition of viral replication. Retinoic-acid inducible gene I (RIG-I) is a viral RNA sensor that activates a signaling cascade to stimulate a type I interferon response. DEAD-box helicase 6 (Ddx6) was recently shown to bind to RIG-I to enhance its functions. E4 11k has been shown to colocalize with and bind to Ddx6, causing Ddx6 to go into aggresomes. Influenza and EV71, single-stranded RNA viruses, have also been shown to interact with Ddx6, leading to the modulation of RIG-I. Therefore, we hypothesize that E4 11k is binding to Ddx6 to modulate RIG-I, leading to a decrease of expression of interferon-beta. Human cells were infected with an Ad 5 wildtype virus for 12, 24, 30, 36, and 48 hours, and qRT-PCR was performed to evaluate expression of RIG-I and interferon-beta. When the expression of RIG-I and interferon-beta was normalized to an internal control, we found that biphasic expression of both RIG-I and interferon-beta with peaks between 12 to 24 hours post infection (hpi) and then 36 hpi and decreases at 30 and 40 hpi. An experiment using two viral mutants that lack the expression of E4 11k, along with an expression vector that only expresses E4 11k, with the same infection time points used previously, is underway to demonstrate the role of E4 11k in the RIG-I-mediated type I interferon response.

Theoretical Study of the Interaction of Select Perfluorinated Alkyl Substances (PFAS) with Transcription Factor, Nuclear Factor Kappa β

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Natural and Computational Sciences

Fort Valley State University
Sponsor: Dr. Celia A. Dodd and Dr. Tiffani Holmes

Per or polyfluoroalkyl substances (PFAS) or "forever chemicals" are a group compounds that are used for their water-resistant properties. PFAS can be classified into short or long chain compounds, based on the number of carbons they contain. Concerns for the longer chain or legacy PFAS compounds stem from their accumulation in air, soil, and water due to slow degradation in the environment. Additionally, exposure to PFAS has been linked to significant health effects and recent evidence indicates they have the potential to be neurotoxic, with the largest effect on dopamine neurons. Multiple studies show PFAS disrupt cell homeostasis by increasing oxidative stress, however the mechanism by which this occurs remains unknown. In this theoretical study, we will use computational methods to examine the potential of three PFAS chemicals (Perflouorooctane sulfonic acid (PFOS), Perfluorooctanesulfonyl flouride (POSF), and Perfluorobutanoic acid (PFBA)) to interact with the transcription factor, Nuclear Factor Kappa β (NF-κβ), activation of which is important to regulation of oxidative stress and cell survival. Computational analysis included geometry optimization of PFOS, POSF, and PFBA via Avogadro using General Amber Force Field (GAFF), protein docking analysis using Autodock Vina with Pyrx graphical user interface, and analysis of protein ligand interactions with BIOVIA Discovery Studio Visualizer. Results indicate that long chain PFAS chemicals (PFOS and POSF) had both stronger binding affinities and potential intermolecular interactions with NF Kappa B, than the short chain, PFBA. This discovery adds to our understanding of PFAS's ability to increase oxidative stress leading to neurotoxicity of dopamine neurons.

The Relationship between Sexual Maturation, Body Size, and Season in Male Eastern Fence Lizards

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Biological and Environmental Sciences

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Sponsor: Dr. Matthew R. Milnes

Eastern Fence Lizards (*Sceloporus undulatus*) are widespread throughout the eastern third of the United States. Previous studies have noted geographic variation in growth rates and average body size of reproductively mature females. The amount of time it takes to mature influences the potential reproductive contribution of relatively short-lived species with high rates of mortality, such as Eastern Fence Lizards. In this study, we examined testis maturation in hatchling to young adult fence lizards. Our objective was to determine the minimum size at maturity and examine the relationship between the stage of spermatogenesis, body size, and time of year. We collected male lizards from the Oconee National Forest over a 3-year-period. The gonads and reproductive tracts were photographed in situ at 1–5x magnification for both quantitative and qualitative analysis at the gross anatomical level. The left testis was removed from each lizard, embedded in paraffin, and sectioned on a rotary microtome. After staining with either Masson's trichrome or hematoxylin and eosin, we staged each testis according to previously established criteria. Testicular stage was positively correlated with body size; however, maturation of the gonads is also influenced by the time of year. Lizards that reached approximately 50 mm snout-vent-length (SVL) or greater by the spring are likely capable of reproducing in their first year. Lizards less than 50 mm SVL by spring do not produce mature spermatozoa in their first year. Our results suggest that there is a complex relationship between sexual maturation and body size in this seasonal breeding species. Ongoing studies from our lab suggest that fence lizards in middle Georgia produce two clutches per year – one in early May and a second in early July. Future studies are warranted to determine whether the date of hatching is a strong predictor of maturation in the first year.

The Role of Adenovirus Protein E4 11k in P Body Protein Relocalization

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Adenovirus serotype 5 (Ad5) is a double-stranded DNA virus that can cause upper respiratory infections and conjunctivitis. One of the viral proteins, E4 11k, supports early viral infection by promoting late gene expression. E4 11k has been shown to disrupt cellular function by relocalizing processing body (p body) proteins to cytoplasmic aggresomes. Aggresomes are perinuclear formations that are sites of misfolded protein storage and only arise when there is cellular stress. The scaffolding p body protein, Ddx6, has been shown to colocalize with E4 11k in aggresomes during a wild-type Ad5 infection. Ddx6, however, was not relocalized to chemically induced (cadmium chloride-treated) aggresomes. This suggests that E4 11k is necessary for the relocalization of Ddx6. We observed the localization of additional p body proteins, Lsm1, Edc3, and Pat1b, in human lung carcinoma cells following wild-type Ad5 infection and cadmium chloride (CdCl2) treatment. Lsm1 and Edc3 were relocalized to both infection and chemically induced aggresomes. Pat1b, however, was not relocalized to either infection or chemically induced aggresomes. To further characterize the role of E4 11k in p body localization, we will infect with E4 11k only, L103A mutant, and D105A L106A mutant viruses and observe the localization of several p body proteins. Currently, the ability of L103A and D105A L106A mutant viruses to induce aggresome formation has not been studied. The L103A mutant cannot oligomerize but has the ability to dimerize. Using this mutant virus, we hope to determine if the oligomerization from E4 11k is required for aggresome formation. In addition, we want to observe the different p body proteins to determine if their localization during mutant virus infection is altered. The significance of this study is to understand better the dynamics of p body and aggresome formation in human cells.

The Roles of Government Policy and Media Imperialism on Small Film Market Sustainability, with Emphasis on the Caribbean

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University of Georgia
Sponsor: Dr. Kate Fortmueller

In today's global economy, many small film production markets fall subject to multinational corporations and conglomerates. Power relations between media conglomerates and governments play important roles in creating film policies and sustaining or dismantling small market film industries, especially in the Caribbean. Small film markets and workers contribute diverse global cultural perspectives, and research on these players promotes their overall success and longevity. Policy and media imperialism can hinder or propel cultural identity and education. This study compares Caribbean film production industries with their Latin American and United States competitors to highlight their inefficiencies. Major results reveal a large gap in infrastructure and market power between Caribbean small-market film industries and those of America or Latin America. United States media conglomerates make it harder for Caribbean film industries to produce authentically ethnic perspectives. Multinational media conglomerates can overshadow and wipe out non-Western and non-European small film markets. Therefore, this research underlines risks faced by the Caribbean in this atmosphere. Going forward, policy and investment recommendations will be made based on information acquired through interviews. Film policy in the Caribbean incentivizes co-productions, and in doing so favors foreign productions more than indigenous ones. There are currently no film policies that heavily support native filmmaking.

Thermoregulatory Nest Building in Eastern Blue Birds (Sialia sialis): The influence of Temperature on Avian Reproductive Strategies

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Sponsor: Dr. Katie Stumpf

Bird species have long served as invaluable indicators of ecosystem health due to their sensitivity to environmental changes. Global temperatures have been rising due to global warming and increasing temperatures have been linked to changes in behavioral and physiological processes, including timing and duration of the nesting cycle. For example, warmer temperatures may prolong the nest building process, or shorten or lengthen the incubation and/or nestling stages. The objective of this study is to examine the influence of temperature on the duration of nest building, incubation, and nestling stages in Eastern Bluebirds. Fifty nest boxes at Panola Mountain State Park in central Georgia were monitored from May 2023 to August 2023. Two temperature loggers were placed in each nest box, one inside and one underneath the box, to determine the internal and ambient temperature of each nest box. Data loggers recorded temperature every hour throughout the 2023 breeding season from May 1st to August 17th from 116 nests. In this study, we will see if average high or average low temperatures during each nest stage (nest building, incubation, nestling) is associated with the duration of each stage using logistic regression. By understanding the impact of climate change on avian populations, conservationists and ecologists can better anticipate and respond to the ecological consequences of global warming, ultimately enhancing the preservation and management of diverse ecosystems.

The use of Metaphors in the Care of Pediatric Sexual Abuse Survivors

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English and Healthcare

Oxford/Emory
Sponsor: Dr. Sarah Higinbotham

How can physicians use language and metaphor to help people who have been subjected to sexual abuse? As a pre-med student at Emory University's Oxford College, I conducted a case study to investigate the use of metaphors and metaphorical language in pediatric practice in the care for sexual abuse survivors. I interviewed three medical professionals with expertise in the care of pediatric sexual abuse survivors using a semi-structured format, incorporating open-ended discussion to collect qualitative data from their clinical experience. The medical professionals varied by geographic location as well as by practice setting. The case study suggests that metaphors and metaphorical tools may be useful in the pediatric sexual abuse practice setting. This case study could prompt more comprehensive studies, which manipulate variables and thus determine if these strategies can be employed in a more generalized population to allow the clinician to establish rapport, enable in-depth patient-physician conversations, and serve as a therapeutic aide. Language and metaphors humanize therapeutic care and survivors of sexual assault need sensitive, human compassion from their medical team. This case study highlights the need for larger and extensive studies to further research and to find more effective ways to personalize continued care for survivors and alleviate pain that accompanies trauma.

The Treatment of "Lunacy" at Central State Hospital: Myths verses Reality

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History and Philosophy

Georgia College and State University
Sponsor: Dr. Stephanie E. Jett

Milledgeville, Georgia is infamous for what is now known as Central State Hospital (CSH). Originally founded as the Georgia State Lunatic, Idiot, and Epileptic Asylum in 1842, it quickly became the largest in-patient mental health facility in the Southeast and, possibly, the country, boasting a campus covering over 20,000 acres (about the area of Manhattan) at its height. CSH has been mythologized both locally and throughout the state due, in part, to the high degree of misinformation surrounding the types of psychological interventions used at the facility. In its time, CSH was considered innovative in its approach to mental health treatment and its treatment of the patients in its care. However, many of those treatments utilized methods that would be considered minimally questionable and maximally barbaric through a modern lens, i.e., lobotomies, electroshock therapy, and something known as "moral therapy." Due to the prevalence of misconceptions and misunderstandings surrounding CSH and other facilities like it around the country, the shadow cast from the past has contributed to the stigma for seeking mental health care in modern times. In my research, I attempted to understand the logistics of pre-modern mental health facilities and the rationale doctors of the time utilized when making treatment choices. Separating fact from fiction and demystifying the mythology surrounding CSH helps better understand the stigma surrounding mental health treatment today. My research is organized and presented in a multi-media website format, featuring podcasts, photographs of Central State Hospital, and archival research on the facility.

The University of North Georgia Herbarium: Contribution to Research, Conservation, and Teaching of Southeastern Flora

Alicia Rodriguez
Biology

University of North Georgia
Sponsor: Dr. James T. Diggs

An herbarium is a collection of mounted dried plants that are preserved and stored for many scientific purposes, especially for teaching and research. At the University of North Georgia, we are focused on collections of regional and Southeastern native plants. Most plants that have been collected have been found in Georgia, but there are a handful from other states. Nearly 2,000 specimens are in our database, with many more currently being processed. The plants have been collected over the years by students and educators, dating back to 1999. Specimens are important for research, conservation purposes, and for teaching. These collections can be used for documentation of biodiversity, revealing biogeographic trends, recording locations of rare and protected species, and conservation biology. DNA can also be extracted from dry specimens, which can be used for population genetics, functional genomics, phylogenetics research, taxonomic revisions, and more. Herbaria and other natural history collections have never been more important to scientific knowledge, and the development of a herbarium at the University of North Georgia will help document the flora of this under-studied and poorly known region of Southeastern North America.

Transing Reproductive Justice

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Women's, Gender, and Sexuality Studies

Emory/Oxford
Sponsor: Dr. Alix Olson

The U.S. has seen an exponential rise in anti-trans rhetoric and legislation in recent years. 2023 had a record number of anti-trans bills filed across nearly every state: the ACLU is tracking 496 anti-LGBTQ bills regarding a wide range of issues, including healthcare, free expression, civil rights, gender information on legal documents, and public accommodations. Bodily autonomy has been a target for increasing control and domination throughout U.S. history, and this recent escalation in attempts to regulate and silence trans people reveals the connections between trans justice and reproductive justice. The framework of reproductive justice takes an expansive and intersectional approach to reproductive politics that aims to encapsulate the many factors shaping individuals' and communities' physical, mental, political, economic, and social well-being. This framework reveals that anti-abortion and anti-trans legislation have the common goal of increasing the power of the state and ruling class by interfering in sexual and gender expression, reproduction, family formation, and bodily autonomy. By examining each of the central tenets of reproductive justice—the right to not have a child, to have a child, to parent children in safe environments, and to sexual and gender autonomy—I work to show the unique barriers imposed on trans people through reproductive politics, the ways trans people are affected by and invested in reproductive justice, and how these two movements can resist these increasing forms of control together

Understanding the 2022 Georgia Gubernatorial Elections: What Factors Impacted Voter Turnout?

Austin Peterson
Political Science

Valdosta State University
Sponsor: Dr. James LaPlant

The Purpose of this analysis is to examine the key predictors of voter turnout within the Georgia 2022 gubernatorial election between Stacy Abrams (Democratic gubernatorial candidate) and Brian Kemp (Republican gubernatorial candidate). This paper analyzes the variables that led to the re-election of Governor Kemp by researching data across each of Georgia's 159 counties. This study reviews eight independent variables all at the county level: percentage of the African American population, percentage of the population 65 and older, percentage of the population with a college degree over 25 years of age, per-capita income, unemployment rate, population density, percentage of early voting, and percentage of mail-in voting. These variables' effect on the dependent variable, voter turnout, is determined through a correlation analysis, scatterplots, boxplot, and multivariate regression analysis. Three of the eight variables proved to be statistically significant. Testing found that certain variables played a statistically significant impact on the likelihood of voter turnout being high or low in each country. The measurement of voter turnout rates is an important tool when analyzing election integrity and outcome.

Unraveling the Mysteries of Plant Defense Hormones, Methyl Jasmonate Signaling

Morgan Wynn
Biology

Valdosta State University
Sponsor: Dr. Ansul Lokdarshi

Plants represent the ultimate source of nutrients for many organisms including bacteria, fungi, and animals. Therefore, understanding how plants defend themselves from pathogens and herbivores is critical to sustainable food supply. Even though 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 most versatile hormones that is actively engaged in plant defense towards different types of abiotic and biotic stresses is Methyl Jasmonate (MeJA). While the signaling events involved in MeJA mediated defense responses have been centered around transcriptional management (DNA to messenger RNA), the details of much faster translational (messenger RNA to protein) regulation remains unknown. My work provides fresh insights into the MeJA 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 module for regulating translation in all plants. Using immunoblotting, we show that eIF2alpha is phosphorylated in response to MeJA treatment in a GCN2 dependent manner in the plant model, *Arabidopsis thaliana*. As anticipated, transgenic plants with knock-out mutation for the *GCN2* gene show reduced growth under prolonged MeJA stress suggesting GCN2-eIF2alpha as an essential component of the MeJA signaling. Ongoing work is focused on understanding the biochemical and molecular events leading to GCN2-eIF2alpha activation in response to MeJA. These results will provide deeper understanding of MeJA signaling in plants and in the future aid in the development of plants with better stress residence/adaptation.

Wage Gap in the United States: What Factors Explain the Pay Gap between Men and Women across the 50 States?

Abigail Wilcher
Political Science

Valdosta State University
Sponsor: Dr. James LaPlant

The purpose of this quantitative study is to examine the key predictors of the "yes" vote to recall California governor Gavin Newsom. This study evaluates the factors that led to the unusual event of a recall election in the middle of the Governor's elected term by reviewing data across the 58 counties of California. The study analyzed eight independent variables: percentage African American population, percentage Latino population, county unemployment rates, percent of the population who have a college degree, percent of the vote for Trump in the 2020 presidential election, population density per capita, the number of COVID-19 cases per 100,000 people, and a nominal level region variable. The impact of these variables on the dependent variable, the percentage of the vote of yes to recall Governor Newsom, is determined through a correlation analysis, scatterplots, boxplot, and multivariate regression analysis.
Three of the eight variables proved to be highly significant. The percent of the vote for Trump in 2020 and the percent of those with a college degree per county were found to be highly significant at $p<.01$. The region variable was found significant at $p<.05$ when an independent t-test was conducted and found the North region to have higher values for the dependent variable. Interestingly, population density and number of COVID-19 cases were found significant at the bivariate level but washed out in multivariate analysis. The African American population and unemployment rate variables had minimal influence on the recall election. While not significant at the bivariate level, the Latino population variable was found significant in the multivariate model. The variable was found to have a negative relationship with the dependent variable. Newsom's recall election was a significant and unusual political event which he will carry with him into his 2022 reelection campaign.

What is Love? Jimmy—Don't Hurt Him No More

Angela Li
Neuroscience and Behavioral Biology

Oxford/Emory
Sponsor: Dr. Eric E. Solomon

Love is a foundational but misused concept that has confused people for thousands of years. For what is claimed to be the driving force behind so many relationships, a satisfying encapsulation of the emotional complexity of this feeling has yet to be found. Efforts to describe love have led many astray into a great corruption of an emotion so pure, and love has been converted to a tool over time to maintain what people truly value, whether it's control, self-satisfaction, lust, or more. In this paper, I examine different interpretations of love represented through character relationships in James Baldwin's Another Country, the dangers of misinterpretation of love, and what we must do moving forward to prevent love from being a source of insecurity and pain. James Baldwin's exploration of love and its corruption is characterized by the strong presence of and manipulation of attachment, with different types of love displayed within his character relationships. Huge issues arise when love is used as an excuse to hide from one's problems and misinterpret one's desires. Obsession, fetishization, violence, and more appear, which characters seek to blanket with their carefree use of the heavy word 'love,' preventing Baldwin's characters from developing genuine connection between them. The relationships in Baldwin's Another Country serve as a microcosm for very real issues resulting from ambiguous uses and definitions of love, serving as a call to action for clarification and proper exploration of what love is through discussion, research, and targeted questioning.

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

Andrea Merritt
English

Georgia State University
Sponsor: Dr. Leslie Whitmire

The institution of enslavement in America often presents itself through an Anglocentric lens imposing a white-centered worldview that Africans were innately inferior to Europeans. However, through published personal accounts, we are able to experience and empathize with the plight of enslaved Black Americans through a few select perspectives. Using the narratives of formerly enslaved writers, I explore the characteristics that differentiate the depictions of the Black experience through the lens and voice of the enslaved from those that are often described through transcriptions or post-editorial works of white narrative overseers. By comparing the accounts of white authors and authentic tones that remained in enslaved writings, I demonstrate the magnitude of influence that white editors and transcribers had with African American narratives and how these writings became somewhat tainted as a result of losing their original voice. Through this research, I will: explain the role of the editors/transcribers in the narratives of Harriet Ann Jacobs and Sojourner Truth; explore the writing techniques that were used during the Antebellum period and in that are still seen in modern Black writing; and compare the enslaved experiences in these works to the descriptions of enslavement by white writers.

Poster Presentations

Acoustic Properties of Connected Speech

Ashtyn Ray and Stephanie Lopez
Communication Sciences and Disorders

Valdosta State University
Sponsor: Dr. Matthew Carter, CCC-SLP

Studies have shown that habitual pitch (fundamental frequency) can be affected by numerous text-related factors including sentence length, sentence type, and communicative intent. The Rainbow Passage and the Grandfather Passages are two passages that are often used interchangeably to elicit measures of pitch. However, no study has systematically investigated if the two passages are in fact similar in the results that they yield. The purpose of the current study was to describe whether frequency, as measured by the correlation of pitch, is similar when extracted from both of these passages. Each college-aged female participant was presented with The Rainbow Passage and The Grandfather Passage and asked to read them aloud. An isolated vowel was also produced as a means of control for fundamental frequency. The pitch was then measured at similar points in each passage. Results indicated that there were no significant differences between the results that were obtained when participants were reading the two different passages. This indicates that these two measures should be considered approximately equivalent and can be used interchangeably. Clinicians should be free to utilize whichever passage proves to be more convenient for them during their assessment. Further studies could investigate if other uses for these passages such as articulation, voice quality, and intelligibility are indeed similar.

Adverse Childhood Experiences at Gordon State College

Viondra Zizi-Payton, Terrica Zellner, Shelby Peters, Elijah Clemmons,
Aeneas Cantey, and Willis DeLee
Human Services

Gordon State University

Adverse Childhood Experiences (ACEs) are traumatic events encountered during youth and adolescent years before the age of 18. These events can vary from physical or emotional abuse, neglect, and/or dysfunction within the household which can manifest and lead to multiple risk factors later in life. The goal of the present study was to determine how Gordon State College students from all levels are affected by ACEs, examine the coping strategies most often employed, and raise awareness for resources to cope with traumatic occurrences in a healthy way. Data were drawn from two paper questionnaires. Sixty students completed a cumulative exposure questionnaire to identify and assess the prevalence of ACEs among the student body. Fifty-three students completed an original "yes" or "no" questionnaire to assess students' coping styles as well as to examine the students' perceived level of personal support. Findings indicate that students at GSC experience much higher rates of ACEs than the national average, thus the student population is at a much higher risk for worse health outcomes later in life. Negative coping mechanisms are often employed by students while fewer engage in positive coping mechanisms. An overwhelming majority of students indicated that they have a current personal support system. Although ACEs are very high at GSC, findings show that the student body is on average more open to help and resources. It would benefit the GSC community to conduct further research to determine if there is a gap, whether legitimate or perceived, between students and resources offered by the college and work to establish a plan of action to close this gap if one exists.

A First-Person Mediation Experience using Virtual Reality

Abigail McDowell
Industrial Management

Mercer University
Sponsor: Dr. Amro Khasawneh

Anxiety disorders are the most common mental health disorders in the United States, affecting 40 million adults (nearly 19.1% of the population). Mindfulness and meditation are proven to soften anxious feelings and often used as alternative to medication to treat anxiety disorders. Therefore, the objective of this project is to design, develop and test an immersive virtual mediation experience which allows individuals with anxiety disorders to be immersed in a relaxing environment. We will apply a user-centered design approach to design the content of the experience. We will be conducting interviews with individuals diagnosed with anxiety disorders, as well as experienced meditators to design the content of the experience. We will then use two-dimensional (2D) and 360° cameras to record an entire mediation experience. The video will then be edited and integrated into two different videos (2D vs. 360). We will recruit individuals with anxiety disorders to participate in the testing of the experience. Participates will be divided into two groups. The first group will meditate using the 2D video on an iPad (control). The second group will meditate using the 360° video experienced utilizing virtual reality (VR) headset. After completing the meditation, participants will complete a survey regarding the meditation experience. The survey will include validated anxiety, and presence scales from the literature. We will use multiple ANOVAs to compare the mean anxiety and presence scores between the two groups. We expect the VR experience to lead to lower anxiety and higher presence than the control group.

Age and Politics: Who Supports Reproductive Rights?

Tori-Anne Chambers
Sociology

Valdosta State University
Sponsor: Dr. Anne Price

Today's subject examines how one's political views and age influence one's thoughts on today's issue surrounding women's right to have an abortion, as well as taking preventative measures to prevent pregnancy from happening unintentionally. The questions asked are simple, yet they will pave the way to determining the individual's thoughts on the issues at hand. They are: What is your age? What is your political party? Do you support the overturning of Roe v. Wade? My independent variables are age and political party, and my dependent variable is beliefs about women's rights to abortion. I hypothesize that there will be a strong relationship between a person's political affiliation and their views on the abortion ban (the overturning of Roe v. Wade). Results of chi-square tests show a statistically significant difference in support for women's reproductive rights by political party identification. There was also a statistically significant difference in support for women's reproductive rights by age cohort. The next step in this research is to examine gender differences in support for women's reproductive rights and the mechanisms linking gender to decisions made in supporting the abortion ban.

Alternative Green Synthesis of the Pesticide Carbaryl

Caden Underwood
Chemistry

Georgia College and State University
Sponsor: Dr. Ronald Okoth

Carbaryl is a wide-spectrum synthetic insecticide used outdoors to control a wide variety of insect pests both in largescale farms and in small gardens and lawns. Unfortunately, the synthesis route used in the industrial production of carbaryl requires the use of the highly toxic and poisonous methyl isocyanate (MIC). In 1984, the leakage of MIC from the Union Carbide chemical plant in Bhopal, India was the cause of thousands of fatalities. Due to the toxicity of MIC, the synthesis of carbaryl and its derivatives also poses a huge challenge for teaching and research labs curtailing structure and activity studies. In order to develop a "greener" synthesis of carbaryl without the use of MIC, a pure carbaryl standard must be established and compared against the synthesized product. Commercially available Sevin® pesticide, which contains carbaryl as the active ingredient, was used as a source of carbaryl. The carbaryl in Sevin® was isolated from the inactive ingredients and characterized by proton and carbon NMR and melting point analysis. Since the standard carbaryl has been isolated, synthesis of carbaryl using safer reagents is the next objective. Future plans for this project involve the synthesis of carbaryl via a 4-nitrophenyl carbamate intermediate in a two-step reaction. The synthesized carbaryl will then be compared spectroscopically to the carbaryl isolated from Sevin®.

Aluminum Doped Magnetic Nanoparticles for Nutrient Removal and Recovery from Animal Processing Wastewater

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Georgia Tech Research Institute
Sponsor: Dr. Jie Xu

Introduction: The prevalence of high levels of phosphorus in water bodies has accelerated the rate of eutrophication, posing severe threats to the safety of drinking water and the stability of aquatic environments. Conventional methods of phosphorus removal include chemical precipitation, biological phosphorus removal, and the use of sorbents to remove phosphate, the most bioavailable form of phosphorus. This study proposes the use of aluminum doped magnetic nanoparticles (AL-NMP) that not only remove phosphorus from water bodies but can be regenerated for nutrient recovery. In addition, such recovery methods also mitigate phosphorus over enrichment of water bodies and address the need for sustainable phosphorus resource management.

Methods: Al-MNP was prepared by dissolving stoichiometric amounts of Al2(SO4)3, FeCl3, and FeCl2 in deionized (DI) water and heated. NaOH was then added, and a black precipitate was produced. The cooled black suspension was then placed on a magnetic separator and washed five times with DI water. X-ray diffraction (XRD) data and magnetic measurements were collected to observe material characterization. Animal processing wastewater samples, both raw and after dissolved air flotation (DAF) were collected at a local poultry processing plant.

Results: The percent reduction before and after treatment using AL-NMP on Total Phosphorus (TP) was >90% for both raw untreated animal processing wastewater and for wastewater effluent of DAF. In addition, almost all forms of reactive phosphorus and organic phosphorus either in soluble or particulate forms were removed preferably over acid hydrolysable phosphorus. Nearly all of AL-MNP were recovered by an external magnet, with negligible amounts of Fe and Al found in treated wastewaters. Lastly, the used Al-MNP can be reused by stripping off the attached phosphorus species through a competitive binding method and be converted to fertilizer to achieve nutrient recovery.

A Microwave Assisted Cope Rearrangement Laboratory Experiment

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Organic Chemistry

University of North Georgia
Sponsor: Dr. Jeremy P. Olson

The Cope Rearrangement is an important reaction in the organic chemistry world, unfortunately there are not many experiments that have been simplified enough to be performed in an undergraduate setting. The following synthesis has been developed in order to demonstrate a Cope Rearrangement along with other essential skills for an advanced organic chemistry student. The method involves a three-step process, first tigloyl chloride is subjected to Suzuki cross-coupling with phenylboronic acid. The resulting product is combined with allyl bromide to form a 1,5 diene to be used as the substrate for the Cope rearrangement. The rearranged product is then formed using the constant heat and pressure of a microwave reactor for 1 hour at 190 degrees Celsius. This experiment not only demonstrates a Cope Rearrangement but also produced a high yield of product without the need of column chromatography.

An Analysis of Host Cell Protein Expression in Response to Variable Ad5 Infections

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Biology

Georgia college and State University
Sponsor: Dr. Kasey Karen

When a cell is infected by a virus, there are two opposing goals; the virus tries to replicate while the cell tries to prevent viral replication. The virus has evolved mechanisms by which it can reprogram particular cell types to support viral growth, allowing them to spread in the body. The cell hosting the virus has evolved defensive mechanisms, which the virus must combat to be successful. In our research, we study the infection course of adenovirus serotype 5 (Ad5). This is a double-stranded (ds) DNA virus used to model the mechanisms of other dsDNA viruses, such as human papillomaviruses (HPV) and herpesviruses. One defense mechanism of the host cell involves Retinoic Acid-Inducible Gene I (RIG-I), which detects the presence of viral RNA in the cytoplasm and initiates a type 1 interferon immunoresponse. This response starts with RIG-I stimulating a pathway where another cytosolic protein, Interferon Regulatory Factor 3 (IRF3), is phosphorylated. Once phosphorylated, pIRF3 activates transcription of interferon beta (IFN-B). Viruses have been shown to inhibit this pathway by binding to another cellular protein, Ddx6, which results in decreased of RIG-I. The viral protein, E4 11k, has been shown to bind to Ddx6. Previous studies have shown that the expression of specific adenovirus dsRNAs activate RIG-I at late times during infection. We used RT-qPCR, to quantify mRNA levels of RIG-I and IFN-B at various time points during a wild-type adenovirus infection. Our data alludes to a viral protein inhibiting IFN-B at late times. We hypothesize that E4 11k is responsible for the decrease in IFN-B and will perform additional studies with E4 11k viruses to determine its role. To complement these studies on mRNA expression levels, we are also conducting immunoblot studies, to quantify the amount of mRNA being translated into functional proteins.

An Evaluation of the Antibacterial Properties of Chromolaena Odorata

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Chemistry

Valdosta State University
Sponsors: Dr. Salami Tolulope,
Dr. Gopeekrishnan Sreenilayam, and Dr. Xiaomei Zheng

In recent years, natural products have been increasing in significance due to growing curiosity around their uses and benefits. These plants have been analyzed and tested for their antibacterial properties against several strains of bacteria. The plant Chromolaena Odorata is sourced from Africa traditionally and was used by natives for medicinal purposes such as treating wounds, burns, and even skin infections. The natural products were extracted by organic and DES solvents followed by sonication and rotavapor to discover the yields. The extracts were tested against biofilm crystal violet and antibiotic disk assays. Extracts with promising activity will be purified by chromatography and the fractions will be tested again for antibacterial activity.

An Investigation of the Potential for Plant Growth on Mars

Caroline Lea
Biology

Abraham Baldwin Agricultural College
Sponsor: Dr. Ben Gahagen

Humans have always been fascinated with the idea of space travel. Many big corporations such as NASA and SpaceX have made it their life's work to make space travel a reality and one of the ways they plan to do this is by utilizing plants to help colonize Mars. This study aims to investigate if certain species of plants will grow on Mars and, if so, how well. For this project, crushed lava rock was used to simulate the regolith on Mars, replicating methodology in previous studies. Earth soil was compared to Martian regolith and it was found that the regolith absorbed and retained water better than the soil on Earth. Alfalfa was grown in both soil and regolith, and it was found that they grew significantly taller in the soil compared to the regolith. The alfalfa that was grown in the regolith was then harvested, dried, crushed, and used as an amendment for the regolith in all subsequent growth trials. Turnips and beans were grown in both plain and alfalfa amended regolith. There was no significant difference in height between those crops planted in plain regolith compared to those planted in alfalfa amended regolith. There was, however, a significant difference in bean stem width in week two with the alfalfa amended regolith. Results indicate that current Mars colonization methodology is still in its infancy and further studies are needed for crop production on Mars. Currently, two cohorts of beans are being grown in both alfalfa amended (treatment) and plain regolith (control). The purpose of this part of the study is to determine if beans grown in regolith will produce viable seeds for a new generation of growth and if so, will there be a significant difference between the two cohorts.

A Study of Social Media Usage

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Applied Mathematics and Physics

Valdosta State University
Sponsor: Dr. Denise Taunton Reid

In this study, the dynamics and adoption patterns of technical innovation are examined via the lens of the Economics Bass Model. Our research is focused on the first-order, two-boundary divisible condition that underlies the model and defines the distinctive S-shaped or sigmoid curve observed in technological adoption. In order to accurately estimate model parameters by fitting the model to empirical data, we apply this strategy to a specific case study of a technological discovery that has the potential to change the game. We also create the analytical answer to the Economics Bass Model, which establishes the theoretical foundation for comprehending innovation dissemination mechanisms. In addition to advancing our understanding of innovation uptake, this study offers crucial guidance for scholars, industry stakeholders, and governments in navigating the innovation process. By combining empirical research with mathematical modeling, our study adds to a better understanding of how technological innovations spread, allowing stakeholders to make more informed decisions and strategies in the continually evolving world of technology.

Atomic and Molecular Investigation of Corrosion and Coating Degradation after Accelerated Weathering of 4130 Steel

Rafael Garcia Chirino
Chemistry

Mercer University
Sponsor: Dr. Joseph D. Keene

The United States Department of Defense spends in excess of $20 billion annually towards corrosion remediation and control. Understanding corrosion and early methods of assessment will improve military asset performance, lifecycle, safety, and war readiness. Our research focuses on establishing methods of non-destructive inspection (NDI) for the detection and analysis of corrosion in common military metal alloys. We have performed salt-fog and ultraviolet accelerated weathering tests on coated and uncoated 4130 steel to investigate the corrosion processes under different environmental conditions. We utilized handheld spectroscopy including FT-IR, Raman, X-ray Fluorescence, Multi-Glossmeter, and Colorimeter to determine baselines and trends in corrosion and material degradation. We have identified specific polymorphs of corrosion products in the metals, and have analyzed the breakdown of the coatings at a molecular level. This method of study will allow the military to conduct field-level evidence-based maintenance to mitigate the costs of repair before the integrity of weaponry and assets become compromised.

Authoritarian Media Cooptation and Its Implications for Cyber-feminist Activism in China

Shawn Chen
Sociology

Oxford/Emory
Sponsor: Dr. Deric Shannon

This research poster offers a comprehensive exploration of the phenomenon of authoritarian cooptation within the Chinese media landscape. It delves into the theoretical underpinnings of media cooptation, dissecting its multifaceted mechanisms and strategies. The primary focus of this inquiry lies in understanding the pivotal role played by media cooptation in the suppression of dissent within Chinese society, particularly in the context of contemporary cyber-feminist activism. Drawing on specific case studies, this research investigates the intricate process of state capture, shedding light on the ways in which authoritarian regimes manipulate and exploit digital platforms for their own benefit. A prominent example discussed is the cooptation of the #metoo movement, a global phenomenon advocating for gender equality and women's rights, on Chinese social media platforms. Through this case study, we underscore the profound implications of comprehending these state-driven tactics of social control. By delving into these dynamics, this research not only contributes to our theoretical understanding of media cooptation but also offers critical insights into the functioning of authoritarian systems. It emphasizes the far-reaching consequences of these tactics on social movements and the broader fabric of Chinese society. Ultimately, this study serves as a valuable resource for scholars, activists, and people seeking a deeper understanding of the complexities surrounding authoritarian regimes and their impact on contemporary socio-political landscapes.

Benzalkonium Chloride Enhances Cell Death Induced by Etoposide in a p53-independent Manner

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Biology

Savannah State University
Sponsor: Dr. Takayuki Nitta

Benzalkonium chloride (BKC) induces various biological effects, and showed cytotoxicity on cells such as conjunctival cells, lymphocytes and nasal mucosa, but mechanisms of cell death induced by BKC, and its potential application in cancer and transformed cells remains elusive. We found that cytotoxic effects of BKC varied among the cancer and transformed cells. In particularly, the combination of BKC and an apoptosis inducer cholinium salt of betulinic acid grafted with glycine ([cholinium][BA-Gly]) showed synergistic inhibitory effects on the growth of 293T cells and induced cell death. Treatment of each [cholinium][BA-Gly], etoposide and high dose of BKC activated molecules involved in apoptosis, but co-treatment of low dose of BKC attenuated apoptosis signals induced by [cholinium][BA-Gly] and etoposide and increased propidium iodide- and trypan blue-stained cells. Etoposide induces apoptosis through DNA-PK, phosphorylation of p53 and transcription of Bax in a mouse fibroblast cell line L929, but co-treatment of wortmannin or cycloheximide did not rescue cell death induced by etoposide in 293T cells. These data suggested that BKC could shift the death signaling pathways from apoptosis to necroptosis through DNA-PK- and p53-independent pathways and demonstrated that potential application of BKC in cancer and toxicological research. To clarify the pathways affected by BKC, metabolic activities, expression and modification of proteins in apoptosis and necroptosis have been investigated.

Bioactive Excipients for Increasing the Efficacy In vitro of Tecovirimat

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Chemistry

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Sponsor: Dr. Thomas Manning

The anti-viral medication Tecovirimat has in vitro efficacy against the variola virus and has demonstrated in vivo efficacy against Monkey Pox. In this study, there are several variations involving bioactive excipients. While the individual components have no efficacy, they do increase SI50 values when combined with TPOXX. Our medicinal agents were tested against Vaccinia virus (Copenhagen), Vaccinia virus CDVR-1A (Resistant Isolate), Cowpox virus (Brighton), and Cowpox virus CPXVR(SF) (Resistant Isolate) at the National Institutes of Health. Vaccina virus causes smallpox. The POX viruses have become of great concern worldwide because of their potential as bioterrorism agents. Current genetic technology allows these viruses to be engineered with improvements in transmissibility and mortality rates. Historically, smallpox is one of the most terrifying infectious diseases going back almost 10,000 years.

Black Music of Excellence: The Racialization of Rock 'n' Roll

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Music and Africana Studies

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Sponsor: Dr. M. Denise Lovett

Throughout American history, music created by African Americans has had an impact on popular music and culture. However, the role that Black musicians, singers, and artists have played in developing American and popular culture has been minimized due to discrimination, prejudice, and cultural appropriation. The purpose of the study was to analyze how songs created by Black artists in the 1950s and 1960s were consumed by the media and reconfigured by white artists. A content analysis was conducted by listening to different versions of songs created by Black artists, seeing how they are different musically, and by reviewing newspapers, magazines, and articles. The results showed that when Black rhythm and blues, and rock 'n' roll music started getting more successful, the white music industry profited by having white artists cover their songs. Many of the Black artists who wrote and/or were the original artists of the song did not get as much recognition nor were paid nearly enough for their records as their white counterparts were. They also did not chart as high as their white counterparts on the Billboard or national charts because they did not have as much status in the music industry. Sometimes, the white artists who covered their songs would change the rough blues/rock 'n' roll sound of the original song to make it sound more palatable to mainstream audiences. Implications of the study for the music industry today will be explored, as well as future research directions.

Brooding Rumination Partially Mediates the Association between Cyber Victimization and Depressive Symptoms

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Psychology

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Sponsor: Dr. Lindsey B. Stone

Introduction: Cyber bullying victimization is characterized as "being the target of aggressive behavior perpetrated through electronic communication technologies' (Mehari et al., 2020). Cyber victimization has been associated with frequent rumination, which in turn, is positively associated with depressive symptoms in college-aged women (Feinstein et al., 2014). Rumination is a maladaptive coping skill, characterized by the repetitive intrusion of negative self-focused thoughts (Van Seggelen-Damen et al., 2023). Brooding rumination, the cognitive process of hyper-fixating on the consequences of distress (Horwitz et al., 2019), is associated with higher levels of depression in adolescents (Smith & Pössel, 2022). Thus, adolescents and younger adults who experience cyber bullying may be at higher risk for depression if they ruminate on the consequences of these negative interactions and the emotions it incites. To our knowledge, no studies to date have examined the association between brooding rumination and depression experienced in relation to cyber victimization.

Hypotheses: The goal of this study is to examine the link between cyber victimization and depressive symptoms in undergraduate women. We hypothesize that brooding rumination will have a mediating effect on the association between cyber victimization and depressive symptoms.

Methods: For this study, survey data was collected from 145 female undergraduate students (88.9% Caucasian), who were recruited based on their participation in a college sorority. Participants were asked to complete the 10-item Ruminative Response Scale (RRS), the 14-item CBCV measuring perpetration and victimization experiences related to cyber bullying, and the 20-item Center for Epidemiologic Studies Depression Scale (CES-D).

Results: We tested the mediation model with a hierarchical regression, entering cyber victimization on Level 1 and brooding rumination on Level 2, predicting depressive symptoms as the dependent variable. The overall model accounts for significant variance in depressive symptoms. The direct effect of cyber victimization on depressive symptoms maintained statistical significance after covarying for brooding rumination.

Discussion: Results indicate that brooding rumination partially accounts for the association between cyber victimization and higher depressive symptoms. Further social and affective implications will be discussed.

Bugs on Drugs:
The Effects of Common Anti-Depressant Drugs on the Growth Rate of Sarcophaga bullata larvae

Lindsey Grimes
Science and Math

Abraham Baldwin Agricultural College
Sponsor: Dr. Gina Profetto

Forensic Entomotoxicology examines the toxins present in the body through carrion feeding insects. Insects have historically been used to help in criminal cases and can help determine the Post-Mortem Index (PMI). It has been seen that toxins or compounds in the body can affect the growth rate of insects and therefore change the PMI. Previous studies have focused on illicit drugs instead of the more commonly prescribed medications. In recent years, there has been an increase in the use of anti-depression medications. Using common anti-depressant drugs and the larvae of Sarcophaga bullata it can be determined if these medications have any effect on the growth rate of carrion insects. For our study, samples of meat were saturated with different drug concentrations (25 mg/ml, 50 mg/ml, 100 mg/ml). The carnivorous larvae were kept in containers with the saturated meat until they pupated. The morphological characteristics of five larvae were measured at each instar including pupation. These larvae were preserved in 80% ethanol and frozen for future analysis. This study focuses on determining how anti-depressant drugs can affect common carrion feeders. Results can help forensic analysis more accurately determine the time of death and give a better understanding of these drugs effects on Sarcophagidae as a whole.

Building an Accessible Basketball STEM Program using Virtual Reality (VR)

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Industrial Management

Mercer University
Sponsor: Dr. Amro Khasawneh

We are conducting a 10-month-long STEM basketball camp for rising low-income 5th school students in Bibb County, GA. The goal of the program is to improve math proficiency and overall engineering knowledge, awareness, and participation of students using sports camps and sports activities. The 10-month STEM basketball program will focus on integrating aspects of the basketball (shooting, drilling, passing, scoring, etc.) with basic math (addition, subtraction, multiplication, and division) and science skills, and various engineering disciplines (materials engineering, human factors engineering, mechanical engineering, etc.). Phase one of this program will be a 5-day summer STEM basketball camp that will take place at Mercer during Summer 2023. We are looking for students to help with creating a virtual experience of the STEM Basketball camp to make it accessible to students with physical disabilities. 360 degrees videos will be captured from the camp and will be integrated and edited using Adobe Primer Pro and Unity3D to create a fully immersive and interactive 360 virtual experience of the STEM basketball camp. Physically disabled students will be able to attend the camp Virtual Reality (VR) headsets. The students will conduct a research experiment (hypothesis testing) to test the VR camp and compare it to the in-person camp (control group) in terms of students understanding of STEM concepts, presence, and satisfaction.

Causes of Nest Predation of Endangered Black-Cheeked Ant Tanger Nests in Costa Rica

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Biology and Ornithology

Georgia College and State University
Sponsor: Dr. Katie Stumpf

The Black-cheeked Ant Tanager (Habia atrimaxillaris, BCAT) is an endangered passerine endemic to the Osa Peninsula on the south Pacific coast of Costa Rica. The increasing amount of human activity and high deforestation rates on the peninsula are likely factors that have contributed to high rates of nest predation that have negatively impacted population size of BCATs. While there is little data about their nesting success, preliminary data have shown that proximity to forest edge, water, and mature forests may be associated with predation. The objective of this study project is to determine nest predation rates, identify nest predators, and determine if any behavioral factors contribute to likelihood of predation. We located nests at two sites, Dos Brazos and Rancho Quemado, between Jan – May 2022. After nests were located, we placed two different models of motion-triggered cameras (inferred at night and a non-inferred during the day) at each nest, set to take 3 pictures every 5 seconds when triggered. Based on this data, we recorded the presence and behavior (feeding, nesting, etc) of adults, eggs or young, and identity of predators. Three nests were monitored at the Dos Brazos site with a total of 383 pictures and 449 videos taken from the cameras. At the Rancho Quemado site, six nests were monitored through a total of 12,523 pictures and 761 videos. At one nest at the Rancho Quemado site, a main predator was identified as the Roadside Hawk (Rupornis magnirostris). Other predators, such as squirrels and mice, were identified at two other nests at Rancho Quemado site. Nest predation is the leading cause of nest failure for passerines, which can significantly reduce the already small population size of this endangered bird, so understanding the ecology of predation is critical to this species' survival.

Calculating Inflation in Athens-Clarke and Oconee Counties, Georgia

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Business

University of North Georgia
Advisors: Dr. Kelly Manley and
Dr. Yongseung Han

Inflation is currently one of the biggest concerns in our economy and a key concept in macroeconomics. In the United States, inflation is measured by the federal government with the Consumer Price Index (CPI) which is based upon a market basket of goods and services for a typical household in metropolitan areas. Data is also collected by organizations such as The Council for Community and Economic Research (C2ER), that focuses on the top quintile of earners in a given area and includes 22 "core" items such as housing costs, food items, healthcare-related visits, and clothing, to name a few. Using data collected during the first three quarters of 2023, we attempt to calculate an inflation value representative of the cost of living in Athens-Clarke and Oconee counties in northeast Georgia. This project attempts to calculate a more specific local inflation rate that can be used by local governments, private and public employers, and business organizations to inform development of policy, appropriate wages and salaries, and needed assistance programs. For this reason, the project is valuable as there has been only one local price index, i.e., Atlanta area, available in Georgia. Overall, between the first and third quarters of 2023, the Athens-Clarke and Oconee County areas experienced an inflation rate of 9.4% over the 22 categories of goods & services analyzed. Rates varied greatly across items, however, with the bulk of inflation due to the increase in new home prices.

Characterization of the TH2/At5g32470 Fusion Protein and its Role in Thiamin Metabolism in Plants

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Biology

University of North Georgia
Sponsor: Dr. Ghulam Hasnain

Thiamine (vitamin B1) is essential for the proper functioning of many central metabolic enzymes. While plants and most bacteria can synthesize thiamine, animals must acquire it from their diet. Thiamine biosynthesis is well understood in both bacteria and plants. In bacteria, thiamine is phosphorylated by thiamin kinase (ThiK) and monophosphate kinase (ThiL). In contrast, in plants, thiamine monophosphate is first dephosphorylated (TH2) and then pyrophosphorylated by a pyrophosphate kinase (ThDPK). Notably, the enzyme responsible for thiamine pyrophosphorylation, ThDP, can also phosphorylate damaged forms of thiamine, such as oxothiamine and oxythiamin. In plants, a preemptive Nudix gene can selectively dephosphorylate the damaged forms of thiamine, but a salvage enzyme to repair the damaged forms is missing. Comparative genomics evidence suggested that the TenA domain of TH2 gene could salvage oxothiamine and oxythiamine. The TenA domain belongs to the TenA_C subfamily, other members of which have amino-HMP aminohydrolase activity. To test our prediction, we have mutated the putative catalytically important residues of TenA domain of TenA-HAD and tested the ThMP activity in the bacterial complementation assay. Currently, we are testing the oxothiamin/oxythiamin toxicity tolerance of a bacterial strain complemented with Arabidopsis TenA-HAD. To test the invitro TenA activity we are expressing the Arabidopsis His-tagged TenA-HAD gene in E. coli and will attempt to purify the protein. An attempt will be made to complement the Arabidopsis TH2 mutant with truncated TenA-HAD protein in which the TenA domain is truncated or mutated, hoping that the substrate of the TenA domain may build up.

College Students' Definitions of Intelligence and Giftedness: Influence of Growth and Fixed Mindset and Attitudes towards Gifted Programs

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Students' understanding of intelligence is different from the way that they understand giftedness. Nationally, students are being selected for gifted/talented programs, but there is a lack of consensus over the defining attributes for giftedness. Intelligence is colloquially considered the primary selection criterion for identifying giftedness, even though there is not a consistent testing approach across states or counties. The consequences of this lack of standardization have not been sufficiently studied. As such, the purpose of this study is to interview students regarding their experiences being tested for intelligence-based programs and identify inclinations toward growth or fixed mindsets. A survey about perceptions of intelligence and giftedness was given to 200 college students at Kennesaw State University. Qualitative content analysis was used to code responses about how the participants defined intelligence and giftedness. Dweck's (2009; Dweck & Yeager, 2020) mindset theory was used to classify responses as either fixed or growth mindset. Approximately half of participants reported an understanding of intelligence as being fixed, innate or static, indicating a fixed mindset. The other half reported an understanding of intelligence as growing, evolving, and improving, indicating a growth mindset. When it came to giftedness, however, a vast majority (55%) seemed to view "giftedness" as a fixed natural aptitude, instead of potential that can be refined through practice and effort. This indicated a fixed mindset towards giftedness that can affect people's self-efficacy into adulthood. Race is another key variable to be reviewed in this context, as it can affect placement into and outlook on gifted programs. In our study, the racial demographic is equally represented in gifted programs, however different races experience gifted/talented programs in different ways emotionally.

Computational and Crystallization Studies of a Capreomycin Complex for the Treatment of Drug Resistant Tuberculosis

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Chemistry

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Sponsor: Dr. Thomas Manning

As the second deadliest respiratory infectious disease, Tuberculosis (TB) impacts over two billion individuals globally. A current area of concern is the various forms of resistance emerging, including drug-resistant (DR-TB), multidrug-resistant (MDR-TB), extremely drug-resistant (XDR-TB), and total drug-resistant (TDR-TB) Mycobacterium Tuberculosis Bacterium. Capreomycin is a broad-spectrum antibiotic used to treat resistant Tuberculosis. Based on prior literature, no clinical evidence shows a relationship between Capreomycin and clinically apparent liver disease. Significant side effects include kidney problems, reduced hearing, balance, paralysis, and dyspnea. Capreomycin can be administered in addition to a second medication, which may present additional side effects such as neuromuscular blockage, ototoxicity, nephrotoxicity, and a loss of hearing. In a past study conducted by the NIH-Infectious Disease division, one of our compounds was a copper complex of Capreomycin, its efficacy against drug-resistant Tb improved approved two hundred times, or a lower concentration produced better results. The lower concentrations also result in lower side effects. The current study has two levels: a computational level that examines the binding of the Cu(II) ion at various locations on Capreomycin and an experimental level that examines the type of crystal formed by different ratios of Cu(II) / Capreomycin on the drugs crystal's structure.

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Computational Modeling a New Herpes Simplex 2 Drug

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Sponsor: Dr. Thomas Manning

Herpes simplex 2 Herpes Simplex Virus Type 2 (HSV-2) stands as a global health concern, causing recurrent genital herpes infections with significant physical and psychological impacts. This abstract provides an overview of the drug development efforts and the key proteins targeted by the antiviral agent, valaciclovir, in the pursuit of effective treatment and prevention of HSV-2 infections. QSAR techniques are used to develop new molecular structures for HS2. There are 3 drugs used to treat genital herpes (a product of HS2) symptoms: acyclovir (Zovirax), famciclovir (Famvir), and valacyclovir (Valtrex). Modeling will determine if these drugs can be improved in efficacy. HSV-2 infection of the central nervous system can result meningitis, but other infections such as encephalitis, myelitis, and lumbosacral radiculitis are correlated with HS2 presence. In adults, HSV2 is responsible for 10% of herpes simplex virus encephalitis cases, and HSV2 for the other 90%.

Controlling Drug Release Properties of Tetraethyl orthosilicate (TEOS)-based Sol-Gel Nanoparticles

Raven Glover
Chemistry, Physics, and Astronomy

Georgia College and State University
Sponsor: Dr. Catrena H. Lisse

While HIV and AIDS have optimistically decreased in the United States, African Americans remain the foremost racial group implicated. This disproportionate affinity is substantially forged from the scarce and discriminatory prevention care (PrEp) to which they are predisposed. Diverging from the conventional route of drug delivery will increase ease of use, thereby improving patient compliance and optimizing patient outcomes - the fundamental motivation for this undergraduate research project. Many biomolecules including drugs like emtricitabine, HIV antiviral, can be released from sol-gels and the quantity and duration of the release can vary widely. Processing parameters render these release properties exquisitely versatile. Tetraethyl orthosilicate (TEOS)-based hydrogels, with drug-releasing properties, were formulated through TEOS hydrolysis followed by modifications to the volume and pH of the colloidal suspension. After entrapping and encapsulating fluorescein as a prototypical drug, the drug-release properties were investigated by altering the pH and age of the sol-gel nanoparticles. UV/Vis and fluorescence spectroscopy were used to monitor the fluorescein release and imaging of the sol-gel nanoparticles was observed using scanning electron microscope (SEM). The experimental methodology and preliminary results will be highlighted in the presentation.

Could Woven Polypropylene Market Bags Successfully be used as a Geotextile Substitute in Construction?

Angel Mancio
Industrial Management

Mercer University
Sponsor: Dr. Todd Davis, PE, SE

This research project examines if "costales", a common large woven polypropylene bag used to carry agricultural goods to markets in the majority world, could be used as a geotextile substitute. This research idea stemmed from a bridge project in the mountains of Guatemala in which "costales" were used to reinforce soils under the foundation. Normal industrial geotextiles with well-defined material properties commonly used in construction are often not readily available in isolated markets and are costly compared to the inexpensive and locally sourced "costales." This project seeks to determine the tensile strength of these "costales" for their use in construction. The testing procedure tested four data sets according to the wide strip tensile test method found in ASTM D4595. The four sample sets included the two most common "costales" found in the market (red and tan) and considered strand orientation relative to the weaving pattern (vertical and horizontal). Four sets of six samples were tested in an MTS universal testing machine which monitored load and displacement to obtain tensile strength. In summary, each of the four data sets showed consistent results with coefficients of variation between 1% and 5%. The average tensile strengths of the four data sets were: 1025 lb/ft and 950 lb/ft for the red "costal"; as well as 783 lb/ft and 878 lb/ft for the tan "costal" with vertical and horizontal orientation respectively. Based on an ANOVA analysis, the results of the four data sets were significantly different from each other, indicating that bag type and orientation matters. This research will benefit small and isolated communities by enabling them to use locally sourced inexpensive "costales" to improve weak soils in their community infrastructure projects. Although the results are on the low end of tensile strengths of woven geotextiles, these bags can be used effectively in small projects.

Design of Faraday Cages for High Frequency Electromagnetic Shielding

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Kennesaw State University
Sponsor: Dr. Kevin L. Stokes

Faraday Cages are metallic enclosures used to shield the interior region from electromagnetic (EM) radiation. They are used in a wide array of applications from shielding computers and sensors from EM interference to hardening electrical power substations against electromagnetic attacks and geomagnetic disturbances and serve a crucial role in the Digital Age's security infrastructure. While they are effective for low frequency electromagnetic radiation, their shielding effectiveness is degraded at high frequencies, especially in unique geometries. With the remarkable advancements in metallic 3D printing technology, it is now possible to affordably manufacture specialty Faraday Cages for specific electronic security applications, overlaying traditional plastic and insulator components to for complex structures with conductor lattices to reflect, absorb, or redirect electromagnetic radiation around the container's surface. The interaction of MHz and GHz electromagnetic pulses with Faraday Cage designs of various geometries (enclosed surfaces, meshes, composites) is simulated with Ansys HFSS, an industry-leading commercial computational electromagnetic solver and presented using Ansys graphing functionality. We evaluate the designs' ability to attenuate the EM pulses and aim to optimize Faraday Cage design to contain the least amount of material while also effectively shielding broad-band pulses – especially those present in EMP attacks (i.e., in the GHz range).

Detection of Antibiotic Resistant Genes in Northeast Georgia Water

Noemi Leal, Michelle Vo, Brian Le
Biology

University of North Georgia
Sponsors: Prof. Margi Flood,
Dr. Jeanelle Morgan, and Dr. Swapna Bhat

Treating bacterial infections with antibiotics can be lifesaving. However, bacteria have developed resistance to many of them due to the overuse and misuse of these drugs. This is an increasingly prevalent public health issue. Because bacteria can physically transfer DNA or uptake cell-free environmental DNA (eDNA) that contain antibiotic resistant genes (ARGs), the prevalence of infections that resist treatment with antibiotics is rising. Currently there is no data on ARGs in northeast Georgia water. Therefore, we aim to detect and characterize ARGs in the northeast Georgia water using molecular tools. We have developed a protocol to detect ARGs based on current literature. Strains of known antibiotic resistant bacteria (ARB) were cultured and DNA was extracted. This DNA was suspended in distilled water to simulate eDNA in water sources to serve as our control. The water was filtered through a nitrocellulose membrane. Weused qPCR with specific primers to detect, amplify, and quantify ARGs. We will sample water from various sources and use our detection method to identify ARGs. We will present our results on the detection and quantification of eARGs from these various water sources in the northeast Georgia area.

Determination of Fatty Acid Transport Proteins Catalytic Activity and Substrate Specificity

Sophia McNeill, Rezwana Karim, and Hening Lin
Chemistry and Chemical Biology

Cornell University
Sponsor: Dr. Hening Lin

Fatty acid transport proteins (FATP) are a family of integral membrane transport proteins which are known to play a vital role in uptake of long chain fatty acids. We sought to determine if these structures potentially synthesize fatty acyl-CoA via catalytic domain which resembles that of the ACSL family of proteins. ACSL proteins are known to convert free long chain fatty acids into acyl-CoA esters. Previous studies have found that FATP-2, a member of the FATP family, has Acyl-CoA synthetase activity. This has provoked our interest in investigating catalytic activity in other FATPs that have a similar catalytic domain. To address this hypothesis, we constructed two plasmids, one compatible for mammalian cell culture using the PCMV-4A vector backbone, and one compatible for E. coli systems using the pET-28A vector backbone. The pCMV-4A vector contained a FLAG sequence while the pET-28A vector contained 6X His sequence which will allow us to pull down the proteins via Flag IP (immunoprecipitation) or IMAC (Immobilized metal affinity chromatography) nickel purification, respectively. Once assembled, these constructs were then used to transfect or transform into their respective cell types. Western blot of immunoprecipitated proteins aided in determining presence and quality of the translated FATPs. Protein purification proved difficulty in isolating high quality soluble proteins so in-cellular assay of Biorthogonal labeling of LCFA's (long chain fatty acids) used in protein acylation was evaluated via click chemistry in transfected cells to determine substrate specificity and catalytic activity in the absence of purified proteins.

Detection of Nitroaromatic Compounds using Porphyrin-Doped Silica Sol-Gels

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Chemistry, Physics, and Astronomy

Georgia College and State University
Sponsor: Dr. Catrena H. Lisse

The development of a reproducible and reusable method for the detection of 2,4-dinitrophenol (DNP), 2,4,6-trinitrophenol (TNP) and other nitroaromatic explosive precursors in aqueous and vapor phase systems is of great significance in forensic science. Porphyrins immobilized within silica sol-gels were synthesized and used to study the binding of DNP and TNP to the porphyrin. Silica sol-gels were doped with free-base meso-tetrakis (4-carboxyphenyl) porphyrin, H2TCPP, during the polycondensation process. The interaction of the porphyrin with nitroaromatics, the porphyrin functionality, and the structural integrity of the doped sol-gel were examined using thermogravimetric analysis, fluorescence, and UV-Vis spectroscopy. The experimental methodology and preliminary results of the study including the intermolecular binding of the DNP and TNP in aqueous phase with the pyrrole centers of the porphyrin will be presented.

Developing a User-Friendly Software to Aid Management of Peer Supplemental Instruction Services at Georgia Gwinnett College

Nero Dunmoye
Information Technology

Georgia Gwinnett College
Sponsor: Dr. Saiam Tangirala

The Peer Supplemental Instruction (PSI) program at Georgia Gwinnett is managed by staff, volunteering faculty, and part-time student workers. It is designed to support student academic success in STEM-related courses, and to provide service-learning leadership opportunities for juniors and seniors. The PSI program is responsible for providing supplemental instruction by trained junior and senior students. This allows PSI program to assist their underclassmen in topics or subjects they might need help improving in. My main focus was coding and developing a user-interface to an Excel reporting tool and to ensure that everything was user-friendly and secure. I implemented a login feature and a way to give each user access to specific Excel sheets. I did this by adding roles to each user, for example, if you had the admin role you could access anything in the workbook but if you were a regular user, your access was limited. I also added data provided to me by a fellow person who was working on this with me and also worked on implementing that into my work.

Development of an Attitude Toward Sex Education Scale

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Psychological Sciences

Valdosta State University
Sponsor: Dr. Meagan M. Wood Hopkins

Sex health education is a controversial topic. Currently, 30 states mandate sex education and 22 states require that abstinence is stressed in the education (SIECUS, n.d.). Additionally, most sex educations programs are not fully comprehensive. In a recent report, 8.2% of students report receiving sex education that was LGTBQ+ inclusive (Kosciw et al., 2020). The purpose of this study was to develop an instrument to measure attitudes toward sex education. Participants responded to an initial item pool of statements including questions about LGTBQ+ inclusivity in sex education courses. Factor analysis was used to create the final scale. Analyses were conducted examining the reliability and validity of the scale. Additionally, individual differences in areas such as sex, race, year in school, political party, and sexual orientation were examined. Implications and future directions for research are discussed.

Displacement and Disruption: How Gentrification is a Product of White-Dominated Thinking and Systemic Racism in Atlanta, Georgia

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Sociology

University of West Georgia
Sponsor: Dr. Tiffany A. Parsons

The idea that gentrifying a neighborhood increases its social value can be a direct result of systemic racism and white-dominated thinking in society. The urban renewal process of gentrification has arguably been viewed by some researchers as having a positive impact on the neighborhood due to the economic benefits it can provide homeowners and the overall resulting rise in social value on a city. Yet, these studies fail to look at the foundation of gentrification and how it stems from a complex history of systemic racism and the prevalence of racial domination by the white population. This study aims to provide a re-examination of the current gentrification knowledge through the lens of race and illustrate how urban renewal reveals the negative impacts of gentrification on multiethnic neighborhoods, including the removal of minorities who inhabit these communities and the implementation of covert discrimination and segregation within neighborhoods. The study explores gentrification in Atlanta, GA through participant observations and compares the findings to gentrification in Washington, D.C. to examine gentrification in two different geographical regions. The findings indicate that gentrification does not increase a neighborhood's social value but rather illustrates how urban planning continuously fails to consider its impact on minority populations.

Does Habitat condition around Artificial Nest Boxes Influence Nest Success for Southeastern American Kestrels?

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Natural Resource Management-Wildlife

Abraham Baldwin Agricultural College
Sponsor: Dr. Jason Scott

Southeastern American Kestrel (Falco sparverius Paulus, AMKE) is listed as a species of concern in the state of Georgia and has undergone population decline throughout their native range. To bolster populations, artificial nest boxes have been installed throughout Georgia. I aim to evaluate how proportion of early successional habitat around artificial nest boxes influence nest success in AMKE. I tested the hypothesis that nest success would increase with increased early successional habitat within a 500m radius around nest box locations. Prior to this study, artificial nest boxes (n=114) where placed available locations within the fall line sandhills ecoregion of Georgia (between Butler and Columbus) and nest success was recorded during the 2023 breeding season (May-July). I defined nest success as any nest with at least one chick successfully hatched from the clutch. Nest boxes were checked biweekly using peeper camera technology to monitor hatching status and chick development. Buffers (500m) were developed around each nest box using GIS and early successional habitat was delineated by canopy cover (<50% = early successional habitat) using aerial imagery <2 years old. Using logistic regression we found no relationship between nest success and proportion of early successional habitat within the 500m buffer [p(nest success)(df=113)=e(-1.6702+1.5087*(habitat)/(1+e(-1.6702+1.5087*(habitat)), p=0.094]. While the relationship was not significant at this buffer size, further research considering smaller and larger scales is needed to fully understand the influence early successional habitat may have of nest success for this important species of concern. Further study may inform more successful nest box installation by managers.

Do The Number of Hours Worked, Time Management, and Stress Predict GPA?

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Rural Studies

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Sponsor: Dr. Janet L. Koposko

Past studies have shown that there are differences in GPA based on whether or not a college student has a job or not (Watanabe, 2005). Previous studies have also examined stress among college students (Dundes & Marx, 2006). However, no studies have simultaneously examined the number of hours students work, their stress levels, and their time management skills. Considering that hours worked can influence time management and that effective time management can be a buffer against stress, the purpose of the present investigation is to examine how these three variables predict students' academic success. The independent variables will be number of hours worked on average each week, time management, and stress level. The dependent variable will be grade point average. Data will be collected through an online survey and results will be analyzed using linear regression. The expected outcome is that the number of hours worked will be a stronger predictor of grade point average than stress or time management. This study will contribute to the larger field of study by gaining a deeper understanding of the challenges faced by college students as they navigate employment and academics. It will provide insight into the complex dynamics of employment status, academic performance, and well-being among college students.

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Watanabe. L. E. (2005). The effects of college student employment on academic achievement. *The Pegasus Review: UCF Undergraduate Research Journal, 1*(1), 38-47.

eDNA Analysis to Detect Fungal Diseases in Waterways

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Biology

University of North Georgia
Sponsor: Dr. Jeanelle Morgan

Snakes are extremely important to the ecosystem. They keep prey populations in balance and without them it could cause severe damage to the ecosystem. Snake populations have been declining due to snake fungal disease. This disease is caused by the fungus Ophidiomyces ophiodiicola. This is a pathogen that has been emerging in North America and is starting to pose a significant threat to snake health and population sustainability. Some signs of snake fungal disease include localizing thickening or crusting of the skin, abnormal molting, and facial disfiguration. This usually leads to emaciation and even death. Ophidiomyces ophiodiicola can be detected in soil and waterways; however, little is known about the persistence and growth of the fungus in either environment. To observe how prevalent snake fungal disease is in the North Georgia Region, we are using eDNA, which is easier to collect without disturbing organisms. eDNA can be collected from many different environments including the soil and water bodies. We have confirmed our detection method and have determined the detection limit. We will report our fall 2023 sampling and detection results.

Effects of an Outdoor Environment on Student Behavior

Willow Gruber
Teacher Education and Elementary Education

Valdosta State University
Sponsor: Dr. Forrest R. Parker III

In an era marked by rising concerns about student behavior issues and their impact on the learning environment, this presentation delves into the promising realm of outdoor classrooms as a novel and effective strategy to address these challenges. Drawing upon a growing body of research and practical experiences, we explore how outdoor classrooms offer a unique and dynamic setting that can positively influence the behavior of students, particularly those struggling with behavioral issues. This presentation will begin by outlining the prevalence and consequences of behavior issues in today's educational settings. It will then transition into an in-depth analysis of the key benefits that outdoor classrooms can provide for students, teachers, and schools as a whole. From improved focus and reduced stress to enhanced social skills and heightened engagement, we will uncover the multitude of ways in which nature-based learning environments contribute to fostering positive behavior. Furthermore, we will discuss the practical aspects of implementing outdoor classrooms, offering insights into design considerations, safety measures, and curriculum integration. Real-world case studies will be presented to highlight successful examples of schools that have leveraged outdoor classrooms to effectively address behavior issues and create inclusive, nurturing learning environments. By the end of this presentation, attendees will gain a comprehensive understanding of the potential of outdoor classrooms in transforming the educational experience and positively impacting the behavior of students. We will also address potential challenges and provide strategies for overcoming them, ensuring that educators and administrators leave with actionable insights to consider when contemplating the integration of outdoor classrooms into their own educational environments. Join us in this exploration of how the natural world can be harnessed to inspire positive behavioral change in our students and promote a more harmonious and productive learning atmosphere.

Elucidating the Effects of Artificial Lighting on African Mammal Behavior

Lillie Hayes
Biology

University of North Georgia
Sponsor: Dr. Jessy Patterson

Ecosystems and wildlife populations around the globe are being affected by anthropogenic influences. Wildlife-based tourism has been widely debated in the ecology field, as it provides economic and educational values, but can significantly alter wildlife habitat and behavior. One area that needs more focus is the effects of artificial lighting on African mammal behavior. Our research provides greater insight into human effects on mammalian species by examining the differences in behavior at artificially lit and unlit waterholes on the Ongava Game Reserve in Namibia. We observed and documented mammalian behaviors (i.e., movement, drinking, and vigilance) for 12 species using security camera footage from four waterholes, two lit and two unlit. We compared the number of behaviors between waterhole types, the number of behaviors with each other, and the number of behaviors between waterhole types for each species using separate generalized linear mixed models with a Poisson distribution. Between waterhole types, the number of vigilance behaviors and times that animals moved around the waterholes were different. Further, we found 10 pairs of behaviors that were significantly different from each other between waterhole types. Lastly, five species, black-faced impala (Aepyceros melampus petersi), giraffe (Giraffa camelopardalis angolensis), greater kudu (Tragelaphus strepsiceros), oryx (Oryx gazella) and steenbok (Raphicerus campestris), had a significantly different number of behaviors between waterhole type. These results shed new light on the widely unexplored impacts of ecotourism in Africa.

How Home Culture and Age Impact English Language Learning?: An International ESOL Comparative Case Study

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Valdosta State University
Sponsor: Dr. Luis G. Bejarano

There are many factors that can influence a learner's acquisition of a second language, and these are even more relevant when comparing two different ESOL students in two different countries. This poster examines the cultural, linguistic, and geographical factors as well as the age of the individuals, and how these factors can impact different English language learners (ELLs). It will then examine variables prevalent in ESOL learners in the US, such as lack of identification with the dominant culture and socio-cultural, as well as linguistic variables including accent, ronunciation, and syntax. The research compares findings from an adult ELL in the United States and an adolescent ELL in Costa Rica (where the researcher taught ESOL in the Summer of 2022). Methods of data collection include phone and video calls, conversations with the informants, a questionnaire, speaking with family members, observation of class, and face-to-face English teaching. As for data analysis, the hypotheses developed were analyzed to be proved or refuted after observing and interviewing the informants. Some pedagogical implications were developed after the case study and the researcher's first-hand experience teaching ELLs in Costa Rica, regarding how different ELLs home cultures and comfort levels can affect their motivation to learn English. This study further contributes to the research that language teachers need to acknowledge the many diverse backgrounds and factors affecting their ESOL students.

Enhancing Secondary Study Spaces: An Exploratory Study of the Effects of Environment and Information irculation on the Popularity of Study Spaces on College Campuses

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University of West Georgia
Sponsor: Prof. Taylor Bryant

This research project aims to evaluate environmental factors in secondary study spaces on college campuses. bluestone, the University of West Georgia's student-run public relations firm, worked with Ingram Library to answer the question, "How do environmental factors and the circulation of information affect the popularity and utilization of secondary study spaces on college campuses?" This research aided in a better understanding which factors influenced the popularity of study spots on campus. bluestone compiled data from previous qualitative and quantitative surveys during the research phase. The firm examined the overall attractiveness of the library as a study space on the University of West Georgia's Carrollton campus. Students surveyed the appearance and layout of the library on-site and compiled a list of potential changes to increase foot traffic within the building. The students also observed regional library systems as well as other college libraries to understand what appeals to students. bluestone created three objectives to increase foot traffic within the physical library space: update directories, create ergonomic spaces and increase the flow of information to the campus. The firm drafted floor plan models, re-branding boards and social media templates to achieve all of these objectives. After collaborating with Ingram Library, bluestone found an increase in engagement on the library's Instagram account and in foot traffic to the secondary floor in the building. The firm has began replicating many of the findings in its own office space by creating a more open floor plan to encourage interaction. The findings of this study will help encourage students to create connections and utilize secondary spaces when studying on college campuses. Ultimately, the findings of this study can be applied to secondary spaces looking to attract more students.

Examining the Role of Autophagy Regulator Atg7 on the Tumor Immune Response of Melanoma

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The University of Georgia
Sponsors: Dr. George Souroullas and Dr. Sarah Zimmerman

Mutations in epigenetic modifiers can lead to immunotherapy resistance in melanoma, the deadliest form of skin cancer. In recent years, advancements in immunotherapy treatments have shown great promise. Despite these developments, however, a significant population of melanoma patients treated with immunotherapy still experience cancer progression, relapse, or treatment toxicity. Thus, our understanding of how epigenetic mutations influence the tumor immune microenvironment is incomplete. A common mutation in melanoma occurs on EZH2, the catalytic component of Polycomb Repressive Complex 2. EZH2 methylates histone 3 lysine 27 (H3K27me3) and functions as a transcriptional repressor. Our lab previously showed that in mouse models of $Ezh2^{Y641F}$ melanoma, Ezh2 methylates and interacts with Stat3, an IFN signaling regulatory protein, and is linked to altered immune responses. Together with Stat3, Ezh2 paradoxically acts as a transcriptional activator that promotes expression of numerous genes, including Atg7, an essential regulator of autophagy. Autophagy is associated with improved tumor antigen presentation and increased immune cell recruitment, but the specific mechanism is not yet known. In this study, we used CRISPR/Cas9 to generate Atg7 knockouts in five $Ezh2^{WT}$ and $Ezh2^{Y641F}$ mouse melanoma cell lines on a $Braf^{V600E}Pten^{F/F}$ background, driven by the melanocyte-specific tyrosinase Cre. Two of these cell lines were injected into mice and the resulting tumors were analyzed for infiltrating immune cells via flow cytometry. We found no significant differences in overall blood cell infiltration (CD45+) between the Atg7 control and KO for the neither WT nor the Y641F mutant. There was an unexpected increase in NK1.1+ cells in both the WT and Y641F mutant after Atg7 deletion, raising new questions about the role of these cells in melanoma immune responses. Repeating this study in the remaining cell lines is necessary to strengthen these findings. Further studying how Atg7 leads to increased NK cell infiltration could lead to improvements in immunotherapy approaches for melanoma patients.

Exploring Kepler 62f's Climate Dynamics through an Energy Balance Model

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Valdosta State University
Sponsor: Dr. Billy Quarles

Energy balance models evaluate thermal diffusion within the atmosphere of an Earthlike planet, and thus are useful for evaluating the potential climates of planets within the habitable zone of their host star. The habitable zone simply marks the orbital distances where the radiative flux from the host star could plausibly be sufficient to allow for water on the surface of a terrestrial planet. We use a 1D energy balance model, an open-source python package called ClimLab, to evaluate how changes in the spin of Kepler-62f affect its potential climate. The axial tilt of Kepler-62f is perturbed by its neighboring planets, which can cause variations in the seasonal production of ice on its surface. The climate of Kepler-62f can be modified through feedback from the changes in the planet's reflectivity, which is similar to Earth's Milankovitch cycles, or periods of glacial advance and retreat. Our results show that the extent of ice coverage on Kepler-62f does not vary greatly because the axial tilt remains stable. Modeling the potential climates of exoplanets, like Kepler-62f, using energy balance models can be helpful to better target other possible reservoirs for life in our Galaxy.

Exploring Snail Shell Morphology and Evolution in the Diverse Ecosystems of Chile

Maya Stevens
Biology

Valdosta State University
Sponsor: Dr. John Phillips and Dr. Uyeno

Snail shells (made of calcium carbonate) are shaped to function as an exoskeleton to protect the snails against predators and environmental hazards. These shells have a long evolutionary history, with diverse forms and structures developed over millions of years. Shell shapes, sizes, and designs often vary among different species, even some closely related taxa. This variation has intrigued scientists for centuries due to its complexity. One region that displays significant snail remarkable biodiversity across different ecosystems is the Andes Mountains in western South America. Within this region, Chile especially contains diverse environments and many unique snail species, which makes it a great place to investigate the adaptation and evolution of snail morphology. Chile ranges from the Atacama Desert in the north to temperate rainforests in the south, which can provide an understanding of the influence of various environments on snail shell morphology and evolution. In this study, we analyzed shells of land snail species from Chile to understand their morphology. All Chilean snails were x-rayed with an Inspex20i Digital X-ray and digitized in R to assign multiple landmarks of each shell for shape analysis. The analysis of snail shapes can serve as a beneficial resource to reveal the complex relationships between organisms and their environments.

Exploring Veteran Identity through Lyric Analysis

Trenholm Fahy, Lilla Gillen, and Lauren Gibson
Psychological Sciences

Georgia College and State University
Sponsor: Dr. Sephanie E. Jett

Researchers 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 variables and ask the group of interest to provide responses without being included in the research process or reaping any direct benefit from participation. A high degree of distrust and disenfranchisement is present within the Veteran community towards the mental health care system and scientists. We aim to use a Community-based Participatory Action Research (CbPAR) model to amplify their voices and focus on what is important to them. We are seeking to allow Veterans to define their identity in their own words. Researchers serve as messengers to help amplify Veteran voices and disseminate their stories to the larger community. This study is part of a larger research project using both photovoice and lyric analysis to help define the "sights and sounds" of Veteran identity. In this study, we asked Veterans to identify songs that answered the question, "What does being a Veteran mean to you?" Veterans worked individually and in groups with researchers through the process of lyric analysis and thematic exploration. Lyric analysis is a music therapy intervention in which the client and therapist listen to a song together and discuss the connection the lyrics have to the client's life experiences. Transcripts of interviews are being analyzed to uncover shared themes that help researchers understand how they conceptualize their identity as Veterans. External validity will be addressed through member checking, in which participants will review transcripts, discuss identified themes, and choose songs to present as a part of an immersive, interactive gallery experience for the community to allow for their stories to be told. We assert that more research should be done with the Veteran community, not to them.

Exploring Veteran Identity using the Photovoice Technique

Meredith Robertson, Haley Blackwell, and Dawson Robinson
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Georgia College and State University
Sponsor: Dr. Stephanie E. Jett

Veteran identity has been operationalized to be a Veteran's self-concept deriving from their shared military experiences. After separation from service, many Veterans experience "reverse culture shock," which can negatively impact interpersonal relationships and results in negative feelings such as helplessness, isolation, and emotional disconnection. Understanding how Veterans define themselves in their civilian lives can give us insight that could bridge the gaps between them and their available support systems. We utilized a qualitative, community-based participatory action research (CbPAR) model which empowers Veterans to use their personal voices to tell their stories and help researchers communicate those stories to the community. In this framework, we employed the Photovoice technique where Veterans take pictures that represent the answer to the following prompt: What does being a Veteran mean to you? This study is part of a larger project using photovoice and lyric analysis to help define the "sights and sounds" of Veteran identity. Veterans were then asked questions individually and as a group to help the researchers understand the meaning of the images relating to the prompt. Transcripts of the interviews are being analyzed to uncover common themes and elements that represent a definition of Veteran identity. The conceptual framework for this project was presented last year. This year, the preliminary results of these analyses will be discussed. To allow Veterans' stories to be told to the public, our next aim is to create an immersive, interactive gallery reflecting their experiences through their photos. We argue that without more emphasis on qualitative, CbPAR methodologies, research with special and/or marginalized populations, like Veterans, will continue to be more exploitative than beneficial for them. CbPAR methods help eliminate the distrust in scientists and clinicians already experienced by many in these populations.

Flexible Energy Sources using Embedded PVDF Films

Chloe Taylor
Engineering

The University of Alabama
Sponsor: Dr. Mark Ming-Cheng Cheng

Power is required for wearable devices. In this research, we have focused on self-powered energy sources that can harvest both mechanical from motion as well as magnetic field. Due to high piezoelectric coefficient, outstanding stability, and excellent flexibility. b-phase polyvinylidene fluoride (PVDF) is the most well investigated piezoelectric polymer material. Because PVDF lacks magnetic characteristics we use Iron (III) Oxide magnetic nanoparticles to introduce magnetic properties. This summer I investigated the embedding of Iron (III) Oxide nanoparticles (magnetic) in PVDF films with two distinct Iron (III) Oxide mass fractions, (1) 20%, (2) 40% and one without any magnetic property (added 40% Iron (III) Oxide, alphas phase) as a control, as well as their applications.

From Worms to Wonders: Exploring Total Protein Isolation in C. elegans

Andrew Jimenez
Science and Mathematics

Abraham Baldwin Agricultural College
Sponsor: Heather M. Cathcart

C. elegans is a popular model organism used in studying neurological disorders like dementia. Our research focuses on a specific protein, APL-1, which is an ortholog similar to human amyloid precursor protein linked to early onset Alzheimer's disease. The ynIs-79 strain is an overexpression mutant in which accumulation of the protein causes larval lethality, molting defects, and motor dysfunction. This mutant overexpresses APl-1 in ventral cord neurons and is tagged with a GFP marker. Thus far, we have used a traditional protein extraction assay as well as a sonication protein extraction to determine the baseline concentrations of total protein in various C. elegans strains. These techniques will serve to maximize total protein concentration to quantify APL-1 using Western Blot analysis. The traditional protein extraction yields low total protein and reduces the chances of identifying APL-1, while the sonication extraction technique yields higher total protein. Finally, optimizing the protein isolation will allow us to accurately quantify the APL-1 protein at specific stages of the nematode's life cycle when raised in the presence of various antioxidant compounds.

Geographic Distribution and Dirofilaria immitis Infection rates in members of the Anopheles crucians s.l. Species Complex in South Georgia

Zoe Barrett and Tod Butenschon
Biology

Valdosta State University
Sponsor: Dr. Eric W. Chambers

Dirofilaria immitis is a parasitic roundworm commonly known to cause heartworm disease in domestic dogs, cats, and wild canids. Mosquitoes are the obligatory intermediate hosts. This study delves into the role that the mosquito species complex, Anopheles crucians s. l. plays in transmission. The An. crucians s. l. complex consists of six mosquito species that are not readily identifiable by keys at the adult stage. Our study used mosquitoes collected previously in Lowndes County, GA by a VSU graduate student. The questions we sought to answer were: (1) What members of the An. crucians species complex were present in Lowndes County, GA and (2) What was the rate of infection of D. immitis within the An. crucians species complex. We used polymerase-chain reaction (PCR) and agarose gel electrophoresis to answer these questions. We amplified the ITS2 rDNA gene by PCR to determine which species were present and we used PCR amplification of the D. immitis ITS2 16S gene to determine infected mosquitoes. We found three different species of An. crucians s.l. in Lowndes County: species A, species C, and species D. The minimum rate of infection within the An. crucians s.l. mosquitoes screened in this study was 4.7%. Based on this work we believe that further investigation into D. immitis transmission by An. crucians s.l. is warranted.

Gopher Tortoise Activity and Behavioral Patterns at Lake Louise Field Station in Valdosta, Georgia

Shyanne Christner
Biology

Valdosta State University
Sponsor: Dr. J. Mitchell Lockhart

The Gopher tortoise (Gopherus polyphemus) is a federally protected, keystone species in the southeastern Coastal Plains. Understanding behavioral patterns of Gopher tortoises may be essential to further the recovery of populations. We utilized past data from a year-long (2019-2020) camera trap study at Lake Louise Field Station in Lowndes County, Georgia, to survey and classify tortoise behavior. We sorted more than 1,000 tortoise videos by common observational data (hour, day, month temperature and precipitation). Videos of Gopher tortoises were analyzed for behavioral patterns including basking, entering, exiting, digging, mating, and egg-laying. Initial observations indicate Gopher tortoises were found to be most active from May-July between 12:00-16:00. We hope the information collected can contribute to the maintenance and restoration of this threatened species.

Green Tech Oyster Restoration: Saving the Ocean One Bivalve at a Time

Thomas Wilson
Chemistry

Valdosta State University
Sponsors: Dr. Thomas Manning and Dr. James Nienow

Oysters are a critical environmental tool that has a tremendous impact on coastal ecosystems. Oyster bars prevent shoreline erosion, which is becoming a growing problem are destructive storms are on the rise. Oysters are a keystone species responsive for a number of species, from various fish to crabs. Finally, a single oyster can filter up to 50 gallons of water per day, making an oyster bar with millions of oysters an incredible natural filtration system. Worldwide oyster populations are down almost 90%. Our group is testing several materials for use in oyster restoration that are green technology. We have received permits from the state of Florida and the United States Army Corp of Engineers for our three-year project. This talk will outline our current materials and some of their specific advantages compared to other restoration methods. Scanning Electron Microscopy is used to examine the fine structure of oyster shells and elemental analysis provides some interesting measurements, such as the identification of tellurium in the shells.

How Age Impacts Perceptions of Credibility as a Function of Author Race and Gender Identity

Daniel Faulkner
Psychology

Valdosta State University
Sponsor: Dr. Mark A. Whatley

I examined whether participant age, author gender, and racial identities influenced perceived author credibility. Participants (N = 135) read an article about university inclusivity where author race (White or Black) and gender identity (cisgender or transgender) were manipulated. The participant variable of age (younger or older) was created by a median split analysis. After participants read the article, they rated the author on credibility. Credibility was assessed with a modified version of McCroskey and Teven's (1999) measure of source credibility. The results showed a significant main effect for participant age and were qualified by a two and three-way interaction. The overall pattern of results indicated an increase of favorability toward the Black transgender author among older participants, whereas younger participants were more favorable toward the White transgender author. Results are discussed in regard to social comparison theory.

How Organized Sports Help Kids with Behavioral Issues

Savannah Stephenson
Teacher Education and Elementary Education

Valdosta State University
Sponsor: Dr. Forrest R. Parker III

In today's educational landscape, addressing behavior issues among students has become a critical concern for educators, parents, and society at large. This presentation explores the profound impact of organized sports on students with behavior issues, shedding light on the multifaceted benefits that extend beyond the playing field. This poster delves into the transformative potential of sports programs as a powerful tool for fostering positive behavior and personal growth in students. My poster presentation draws from an extensive body of research, case studies, and real-world examples to highlight the following key points: Physical Health and Well-being: Participation in organized sports promotes physical fitness, health awareness, and a sense of well-being among students. It helps combat sedentary lifestyles, obesity, and related behavioral issues, ultimately leading to improved self-esteem and body image. Teamwork and Social Skills: Sports encourage collaboration, communication, and teamwork. Students with behavior issues often struggle with interpersonal relationships, and sports provide a structured environment where they can learn to work effectively with others, manage conflicts, and develop essential social skills. Discipline and Time Management: Commitment to a sports team requires discipline and time management skills. Through regular practice and competitions, students learn to prioritize responsibilities, set goals, and adhere to schedules, which can positively influence their behavior in the classroom and beyond. Self-confidence and Self-esteem: Success in sports can be a significant source of self-confidence and self-esteem for students. As they achieve personal and team goals, they gain a sense of accomplishment, which can translate into improved behavior and attitude in other aspects of their lives. Emotional Regulation: Sports provide a safe outlet for students to express and regulate their emotions. Engaging in physical activity helps reduce stress, anxiety, and frustration, offering an alternative means of coping with challenging emotions and improving emotional stability. Sense of Belonging: Belonging to a sports team fosters a sense of community and belonging for students, which can counter feelings of isolation and disconnection. This sense of belonging can have a profound impact on their behavior, leading to more positive interactions with peers and teachers. Conflict Resolution Skills: Sports often involve competition and conflicts, which provide valuable opportunities for students to learn conflict resolution skills, including negotiation, compromise, and respectful communication. Through a comprehensive examination of these factors, this presentation aims to provide educators, parents, and stakeholders with a deeper understanding of how organized sports can be a powerful intervention tool for students with behavior issues. By harnessing the inherent benefits of sports programs, we can help these students build a foundation for improved behavior, personal growth, and a brighter future.

Identification of Gene Regulators of Germline Development in C. elegans

Tara Chandhok
Biology

Oxford/Emory
Sponsor: Dr. Sheldon R. Lawrence II

The regulation of stem cell proliferation vs. differentiation lies at the heart of many biological and biomedical problems ranging from fetal development to tissue engineering to aging and death. The specification of the germline stem cells, the robust maintenance of this population and its differentiated descendants that form gametes are essential to an organism's function. We study cell signaling pathways that regulate stem cells and the germline stem cell niche in C.elegans. We seek to address a key question in stem cell biology about how the balance between stem-like and differentiating cell fates are maintained and regulated. C.elegans is an ideal model to address this question. In a study to identify gene regulators of germline development, we conducted RNAi screens of three genes (Jun-1, Xtr-2 and JMJD-3.2) to elucidate their potential role in germ stem cell proliferation in *C.elegans*.

Identification of the Origin of Pediatric Glioblastomas using Human Embryonic Stem Cells

Autumn Hampton
Biomedical Physiology and Sociology

University of Georgia
Sponsor: Dr. Kosuke Funato

Glioblastomas are highly aggressive tumors that affect the central nervous system (CNS), and these tumors occur mainly in adults but also impact children and young adults. There are many brain tumor entities, and each entity exhibits a distinctive molecular profile. Our objective is to understand the differences between these brain tumor entities, particularly in children. In this project, we focus on the BCOR-subtype, in which the BCOR gene is mutated. The BCOR gene encodes the BCL-6 corepressor protein that does not attach itself to DNA but interacts with other proteins that bind to DNA and suppress the activity of a variety of genes. However, neither the cell of origin of this subtype nor the role of BCOR in glioblastoma is known. To address these questions, we utilize human embryonic stem (hES) cells as a model system. Our plan is to derive particular types of neuronal cells from hES cells by controlling developmental signaling pathways using combinations of growth factors and small molecule inhibitors. We then introduce the mutations to evaluate if the mutations transform particular cell types. More specifically, we knock out the p53 gene in hES cells by CRISPR/Cas9 system and introduce mutant BCOR gene into hES cell-derived neural progenitor cells by the "Sleeping Beauty" transposon system. Our study will provide us with an important insight into the molecular mechanisms underlying the formation of glioblastoma in children and facilitate the development of diagnosis and appropriate therapies for glioblastomas and patients with these tumors.

Identifying Need in the Animal Medicine Industry

Danielle Ross
Chemistry

Valdosta State University
Sponsor: Dr. Thomas Manning

This project is focused on a review of over one hundred medications that veterinarians use for animals, from pets and livestock to wild animals. The FDA approves animal drugs on three levels: Approval, Conditional Approval, and Indexing (1). Indexing allows for the drug listed on the Index to be unapproved but has legal marketing status. This project is focusing on identifying novel medications for animals that could be Indexed and potentially used by an industrial partner (2). For example, we (VSU) have developed a novel medication that has been tested by the National Cancer Institute (in vitro) against melanoma (see figure 1). This drug could be used to treat animals, ranging from horses to cattle that contract melanoma. A large producer of animal medications is being contacted to see if our medications interest them. Our list will provide a baseline of what is currently being used and working, and where there is a need.

Impact of Fire on Germination Rates of Root Hemiparasite, Seymeria cassioides (Orobanchaceae)

John Thomas Prater
Arts and Sciences

Abraham Baldwin Agricultural College
Sponsor: Dr. Benjamin Gahagen

Seymeria cassioides is a root hemiparasite in the Orobanchaceae and has a widespread distribution in the southeastern US. Members of this species are mostly found in woodlands dominated by pines, which serve as hosts to this parasite. Evidence suggests that S. cassioides can have detrimental effects on pine seedlings and impact the overall growth rate if they are not controlled. While fire positively impacts germination rates and overall regeneration of pine seeds, little is known about the impact fire has on S. cassoides. Since the use of herbicides and other similar means of control can also negatively impact the health of the pines, an alternative must be found. This study aims to further investigate how fire can impact germination rates of S. cassioides. Seymeria cassioides seeds were subjected to three different temperature treatments of 100oC, 120oC, and 150oC. Approximately 1000 seeds for each group were sterilized and spread between three sterilized glass petri dishes with filter paper. Seeds were monitored every day for signs of germination. Germination was defined by cotyledons emergence. Results indicate that the germination rates of the control, 100 oC, and 120 oC groups are similar, with no germination on the 150 oC treatment seeds. For the logging industry, routine high temperature-controlled burns could diminish the population size of S. cassioides and reduce the damage to pine growth. Seeds deeper in the soil located in the seed bank may be subjected to less severe temperatures however and still survive. With controlled burns reaching temperatures of up to 440 oC most of the seeds on or near the surface should be rendered unviable by the heat.

Implementing Tracking Abilities for Sensor Retrieval in USVs using Computer Vision

Morgan McCaskill
Mathematics

Francis Marion University
Sponsor: Dr. K. Daniel Brauss

The Nimboat is an Unmanned Surface Vehicle (USV) designed to deploy and retrieve underwater sensors that monitor environmental conditions in secluded Alaskan beaver ponds. Our team worked on restoring the Nimboat to its original condition and adding an object detection component for tracking buoys attached to the sensors during retrieval. Several simple trackers were coded and uploaded to the boat's Raspberry Pi. Because the buoys are still in development, each tracker was tested on a makeshift buoy to determine the one with the highest performance. Comparative data collection for the trackers is ongoing. Future directions for the project include improving the best simple tracker further, making the boat autonomous, and revisiting the arm design of the boat to add more degrees of freedom in its movement.

Indole-3 Acetic Acid induces Arteriolar Vasodilation by Stimulating Nitric Oxide Production from Endothelial Cells

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Pharmaceutical Sciences

Mercer University
Sponsor: Dr. Raquibul Hasan

BACKGROUND: Indole-3-acetic acid (IAA), popularly known as auxin, is a plant growth hormone that is also produced in the human body when tryptophan is metabolized by the gut microbiota. A few previous studies suggest that IAA has antioxidant and anti-inflammatory actions. However, the effect of IAA on the regulation of arterial contractility remains unexplored. In this study, we demonstrate that IAA relaxes small mesenteric arteries by stimulating endothelial nitric oxide (NO) production.

METHODS: To study arterial contractility, pressure myography was used. Small mesenteric artery segments isolated from the Sprague Dawley rat of between 6-10 weeks were cannulated and maintained at 37˚C in a perfusion chamber. Intraluminal pressure was gradually increased to 80 mmHg. Then, IAA (0.01 nM -1 μM) were applied after the development of myogenic tones at 80 mmHg. Diameter changes were tracked and analyzed.

RESULT: Our pressure myography data shows that IAA produces vasodilation in myogenic mesenteric arteries in a dose-dependent manner. Endothelium removal reduces IAA-evoked vasodilation in myogenic arteries, suggesting the involvement of endothelial signaling in this process. Our Western blotting and NO fluorescence analyses reveal that IAA enhances the phosphorylation and activation of endothelial nitric oxide synthase (eNOS), leading to NO production and vasodilation. In a related study, our laboratory has demonstrated that IAA inhibits vasoconstriction induced by endothelin-1 by directly binding to and blocking ETA and ETB receptors. Overall, our data suggests that IAA is a multimodal vasodilator whereby it stimulates endothelial nitric oxide production and competitively blocks ET-1 receptors in vascular smooth muscle cells.

CONCLUSION: Altogether, we demonstrate that IAA is a novel regulator of arterial contractility with multimodal actions. IAA holds the promise to be a next generation of hypertensive drugs with unique vascular actions, which may explain profound antihypertensive action of IAA as reported by our lab.

Insight on Ferrochelatase as a Novel Therapeutic Target

Shreya Raj
Biochemistry

University of Georgia
Sponsor: Dr. Amy Medlock

Ferrochelatase catalyzes the final step of the heme biosynthesis pathway, specifically, the incorporation of ferrous iron into protoporphyrin IX to produce heme. An interesting characteristic of the protoporphyrin IX substrate is its photoreactivity, rendering cells with high protoporphyrin IX buildup susceptible to photodynamic therapy for cancer treatment. To date, 5-aminolevulinic acid is administered to generate protoporphyrin IX accumulation in patients with prostate cancer, glioblastoma, and cutaneous leishmaniasis as a target during photodynamic therapy. Further, ferrochelatase inhibition depletes the heme cofactor; depletion has recently been linked to the treatment of ocular angiogenesis. Due to the growing importance of ferrochelatase in disease treatment, there have been efforts to identify potent small-molecule inhibitors of the enzyme. Thus, we sought to identify and evaluate small-molecule inhibitors of ferrochelatase via a three-phase approach. Phase I involves in vitro kinetic assays to monitor ferrochelatase enzyme activity in the presence of different potential inhibitors. Phase II involves co-crystallization of ferrochelatase with the potential inhibitors to elucidate the structure of the ferrochelatase enzyme-inhibitor-substrate complex. Phase III involves in vivo analysis to understand how the compound affects heme synthesis in human erythroleukemia cells. Our findings revealed novel small-molecule inhibitors of ferrochelatase, and that a previously identified inhibitor (vemurafenib) does not inhibit the enzyme in vitro. These results suggest that there are new small molecule inhibitors of ferrochelatase. This will ultimately reduce the gap in knowledge and treat diseases associated with both protoporphyrin IX buildup and heme depletion.

Investigating the Effect of Seasonal Variation on Cirri Appendages in Dwarf Seahorses

Paige Bland and Dalila Sanchez
Biology

Valdosta State University
Sponsor: Dr. Emily Rose

Seahorses are cryptic fishes found in coastal marine environments that grow skin filaments, also known as cirri. Cirri presence has been reported to vary across seahorse species and tend to disappear in captive individuals, but we do not know what factors cause changes in cirri length and appearance. By analyzing the cirri on seahorses from various collection events throughout the year in Tampa Bay, we aim to determine what environmental factors influence the presence of cirri across the sexes and age distributions in the wild. Seahorses were photographed after collection and cirri were documented for four locations on the fish's body, including eyes, head, crown, and body segments. Preliminary results indicate that cirri on some parts of the body are more numerous and ornamented in the summer months while seahorse populations are more dense in the wild. Analyses are being conducted to determine if the presence of the cirri varies across the juveniles compared to sexually mature adult seahorses. Previous studies on European seahorses indicate that larger fish had more cirri, therefore future directions include measuring body sizes of the seahorses to investigate this relationship in the dwarf seahorse. The results from this illuminate potential seasonal adaptations to changing environmental conditions for wild populations of seahorses. This research presentation will be on-site.

License Plate Upscaling with Super Resolution Generative Adversarial Network

Yuzheng Mei
Electrical and Computer Engineering

Georgia Southern University
Sponsor: Dr. Rami J. Haddad

The car license plates are mainly used to identify vehicles. However, even a 4K camera on top of a building could not capture a good image of a license plate on the street because, after zooming in on the license plate, the resolution becomes very low. In order to improve the quality of the image and use it to identify the tag number on the license plate, we proposed using two Convolutional Neural Networks, a Generator, and a Discriminator, that are trained to up-sample a license plate and improve the visual quality of it. The two networks were trained simultaneously within the Generative Adversarial Network structure. The main focus is to enhance the image quality of low-resolution license plates to be able to recognize the license plate tag. High-resolution (HR) images of license plates with random tag numbers were generated as training samples. Then, they were down-sampled and fed into the generator to produce an upscaled super-resolution (SR) image. Subsequently, the discriminator tried to predict if the image is SR or HR, and the result was used to train the Generator. Low-resolution images ranging from 16x16 to 64x64 were upscaled to super-resolution ranging from 64x64 to 256x256. The images were compared with interpolated images of the same size combinations using Peak Signal-to-noise Ratio and structural Index as the evaluation metrics. The resultant SR images' PSNR is almost double the interpolated LR images' PSNR. This proposed novel network could eventually be utilized by law enforcement to identify vehicles using low-quality images, which is currently impossible when utilizing the security camera's low-resolution footage of the license plate. This method of improving the quality of images does not only apply to license plates and law enforcement; it can also be used to improve medical images or restore historical images using low-quality images, which is currently impossible when utilizing the security camera's low-resolution footage of the license plate. This method of improving the quality of images does not only apply to license plates and law enforcement; it can also be used to improve medical images or restore historical images.

Listen to Them Play: A LENA Communication Analysis of Children with Autism in Makerspace Environments

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Speech-Language Pathology

University of West Georgia
Sponsor: Dr. Kay Green

The research is clear that children engaged in the classroom are more likely to have increased academic achievement and social communication skills. Creating hands-on, problem-based, creative activities that interest children with disabilities may increase student engagement. A maker space learning environment is one way to increase both student interest and engagement. A maker space is a learning environment providing hands-on experiences that allow students to collaborate, create, and actively engage with one another. In this environment, students are given resources that interest them and spark questions. Due to the creative nature of a makerspace environment, this is a space in which all children can find success. This type of environment can also promote social communication skills, child vocalizations, and conversation skills. Though there are many studies on maker space learning environments, there is a paucity of research conducted on students with disabilities. The current study had two purposes: 1) the researchers investigated how an inclusive makerspace learning environment promotes student communication skills, engagement with other children, child vocalizations, and conversation turn counts, as measured by LENA devices. 2) the researchers investigated which station promoted the most child engagement in the makerspace stations, as measured by the Seek and Share Resources Tool (White et al., 2022). In the current study, researchers recruited five children ages 5 to 7 to participate in a 3-day makerspace summer camp for two consecutive summers. Three of the five child participants were diagnosed with autism spectrum disorder (ASD). The camp was housed in a university early learning center classroom, designed specifically as a makerspace environment. The instructors included two graduate assistants, three faculty members, and one 3D printing staff expert. The disciplines of the instructors included Communication Sciences and Disorders, Early Childhood Special Education, and Instructional Technology. The instructors designed the environment to be inclusive by using visual supports, verbal cues, explicit instruction, and environmental considerations and supports, such as pacing, location of materials, and types of materials. Data were collected via LENA devices and video recording for coding (for the measurement of the Seek and Share Resources Tool). Within the first summer camp, the researchers used a single-case alternative treatment design to determine which makerspace station promoted the most student engagement and LENA devices to determine how the makerspace environment promoted communication skills. In both analyses, the researchers found that the small group guided stations, as opposed to the free play stations and the large group interactive reading stations, promoted the most student engagement and conversational turn counts. The small group guided station included activities such as building play doh circuits and small robots. The child-to-teacher ratio at the small group station was two children per adult. The second summer camp will occur in the Fall of 2023. The researchers will continue with the camp, as designed in 2022, and include a social validity measure. This poster presentation will include the cumulative results from both summer camps.

Modeling the Orbital Dynamics of Super Earth Kepler-62f

Jordan Hewins, Ian McLean, and Jasmine Freeman
Mathematics and Physics

Valdosta State University
Sponsor: Dr. Billy Quarles

NASA's Kepler mission surveyed a portion of the Milky Way Galaxy for exoplanets, which was a resounding success, giving us over 2,600 exoplanets to study. Kepler-62f is one of the first potentially habitable exoplanets discovered by Kepler, as defined by its orbit within the habitable zone of its host star. The habitable zone does not guarantee that life exists, rather it points to the possibility for water to exist on the surface of the planet. We simulate the orbital dynamics of kepler-62f around its host star using an n-body software called rebound, which also offers visualization capabilities for simulation results that make it easier to evaluate the complex orbital dynamics of the whole planetary system. The previously determined best-fitting orbital parameters produce a gravitationally unstable system, where we revise the prior analysis taking orbital stability into account. We evaluate the tidal evolution of the new best fitting parameters to ensure that they are robust. Studying the orbital dynamics of Kepler-62f helps us understand how other possibly habitable exoplanets persist within their own unique environments. Further studies of this and other star systems may lead to insights on how orbital dynamics of exoplanets affect climate and potential habitability.

Morphological Assessment of Hawaiian Anolis carolinensis/porcatus Specimens

Mia Price
Biology

Valdosta State University
Sponsor: Dr. John G. Phillips

The taxonomic status of Hawaiian Anolis carolinensis/porcatus specimens has been a subject of ambiguity, due to morphological similarities between these two species often leading to misidentifications and their spreading geographic regions beginning to overlap. In response to this dilemma, this study aimed to assess and confirm the species status of these specimens within the Museum of Comparative Zoology (MCZ) collection. In order to accomplish this, the results of a recent study suggesting that there is a morphological difference in cheek scale counts between the two species was utilized.

Our results indicate that the average LORNUM (defined as scales bounded by the preoculars, supralabials, and canthal scales) scale count for the Hawaiian specimens falls within the range associated with Anolis carolinensis. While scale counts are not definitive confirmation, our morphological assessment suggests that these specimens likely belong to Anolis carolinensis rather than Anolis porcatus.

This finding supports the hypothesis that Anolis carolinensis is the sole green anole species successfully colonizing the Hawaiian Islands. Furthermore, our study underscores the importance of morphological characters, such as scale counts, in the accurate identification and classification of species, particularly in cases where morphological similarities challenge taxonomic discernment. This research contributes to the ongoing efforts to explain the distribution and taxonomy of green anoles in Hawaii and provides a valuable reference for future work in the field of herpetology.

My Contributions to GhostFragment, a Method to Compare Fragmentation

Walker Hayes
Physics

Valdosta State University
Sponsor: Dr. Ryan M. Richard

Due to the intensive computing time necessary to perform simulations of chemical reactions, fragmentation is often used to make the simulations run faster. Fragmentation involves breaking up systems of molecules into fragments each containing a portion of the atoms present in the system. Unfortunately, this fragmentation often leads to breaking bonds between atoms. The missing valence electron from the broken bond can cause discrepancies between the calculated energy of the system and what would occur in real life. In order to account for this difference, a hypothetical cap is placed on each end of the broken bond. Many methods exist for both fragmentation and capping strategies. The GhostFragment project's goal is to find the best method for both. To compare strategies, many functions must be created in order to run the simulations. This research details some of the tasks that needed to be completed to begin research and the strategies with which they were completed. These tasks include the following: creating a hydrocarbon generator that creates molecules to perform testing on, making a broken bond function to find bonds that were broken for each fragment, coding the weighted distance capping method, generating a function to assign charge and multiplicity to each fragment in a system, and finally making a function to find intersections between fragments to ensure double counting does not occur. Along with these tasks, many smaller tasks were completed as well to ensure ease of future development and testing.

Myth and Reality: Literary and Scientific Perspective in the Short Story "El hijo"/"The Son" by the Uruguayan Writer Horacio Quiroga

Aldo Madrigal Olivarez
Modern and Classical Languages

Valdosta State University
Sponsor: Dr. Ericka Helena Parra

In this work, we analyze the short story "El hijo" 'The Son' by the Uruguayan writer Horacio Quiroga (1878-1937) from a literary and scientific point of view. We focus on distinguishing myth from reality in the story and giving possible explanations for why the author chose certain words, phrases, or even ideas. There are three types of literary genres: narrative, lyrical, and dramatization. Under the genre of narrative, there are several subgenres, such as the story, the novel, the legend, the fable, and the epic. The methods used in this work are biographical criticism, an approach to genre and time period, and literary analysis. By examining the personal life of Horacio Quiroga, possible scientific connections were made with this short story. For example, how the author's psychological life is reflected in this work.

Nematode Navigators: Unraveling Alzheimer's Secrets using 3D Printed Mazes

Grayson Peek
Biology

Abraham Baldwin Agricultural College
Sponsor: Dr. Heather M. Cathcart

Alzheimer's Disease (AD) is a neurological disorder that hinders cognitive abilities, and it is associated with a buildup of truncated amyloid precursor proteins (APP) in the brain. The ease of manipulation of Caenorhabditis elegans makes them a popular model used for experimentation involving neurodegeneration. C. elegans expresses an APP related gene, apl-1 and we have a mutant strain, ynIs-79, which overexpresses APL-1 in the CNS. Tap habituation is the current method used for assessing memory. We tap the anterior and posterior end, then measure the number of taps required for the nematode to stop responding. We aim to use another tool to assess neurological dysfunction, a T-shaped mold to create a maze impression in agar. The material used to form the 3D cast must be autoclavable to prevent contamination. Initially we used polyethylene terephthalate glycol filament material, but this material was unable to withstand the elevated temperature and pressure of the autoclave. Future trials will use polypropylene filament to 3D print the T-maze and E. coli will be placed in one arm of the T-maze to entice the control or the ynIs-79 mutant. We expect there to be a difference in the ability of the ynIs-79 to navigate the maze when compared to controls.

Novel Medications for the Chikungunya Virus

Camden L. Reynolds-Mosley
Chemistry

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Sponsor: Dr. Thomas Manning

The Chikungunya Virus is a 200 nm by 150 nm RNA enveloped virus that primarily replicates in fibroblasts, causing severe joint pain and persistent inflammation in humans when transmitted through mosquito bites. Current medications for treatment include acetaminophen, paracetamol, and aspirin. It is most prevalent in South and Central America globally, with approximately 9% infection rates last year. Discovered during a 1952 outbreak in southern Tanzania, it has since spread to over forty countries across Asia, Africa, Europe, and the Americas. Unfortunately, there are currently no specific medications for this infection. My project utilizes QSAR (Quantitative Structure-Activity Relationship) calculations to explore antiviral medications designed for other RNA enveloped viruses, such as Flaviviridae, Alphaviridae, Togaviridae, Coronaviruses, Hepatitis D, Orthomyxoviruses, Paramyxoviridae, Rhabdoviruses, Filoviruses, and Bunyaviruses. While Filoviruses like Marburg and Ebola lack treatments, compounds like Remdesivir, developed for COVID-19, can be optimized using QSAR to create a new medicine for Chikungunya Virus infections.

Novel Synthesis and Anti-Viral Applications for a Marine Natural Product

Thomas Wilson and Vanessa Brignolle
Chemistry

Valdosta State University
Sponsor: Dr. Thomas Manning

Bryostatin is a marine natural product that has efficacy against cancer, HIV, Alzheimer's disease, Multiple Sclerosis, and Fragile X. It was originally extracted from a marine invertebrate at extremely low yields (14 tons of the invertebrate yield ½ oz of the drug). Its current cost is approximately 22 million USD/gram. This presentation will focus on two aspects of our work with bryostatin; a novel synthetic approach called pharmaceutical aquaculture. Our aquaculture approach is unique and may also hold opportunities to explore the ocean using a green tech approach for new pharmaceuticals; Bryostatin potential application against neurological diseases as an antiviral medication. We manage to string together in vitro and in vivo datum from several research groups, including ours, to suggest that difficult to detect viral infections may be a hidden cause of several neurological diseases.

Object Recognitions with Flex Sensor Glove using Classification Machine Learning Models

Elijah Philippe Noisin
Machine Learning, Data Science, and Computer Science

Georgia Gwinnett College
Sponsor: Dr. Sairam Tangirala

A low-cost smart glove system known as the "Flex Sensor Glove," which was developed by students at GGC. The system utilized an Arduino-based microcontroller and flex sensors on each finger to interpret an object's size and shape based on degree of finger flexion. The study aimed to assess the glove's capability to differentiate between cylindrical and spherical objects, with potential implications for object recognition using tactile sensors and machine learning. One notable challenge encountered during the study was the scarcity of data. To overcome this limitation, a data synthesis method was employed to generate additional training data. The study proceeded to evaluate four machine learning models: Random Forest, Support Vector Machine (SVM), AdaBoost, and Sklearn Neural Network. Each model was fine-tuned for optimal performance. The results revealed that Random Forest performed well, even when dealing with limited dimensions. SVM, when used without AdaBoost, also exhibited promise. AdaBoost proved effective in mitigating overfitting issues. However, the Sklearn Neural Network demonstrated strong performance during training but faced considerable challenges during the validation phase.

Palatable Food Seaking Following the Selective Norepinephrine Neurotoxin DSP-4 in Rats after Forced Abstinance

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School of Medicine

Mercer University
Sponsor: Dr. Ali Gheidi

A growing body of literature suggests that food seeking/taking and drug addiction overlap in neurobiology. For instance, many drugs of abuse, as well as palatable foods, recruit cortical neuronal ensembles. Unknown, however, is how neuromodulators, such as norepinephrine (NE) from the Locus Coeruleus (LC), perturb medial prefrontal cortex (mPFC) neuronal ensembles, and food-seeking. To investigate the relationship between food seeking/taking, neuronal ensembles, and NE, female rats were required to lever press (FR1) for banana-flavored sugar pellets for ten days. To minimize stress to the animals, they were not weighed and lavaged (to determine the estrus cycle) until day 6 of the study. On day 10 of sugar pellet self-administration, the rats were injected with the selective Norepinephrine neurotoxin DSP-4 (50 mg/kg/.i.p) or saline and placed in home cages for ten days. On day 20, rats were given a single re-exposure session to the self-administration context (without sugar pellet delivery). Their responses were recorded for one hour. One and half hours following the start of this re-exposure session, rats were transcardially perfused, and the mPFC was sectioned for dual immunofluorescence (IF) for the immediate early gene Fos and dopamine beta-hydroxylase (DβH) (for confirmation of NE loss). Our preliminary results show comparable levels of lever pressing and body weight in female rats given saline or DSP-4. We are replicating with male rats, analyzing the female estrus cycle, and performing IF in mPFC sections.

Data Analytics Study on Peer Supplemental Instruction at Georgia Gwinnett College for the Academic Year of 2021-2022

Roger Pacheco
Management Information Systems

Georgia Gwinnett College
Sponsor: Dr. Sairam Tangirala

Peer Supplemental Instruction (PSI) at Georgia Gwinnett College is a program designed to provide leadership opportunities in teaching to juniors and seniors through Peer Supplemental Instruction sessions. This study involved the collection and analysis of data from the 2021-2022 academic year, encompassing 1,088 PSI sessions and 276 student participants. Comprehensive data analysis was conducted using Microsoft Excel and Power BI, examining various factors, including students' majors, tutored courses, housing situations, GPAs, classification, and attendance frequency.

The analysis of these parameters allowed us to assess the impact of PSI sessions on participating students. Our findings highlight several key insights: 30% of students returned to PSI sessions in the spring semester, freshmen exhibit the lowest participation rate, and while the majority of attendees are biology majors, the most attended classes are in the field of chemistry. These findings bear significant implications for the PSI program, providing valuable guidance to refine their outreach strategies in accordance with the preferences and needs to the students attending the PSI program.

"People Don't Get Me": The Creation of a Scale to Measure being Misunderstood

Katherine D. Carpenter
Psychological Sciences

Valdosta State University
Sponsors: Dr. Mark A. Whatley and Dr. David Monetti

To what degree do individuals feel misunderstood in the world? Our assumption is that a significant portion of individuals consider themselves imperfectly understood. This was the initial question that drove the current research. We were interested in creating an assessment of individuals' attitudes toward being misunderstood. An initial pool of 65 items was created to measure an individual's attitude toward being misunderstood. A principal component factor analysis was performed on the data from a pool of 80 participants. The analysis indicated a multiple factor solution. Based on the scree plot, a two-factor solution was warranted. Participants self-reported experience of being misunderstood correlated significantly with both factors. We also administered a creativity scale that is commonly utilized and publicly available called the Divergent Association Task. This scale was included in order to correlate participants' divergent creativity with the results of the misunderstood scale. Creativity scores did not correlate significantly with either of the misunderstood factors suggesting that divergent creativity is not a component of being misunderstood.

Police Killings: Why Here, Why Me?

Alana Murray
Criminal Justice

Mercer University
Sponsor: Dr. David A. Davis

Police killings are a critically important public health concern for minority populations. Over the past decade, incidences of police use of deadly force have increased (Mora, Terrill, and Foster, 2022), even as overall crime rates have gone down. In 2022, there were only 10 days that law enforcement did not kill someone in the US (Mapping Police Violence, 2023). The main objective of this research is to understand the racial divide between law enforcement and US citizens and create a better system that results in fewer fatalities. Using data from the Mapping Police Violence database (2023), this research examines police killings in the 100 most populated cities in the U.S. under the lens of conflict theory. It also examines varieties of economic, racial, and place-based threats, as well as police strength that pertains to the size of law enforcement agencies, police budgets, and low-level arrests. Racial threat is significant only for black and Hispanic victims, with officer assaults being more significant for white victims.

Pollination of Seymeria pectinata

Lindsey Grimes
Science and Math

Abraham Baldwin Agricultural College
Sponsor: Dr. Ben Gahagen

Seymeria is a genus of hemiparasitic plants that belong to the family Orobanchaceae. Two species in this genus that are present in south and central Georgia are Seymeria cassioides and Seymeria pectinata. These plants differ mainly in their flowering times and S. cassioides flowers are glabrous whereas S. pectinata flowers are pubescent. The pollution of these two plants have not been heavily studied, though more effort appears to have been given to S. cassioides, nor has there been any comparisons of the insects that pollinate them. Some articles have tried to categorize the pollinators but only have ever focused on bees (Superfamily Apoidea). While these insects are important, they are not the only pollinators. The study will continue to work to identify as many pollinators as possible that visit S. pectinata. To accomplish this flowering S. pectinata are watched between the times of 9 AM to 12 PM to have maximum pollinator visits. Other factors such as temperature, weather conditions, and location have been taken into consideration and made note of. Each area with flowering plants is watched for ten minutes before moving to another area. This is so that more plants can be seen in the same areas. This not only allows for more observations of insects that are more commonly visiting the plants but to also get greater biodiversity. The data collected after the observations are complete will be compiled into a chart and compared to other article's results. This research will help better understand the pollinators in different ecological areas and better understand the native pollinators of southern and central Georgia.

Predicting Future Conflict using Targeted Maximum Likelihood Estimation and Political Stability

Josephine Hughes
Economics

Mercer University
Sponsor: Dr. Andre Waschka

The commonplace use of defense treaties between allied nations has interwoven the national security of the participating countries, meaning that if one country engages in a conflict, its allies could also be forced to engage. This possibility forces nations to prepare for unexpected conflicts and their consequences. In the United States, the current method (used for decades) of monitoring global disturbances requires highly trained and often senior-level intelligence analysts to perform independent threat and warning analyses so decision-makers are given time to prepare a course of action for a potential future conflict. The retirement of senior analysts who can perform the level of analysis required is beginning to cause a problem for the intelligence sector. In order to compensate for this loss of personnel, we have created a model to aid the remaining capable, but inexperienced intelligence analysts in predicting future conflicts. Starting with a variety of data gathered by the United States and European Union, including an array of economic and institutional variables, which have been statistically proven to have an impact on political stability, we developed an ensemble algorithm using Targeted Maximum Likelihood Estimation (TMLE). This model was able to, with strong likelihood, estimate the probability of a conflict in the future over a 1- and 5-year time horizon. Our model indicates that political stability can be used to predict future conflict, meaning that the model can be used as a tool to aid intelligence analysts in identifying countries that are at an increased risk of conflict.

Prenatal Cannabinoid Exposure leads to Memory Deficits through Alterations in Glutamate Receptor Expression

Katie Moerschel and Allisa George
Molecular and Cellular Biology

Kennesaw State University
Sponsor: Dr. Vishnu Suppiramaniam

As the legalization of cannabis has increased, prenatal exposure to cannabis has also increased significantly and is expected to continue rising. Currently, no therapy is available for cognitive deficits associated with prenatal cannabinoid exposure (PCE). Glutamate, a major excitatory neurotransmitter in the brain, plays a significant role in memory formation in the hippocampus. The two major glutamate receptors in the hippocampus, N-Methyl D-Aspartate Receptors (NMDARs) and alpha-amino-3-hydroxy-5-methyl-4-isoxazole Propionic Acid Receptors (AMPARs) are required for learning and memory formation. This project hypothesizes that memory deficits observed in PCE rodents are due to the upregulation of specific subunits of AMPA and NMDA receptors. To test our hypothesis, pregnant Sprague Dawley rats were orally gavaged with 5 mg/kg of pure D9-tetrahydrocannabinol (THC) from gestational day five to post-natal day nine and examined between PND 40-50. To evaluate the learning capacity and memory deficits, behavioral experiments were performed such as an elevated plus maze (EPM), trace fear conditioning (TFC), and contextual fear conditioning (CFC). Immunoblotting of hippocampal lysates revealed that PCE significantly increased the expression of GluA2, a subunit of AMPARs, and GluN2A, a subunit of NMDA receptors. In summary, our studies demonstrate, at least in part, the molecular mechanisms of hippocampal-dependent memory deficits associated with PCE.

Psilocybin in the Treatment of Depression: A Meta-Analysis

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Psychology

University of North Georgia
Sponsor: Dr. Clayton I. Teem II

Typical pharmacological treatment for depression includes selective serotonin reuptake inhibitors and selective norepinephrine reuptake inhibitors which are 5HT-2A antagonists. This type of treatment works for about 50% of individuals and a drop off in drug effectiveness can be seen over time. Psilocybin, a 5HT-2A agonist, may be able to provide another route of therapeutic relief for some individuals who suffer from depression. Three studies met the threshold for this meta-analysis. All of which conclude that psilocybin can be an effective method of treatment for some patients with depression. The data was analyzed with Bornstein's Comprehensive Meta-Analysis Software (2021). The study participants in the three treatment groups were administered psilocybin while the control groups were separated into three different categories (low dose of psilocybin, niacin, and wait list). Effect size is on a spectrum with a small (0.2), medium (0.5), and large (0.8) effect. The results exhibited a large effect size (Hedges' g = 1.71, 1.44, 2.39) for groups treated with psilocybin. These findings suggest that psilocybin may be used to treat patients who struggle with the effect drop off of common pharmacological treatments or overall treatment resistance. This can widen the scope and success rate of treatment for depression. Further research is needed to understand and utilize the potential benefits of psilocybin for depression and additional mental disorders.

Qualitive Detection of Illicit Drug Use in Hair Samples via GC/MS

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Chemistry, Physics, and Astronomy

Georgia College and State University
Sponsor: Dr. Catrena H. Lisse

For decades literature has shown that hair analysis is one of the most common methods to test for substance abuse, one which allows for drugs to be detected after significant periods of time. An experimental method for qualitative analysis of drugs in hair samples was developed and validated. Hair samples were decontaminated with dichloromethane and cut into small pieces before extraction with methanol. After heating, the extracts were divided into two parts; both were evaporated to dryness. One half of the extract was derivatized using N-Methyl-bis-trifluoroacetamide (MBTFA) for analysis of amphetamines, and the other half was derivatized using N-methyl-N-t-butyldimethylsilyl trifluoroacetamide (MTBSTFA) for analysis of other illicit drugs. Deuterated methylenedioxyamphetamine (MDA-d5), deuterated oxazepam (oxazepam- d5), and deuterated phencylidine (PCP-d5) were used as the internal standards. Standard solutions were prepared by mixing all three internal standards at a concentration of 0.1 mg/mL in methanol. The samples were analyzed using electron-impact gas chromatography/mass spectrometry (GC/MS) for analysis of commonly abused drugs. The experimental design of this research project and preliminary results will be presented.

Qualitative Determination of Heavy Metals through the use of Tetra Hydroxyphenyl Porphyrin-Doped Silica Sol-Gels

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Chemistry, Physics, and Astronomy

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Sponsor: Dr. Catrena H. Lisse

Heavy metal sensing is an important issue because of its negative effects on health in both humans and wildlife, as well as the damages caused to the flora in the proximal area of its release. This research investigates the application of tetra hydroxyphenyl porphyrin (H_2THPP) doped silica sol-gels as reusable colorimetric sensors for the presence of heavy metals in aqueous solutions. Sol-gel matrices (monolithic xerogels and dip-coat thin films) were used to determine optimal properties and feasibility. Aqueous solutions of zinc chloride, copper (II) chloride, nickel (II) chloride, lead (II) acetate, chromium (III) chloride, and cobalt (II) chloride were utilized for detection, validation, and colorimetric sensing. The interaction of the porphyrin with heavy metals, the porphyrin functionality, and the structural integrity of the doped silica sol-gel were examined using thermogravimetric analysis, Fluorescence, Raman, and UV-Vis spectroscopy. The experimental methodology and preliminary results of the research will be presented.

Rapid Parasitic Plant Evolution: Parasitic Evolution of RPL_16 and Photosynthetic Dependencies

Anna Kelly Lawless
Cellular and Biomedical Biology

Berry College
Sponsor: Dr. Caitlin E. Conn

The RPL16 gene is a chloroplast protein within parasitic and nonparasitic plants that vary in whether or not they carry out photosynthesis. The Orobanchaceae family has a unique array of both non-parasitic and parasitic plant species; some parasites photosynthesize, while others do not. Fourteen other plant species were included in the study to investigate the divergent evolution between the chloroplast genome of nonparasitic plants, photosynthetic parasitic plants, and non-photosynthetic parasitic plants. The first research step was to sequence RPL16 from Arabidopsis and to use it as a query in a reciprocal BLAST search of parasitic and nonparasitic plant genomes. The RPL16 orthologs were then translated, and their predicted protein sequences were analyzed by PSort. Finally, RPL16 sequences were aligned and used to build a phylogenetic tree. RPL16 was found in both parasitic and nonparasitic species. While most RPL16 proteins were predicted to function in the chloroplast, a few copies had predicted mitochondrial protein localization. Phelipanche aegyptiaca (a non-photosynthetic obligate parasite) was the only obligate parasitic species with the mitochondria as RPL16's singular location. Orobanchaceae fasciculata (a non-photosynthetic obligate parasite) had both the mitochondria and the chloroplast as the location of query proteins. Two other hemiparasitic species and one nonparasitic plant species indicated mitochondrial protein localization. Furthermore, parasitic species had an increased number of RPL16 sequences compared to nonparasitic species. The results of this study can be used to further understand the importance of RPL16 in parasitic species compared to non-parasitic species.

Relationships between Concentration Level and Breakfast Habits

Abby Kennedy
Rural Studies

Abraham Baldwin Agricultural College
Sponsor: Dr. Janet L. Koposko

It is well-documented that eating breakfast can have beneficial effects on overall scholastic achievement (Pollitt & Mathews, 1998). However, less research has focused on differences based on the type of breakfast. The purpose of this project was to investigate the research question, "Are there differences in level of focus based on the type of breakfast that college students typically eat?" This study was similar to a study carried out by Ilmiasih (2017), which investigated whether eating or not eating breakfast would result in differences in concentration. However, this study considered not just whether or not students ate breakfast, but the type of breakfast they ate. The independent variable was type of breakfast and the dependent variable was participants' scores on the Disrupted Classroom Concentration Scale (Boulton et al., 2008). Results were analyzed by running a one-way ANOVA and a follow-up post hoc test. Results were statistically significant, $F(6,183)=3.27$, $p = .004$. Individuals who ate a traditional, balanced breakfast ($M = 2.17$, $SD = 0.55$) had significantly less disruptions in concentration than individuals who reported that none of the breakfast types were what they typically ate ($M = 3.07$, $SD = 0.57$). Participants who ate a "grab and go" breakfast ($M = 2.28$, $SD = 0.70$) had significantly less disruptions in concentration than individuals who reported that none of the breakfast types were what they typically ate ($M = 3.07$, $SD = 0.57$). Our project contributes to the larger field of study by illustrating that key differences exist based on type of breakfast, but the significant results all pertained to participants that said none of the six types of breakfast were typical for them. Therefore, more descriptive research is needed on types of breakfasts that people typically eat so that we can better understand how that leads to beneficial effects.

Seasonal Population and Ongoing Size Analysis of Dwarf Seahorses (Hippocampus zosterae)

Diah Brown
Biology

Valdosta State University
Sponsor: Dr. Emily Rose

Like many other marine life, seahorses (Hippocampus sp.) are known to be vulnerable species due to threats such as habitat loss or over-harvesting, that can lead to a rapid decline in the seahorse populations. Additionally, the life history traits of seahorses, including their limited home ranges and their low mobility, are also factors that can lead to declines in their populations. The primary objectives of this study were to document seasonal population dynamics and analyze body size variation in the dwarf seahorse, Hippocampus zosterae. Fish were collected from Tampa Bay, Fl, photographed, and released back into the wild over an entire year from August 2022 through July 2023. When analyzing seasonal abundance, previous results from our study concluded that overall population numbers peaked in October 2022 and experienced a rapid decline in the winter months. This could be due to shorter grass blades being present during the winter months. Furthermore, results concluded that peek breeding season might occur during the end of the summer months, which possibly explains the abundance of juveniles observed in November 2022. Photos of the seahorses were analyzed using the program ImageJ with seahorses measured (mm) based on snout length, head length, trunk length, tail length, body width, and total body length. Our preliminary results concluded that all the parameters tested weren't statistically different across the sexes with the exception being trunk length, indicating sexual dimorphism in dwarf seahorses for this parameter. This difference could be attributed to the different reproductive roles the sexes have in seahorses, given males with pouches on their tails while females have ovaries in their torsos. The ongoing study will have a significant impact on the monitoring of population dynamics for conservation monitoring, identifying habitat changes in the seagrass beds, and detecting wild seahorses mating patterns and preferences.

Sensorized Tissue Phantom for Magnetic Resonance Elastography Benchtop Experimentation

Charles Hong and Tarun Vinodkumar
Mechanical Engineering

Georgia Institute of Technology
Sponsor: Dr. Jun Ueda

Magnetic Resonance Elastography (MRE) is an imaging technique capable of quantifying the stiffness of in-vivo tissue. A mechanical MRE driver induces shear waves into the medium, and the harmonic displacements are captured within the phase of the MR signal. Subsequently, the phase data is processed to create a stiffness map allowing physicians to identify and quantify changes in tissue stiffness. To effectively test and establish new methodologies for advancing MRE technology, it is essential to develop an experimental setup outside of the clinical setting. This work presents the development and testing of a sensorized tissue phantom capable of laboratory benchtop MRE shear wave classification. Soft tissue actuation resembling MRE is simulated by utilizing a voice coil positioning stage that interfaces with a homogeneous silicone phantom. To capture the resulting vibrations, accelerometers are embedded inside the phantom. A 3D-printed testbed mounts both the sensorized phantom and the voice coil while an Arduino collects the data from the accelerometers. Two experiments are conducted to verify the functionality of the developed phantom to capture wave propagations without impeding it. The first experiment measures symmetrical wave propagation by comparing the measurements from symmetrically positioned accelerometers, which are placed opposite and equidistant from the actuation point. The second experiment identifies the wave propagation artifacts induced by the embedded accelerometers. Two accelerometers are embedded at different horizontal positions within the phantom to compare the acceleration readings. The phantom captured the symmetrical wave propagation represented by an average correlation coefficient of .91. Additionally, the embedded sensors resulted in limited effects on the shear wave propagation. The phantom captures and records shear wave vibrations without interference. This phantom may enable further studies on MRE driver designs and configurations for optimizing the MRE signal-to-noise ratio by offering a more accessible method of testing.

Signal Processing Technique for Audio Improvement

Uchechuwku Onwukeme
Engineering

Valdosta State University
Sponsor: Dr. Dr. Oingsong Cui

Audio Signal collection analysis and processing is an interdisciplinary subject that holds great appeal for numerous applications. One such scenario is the study of aviation noise effects, which can cause physical and psychological harm to pilots, including hearing, vision, and cardiovascular damage. As a result, noise reduction has become a pressing issue that people must confront. In this project we use different signal processing methods to suppress the noise level for multiple sound sources.

SNRs: The Stellar Graveyard

Samuel Kimball and Kayleen Linge
Earth and Space Science

Columbus State University
Sponsor: Dr. Rosa Williams

Supernova Remnants (SNRs) are gaseous clouds left behind after the explosion of a massive star or a white dwarf in a binary star system. These events create most of the naturally occurring elements heavier than carbon, and form cavities of hot gas in the surrounding interstellar medium. A neighboring satellite galaxy, the Large Magellanic Cloud (LMC), provides a broad sample of SNRs at a common distance, allowing differences in observations to roughly correspond to differences in physical properties. We use a new optical survey from Cerro Tololo Inter-American Observatory's 4m Mount Blanco Telescope, with the Dark Energy Camera, in the [SII] and Hα emission lines, to examine the LMC for SNRs. We use the astronomical imaging application SAOImageDS9 to compare the two wavelengths and look for enhanced [SII]/Hα ratios which may indicate associated shock conditions. We will use X-ray and radio comparisons, such as files from the European Space Agency, to confirm that the optical shells are indeed SNRs. We will compare any newly discovered SNRs with the older cataloged population to determine notable differences such as the influence of late-stage evolution. Where possible, we also deduce key features where possible, including explosion type, the expansion and behavior of hot gas in comparison to the optical structure, and the interaction of said gas with the surrounding area. Our findings will provide a more complete catalog of LMC SNRs and enhance our understanding of the later, less studied stages of SNR development.

Study of Producer Preference for Small Ruminant in Southeastern and Other Regions: Sheep vs. Goat

Keyanne Johns
Animal Science

Fort Valley State University
Sponsor: Dr. Tiffani Holmes

The ability of small ruminant producers to make good early decisions about their foundation for raising goats and sheep is a key initiative that will determine whether they have long-term positive effects that will allow them to reap the benefits of their animals. Goats and sheep are two of the first animals that were domesticated, initially for meat, milk, dairy products, fleece, and skin. With the needs of the economy constantly fluctuating it is important to raise, sell, and buy animals that will increase profit and benefit producers in the long term. Goats can be very profitable; one can get milk, meat, cheese, butter, soap, and lotion, which are great in-demand raw materials. Sheep are profitable by providing milk, meat, and fiber, they are also easier to maintain because they do not require elaborate facilities and equipment. This study aimed to determine why small ruminant producers choose to raise sheep or goats and what factors into that decision for them. In response, polls were created to see which animal, sheep or goat, farmers would rather raise. The survey included open-ended responses for them to further explain why they would rather own/raise that animal. The online survey was sent to farmers in Georgia with a total of 69 responses, which contributed to the data significantly by showing different responses along with very descriptive reasonings. When divided into two areas (southeastern states and all others), producers in the southeast were more likely to own goats (64.3%) rather than sheep (14.3%) and only (21.4%) own both. There are many things that played into why farmers chose to raise sheep or goat. Some had to do with climate, maintenance of the animal, or the benefits. Although sheep were found easier to maintain when asked which they would recommend, producers still overall favored goats (47.8%) and sheep (37.6%). In conclusion, farmers should constantly be conscious of the reality their capacity to satisfy customer demand for high-quality, animal-derived meals and products will be most influenced by the quality of the animals they start with or acquire as they grow, sustain, and expand their businesses.

Surface Imaging and Analysis of Electrocatalysts for Co2 Reduction

Karli M. Icard
Chemistry

Valdosta State University
Sponsor: Dr. Tolulope O. Salami

Electrochemical reduction of CO2 holds the promise to be the foundation of sustainable production of fuels and chemicals. Our research involves the development of bimetallic and Trimetallic electrocatalysts for CO2 reduction, we are currently studying various alloy systems such as Pd-Co, Pd-Cr, Pd-Ni, Pd-Co-Ni and Pd-Ni-Cr. Our poster will discuss and highlight the use of Scanning Electron Microscope (SEM) and Energy Dispersive Spectroscopy (EDS) to analyze and characterize our electrode surface.

Synthesis and Characterization of Furan-Based Semi-Rigid Diol Monomer

Riley Rowland
Chemistry and Biochemistry

University of North Georgia
Sponsor: Dr. Rahul Shahni

Semi-rigid diol monomers demonstrate potential for the replacement of hazardous BPA in the production of polyesters and polycarbonates, providing exceptional thermal and mechanical properties due to their flexible aliphatic chains and aromatic ring structures. These versatile furan-based monomers are derived from biomass and have garnered increased interest due to their potential as an alternative to petroleum-derived compounds. In this study, bioadvantaged compounds furfural and malonic acid are utilized to synthesize 2-furanarylic acid (FAA) via Knoevengal condensation, followed by a [2+2] solid-state photoreaction to produce rctt-3,4-di-2-furanyl-1,2-cyclobutanedicarboxylic acid (CBDA-2). The CBDA-2 is reduced using sodium borohydride and subsequent addition of an electrophile, either I2 or BF3(CH3)2, to produce the semi-rigid diol cis-1,2-(furan-2-yl) cyclobutane-3,4-dimethanol (CBDO-2). Characterizations of FAA, CBDA-2, and CBDO-2 structures were conducted using spectroscopic methods. CBDO-2 displays promise as a semi-rigid building block for bioadvantaged polymers with outstanding mechanical and thermal characteristics.

Synthesis of a Sensor for Methamphetamine using a Novel Naphthalimide Based Florescent Dye Entrapped in Silica Nanoparticals

Richard Jenkins
Chemistry

Georgia College and State University
Sponsor: Dr. Caterna Higginbotham Lisse

Analytical determination of illicit substances often involves the use of rigorous or expensive detection methods using bulky instrumentation or expensive reagents, creating a need for a development presumptive test that can qualitatively predict the presence of drugs such as methamphetamine. Recent studies have also indicated a potential for nanomaterial-based drug detection methods to be a promising route for high-sensitivity analysis. In particular, silica nanoparticles have been renowned for their high fluorescence capability, biocompatibility, and flexible chemistry. A novel fluorescent "turn-on" sensor for methamphetamine was synthesized based on the recent usage of the naphthalimide dye series and specifically the fluorescent capabilities of the associated derivatives. For this method, aniline was used as a reagent for the desired N-substituted imide group, and was successfully synthesized and characterized by NMR and IR. The product, having a predicted reactivity with methamphetamine via a substitution reaction at the secondary amine group, was entrapped in the synthesized silica nanoparticles. The nanoparticles were synthesized using the Stöber method, which included the base catalyzed hydrolysis and condensation of an alkoxide precursor, tetraethoxysilane. After exposure to methamphetamine, the dye-doped nanoparticles were analyzed using UV/Vis spectrophotometric analysis. Future work includes fluorophore alteration in synthesis to increase fluorescent capabilities when interacted with methamphetamine.

Synthesis of Iron (III) Oxide Nanoparticles in Aqueous Solution

Jason Phillips
Chemistry and Geosciences

Valdosta State University
Sponsor: Dr. Linda de la Garza

The mineral hematite (α-Fe_2O_3, iron(III) oxide) is of particular interest for use in photoelectrochemical solar cells. The photocatalytic ability to split water to produce hydrogen gas and light absorption in the visible range make iron oxide a great candidate for research and development in fields like alternative fuels and solar energy. Preparation of these cells is done with colloidal solutions of α-Fe_2O_3 nanoparticles, which themselves are typically synthesized via the hydrolysis of iron(III) chloride ($FeCl_3$) solution. Rust, a commonly found material, contains iron oxides. The synthesis of the colloidal nanoparticle solutions using lab grade Fe_2O_3 and recycled rust is of interest to then obtain electrodes to characterize overall energy conversion efficiency production of these materials. To find the optimal conditions for the production of colloidal α-Fe_2O_3 nanoparticles with the recycled rust sample, a quantitative approach was taken to prepare and characterize solutions under various conditions to reach the same efficiency as the standard $FeCl_3$ procedure.

Teacher Candidates Working to Create Inclusive Classrooms that Engage Learners with Disabilities

Maeve Spoor and Allyson Simmons
Communication Sciences and Disorders

University of West Georgia
Sponsor: Dr. Katy Green

Educational professionals face many challenges in the modern-day classroom, one of them being meaningful inclusion and engagement of children with disabilities in their classrooms. The purpose of the research project was to investigate teacher candidates' self-perception of their beliefs, skills, and practices regarding inclusion change over the semester after receiving a professional development seminar on interdisciplinary teaming with a focus on Universal Design for Learning and the Appreciative Inquiry framework (i.e., Social-Emotional Engagement - Knowledge and Skills; SEE-KS). The research question was, do teacher candidates' students' self-perception of their beliefs, skills, and practices about inclusion change over the semester after receiving the SEE-KS intervention? To analyze the aforementioned research question, the researcher analyzed data from two groups of teacher candidates: 1) a treatment group (n = 21) who received the professional development seminar, and 2) a comparison group (n = 19) who did not receive the seminar. The independent variable included five two-hour professional development sessions on SEE-KS and peer coaching integrating the appreciative inquiry framework. The dependent variable was pre-post surveys adapted from General Education Teachers' Beliefs and Attitudes toward planning for mainstreamed students. (G-TBAP). Both participant groups took the pre-survey before the intervention and the post-survey after the last session at the end of the following fall semester. Results: the participants in the treatment condition demonstrated an increase in post-test scores compared to the comparison condition on the adapted G-TBAP self-assessment post-test. Results from the Spring 2023 intervention will also be shared in a face-to-face poster presentation.

The Design and Identification of Fructosamine-3-Kinase Specific Nanobodies

Jason Lu
Biochemistry and Molecular Biology

University of Georgia
Sponsor: Dr. Natarajan Kannan

This study presents a comprehensive investigation into the design and binding of nanobodies specific for fructosamine-3-kinase (FN3K), a protein with significant implications in diabetes pathology due to its deglycating activity. The research employed a yeast-display library and magnetic-activated cell sorting (MACS) to identify four nanobodies, which were subsequently assessed for their binding affinity towards FN3K. Immunoprecipitation (IP) experiments illustrated an interaction between the '2A5' nanobody and FN3K. Furthermore, analytical size-exclusion chromatography (SEC) provided additional insights into their interaction through their elution profiles. Notably, in our surface plasmon resonance (SPR) assays, the '4A1' nanobody exhibited an unexpected binding affinity to Protein A, an unusual occurrence considering nanobodies typically lack the FC region responsible for such interactions in conventional antibodies. Despite extensive screening efforts, definitive FN3K-specific nanobodies proved challenging to identify, highlighting the inherent difficulties in achieving high-affinity binding through in vitro screenings and underscoring the need for optimization in yeast display techniques. Nonetheless, '2A5,' '4F4,' and '4A1' continue to show potential as FN3K binders, necessitating further investigation. This study underscores the importance of utilizing a range of biophysical techniques such as thermal shift assay (TSA) and SPR for comprehensive evaluation of nanobody-antigen interactions. The successful identification of high-affinity nanobodies holds promise for the characterization of FN3K and potentially advancing the classification and treatment of a broad range of metabolic diseases.

The Effect of Brown v. Board of Education Locally at Valdosta State College and Lowndes High School

Isabelle Reimer
History

Valdosta State University
Sponsor: Deborah Davis

The 1954 landmark decision of Brown vs. Board of Education set in motion a great change in education across the nation. The interpretation of these changes differed greatly in Georgia colleges and universities, rather than in local school systems. Historical Documents reveal these differences and shape how Brown was applied at Valdosta State College and Lowndes High School. Following Brown, Thaxton's papers discussed how the Cook argument of 1954 used article VIII of the Georgia Constitution to express that taxes could not be provided to an integrated university or college, postponing VSC integration till 1963. The Sibley Report of 1960 was a survey done within Georgia to understand how the public would react to public school integration, whether taxes will be provided to integrated schools, and if students would still attend integrated schools. The purpose of my research was to understand the impact of both these archival sources locally at VSC and Lowndes High School and their integration. Concluding the research, it was found both Lowndes High school and VSU were not integrated for equality, but for economic funds and Thaxton's determination to not be forced into integration.

The Effect of Exercise Mode on Time Perception during Exercise

Kade Johnson
Kinesiology

Augusta University
Sponsor: Dr. Andrew Moore

Background: Time is perceived to pass faster during exercise and times of physiological arousal. Novel experiences are also characterized by time perception distortions because activities which are unfamiliar require more cognitive resources, thus competing for those needed to accurately perceive time. A mode of exercise that is unfamiliar may impact time perception during exercise compared to a familiar mode, yet this has not been investigated. The purpose of this study was to determine the effect of exercise mode on time perception accuracy.

Method: Trained runners (3 men/3 women; age 34.5±8.0 years) visited the lab on two different occasions, each consisting of exercise bouts of perceived 5, 10, and 15 min in a randomized order at a set rating of perceived exertion of 15 (hard/heavy), with 5 min rest between bouts. Participants exercised without a watch until they believed that the prescribed time had passed for each bout. Exercise for one visit was completed on the treadmill, a familiar exercise mode, and the remaining visit was completed on the arm ergometer, an unfamiliar mode. Actual exercise time was divided by target exercise time to yield a ratio that describes time estimation accuracy (TEA). A repeated-measures factorial ANOVA was used to analyze differences in TEA (α=.05).

Results: There was no significant interaction effect between exercise duration and exercise mode on TEA (p=.30, $\eta 2$=.22), nor was there a significant main effect for exercise mode (p=.17, $\eta 2$=.34). There was a main effect of time on TEA which was higher in the 5 min bout (1.25±0.32) than in the 15 min bout (0.95± 0.26; p=.03, d=1.03).

Conclusion: There was no effect of exercise mode on perceived timing during exercise at a directed intensity of "hard/heavy" in trained runners. People experienced with exercise estimated time similarly whether the exercise mode was familiar to them or not.

The Effects of Category 4 Hurricane Ian on the Gulf Pipefish, Syngnathus scovelli

Aldo Madrigal Olivarez, Kenneth Armstrong, and Megan Sims
Biology

Valdosta State University
Sponsor: Dr. Emily Rose

Hurricanes are strong tropical storms that form when warm ocean waters come into contact with thunderstorms. They can have detrimental effects to coastal seagrass beds and their inhabitants like the Gulf pipefish, Syngnathus scovelli, which is a great flagship species to monitor these impacts. This study aims to assess the effects of Category 4 Hurricane Ian on S. scovelli where the negative storm surge drained Tampa Bay seagrass beds for 29 hours on September 28, 2022. S. scovelli were collected on September 16th and October 7th, 2022 from two sites in Tampa Bay that are equidistant from shore using modified push nets. On September 16th, we collected 104 pipefish (33 males, 36 females) from North Site and 172 pipefish (72 males, 44 females) from South Site. On October 7th, we collected 130 pipefish (54 males, 38 females) from North Site and 112 pipefish (46 males, 27 females) from South Site. After collection, adult pipefish were sexed, photographed, and released back at their site with the juveniles. Using Image J software, the adult pipefish pictures were measured for standard length and width. The variation within male and female body dimensions was then compared to investigate sexual dimorphism. Hurricane Ian did not affect the total S. scovelli densities recorded but did significantly impact the densities at each site. Preliminary data indicates a possible adult morphometric shift as well. Understanding how the reverse storm surge impacted S. scovelli and their seagrass ecosystem will provide insight into how the population's dynamics are affected by hurricanes.

The Effects of Having Health Insurance and the Course of Action Taken by College Students when an Injury Occurs

Jaclyn Talbert and Collin Tomeny
Honors College

Valdosta State University
Sponsor: Dr. Michael Savoie

This project is an attempt to better understand the course of action taken when college students need to seek medical attention. The problem being investigated is how accessible it is for college students to go to the hospital in times of emergencies. As we mention later in our hypothesis, we feel that injuries caused by poor decisions are more associated with students who have health insurance while students who don't have health insurance make poor decisions in terms of seeking medical attention. For our methodology, we will survey various college students in and around Valdosta State University. In this survey, we will be asking students what they would do in various situations regarding the possession of health insurance and the stress they exhibit when doing age-appropriate activities. In our research we expect to see that students who do not have health insurance experience more stress while doing age-appropriate activities than students who do have health insurance. We also feel that the nonexistence of health insurance would include limiting their trips to the hospital or seeking some sort of medical attention in times of emergencies. As a result, this project is intended to inform the general public about the effects of having health insurance and the course of action taken when an injury occurs for college students, while also expressing the gravity of the issues that students experience in relevance to their health insurance standing. In conclusion, we feel that the possession of health insurance is much more prevalent of an issue for college students than is discussed.

The Effects of Migratory Status on Avian Species Preservation

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Biology

University of North Georgia
Sponsor: Dr. Dawn E.W. Drumtra

In biology courses, preserved animal and plant specimens are important learning tools for students. Freeze-dry preservation allows for a quick turnaround time when making new learning specimens. However, freeze-dried animals do not last nearly as long as ones preserved by other methods and many factors can impact the longevity of the final product. In our study, we investigated whether the migratory status of bird species had an impact on their ability to freeze-dry. To do this, we freeze-dried 195 birds across 73 species. Out of 195 birds, 173 were deemed successfully preserved for the short term. Birds that were unsuccessful retained excess oils and had a foul odor. Longevity of specimens can be inferred by the amount of water weight lost during the freeze-dry process. The fat content of tissue, like that stored in migratory birds, can reduce the effectiveness of the preservation process. Therefore, we separated the birds into four migratory categories: breeding migrant, overwintering migrant, spring and fall through migrants, and resident birds. We used ANOVA to analyze weight loss between our migratory categories. In all comparisons, the through migrants (birds that only pass through the Atlanta area), had significantly less weight loss than the other categories. This result indicates that through migrants birds are less likely to preserve well than the birds in the other categories.

"The Fearful Count was coming to London": How Study Abroad Redefines the Scholarship of Literature

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English

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Sponsor: Ms. Susan LaPlant

This project analyzes how studying abroad creates a deeper understanding and relationship to the scholarship of literature. I studied Bram Stoker's Dracula while participating in Valdosta State University's London Study Abroad Program, and I spent three weeks immersing myself in the story's history, setting, and culture. London has been one of the main inspirations behind the settings for Gothic literature because of its urban yet historical locations, mysterious streets, and association with the macabre. This was especially prevalent in the Victorian era, in which Dracula was written. In the novel, Count Dracula chooses London as his new home because he wants a populated city where he can satiate his desire to feed undetected and coexist with society. His fascination with the metropolitan hub spanned from the lore of its dark atmosphere. Stoker references specific city landmarks and neighborhoods within the pages, allowing readers to visit these places and experience a unique connection to the story. After personally visiting these parts of London, I can recognize the importance of including the locations in the novel and how they catalyze the plot. As a result, studying abroad enables students to gain a different perspective on literature and how it is studied because they expose themselves to the written environment.

The Function of KAI2 Genes in the Parasitic Plant Triphysaria versicolor

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Biology

Berry College
Sponsor: Dr. Caitlin E. Conn

Parasitic plants use their haustoria, or modified roots to obtain nutrients and the products of photosynthesis from other organisms (Westwood 2010). Obligate parasites require a host to begin germination, and facultative parasites can survive without the presence of a host. KAI2 genes encode proteins in parasitic plants that allow these plants to sense a host. Obligate parasitic plants use KAI2 genes to sense a host and begin germination. Triphysaria versicolor is a facultative parasite that has four extra KAI2 genes present but does not require a host for germination (Honaas et al. 2019). The function of KAI2 genes in Triphysaria versicolor is unknown. Our strategy to determine its function is based on the extraction and insertion of the gene into a non-parasitic plant, Arabidopsis. Triphysaria plants were grown and harvested to extract their DNA. This DNA underwent a polymerase chain reaction to amplify Triphysaria KAI2 genes, while the products were cloned into vectors and transformed into E. coli. After further analysis in E. coli, constructs containing three KAI2 genes from Triphysaria were further cloned into Agrobacterium. Arabidopsis plants were dipped in liquid cultures of Agrobacterium, which transfers the parasitic genes into Arabidopsis plants. After Arabidopsis matures, its seeds will be harvested, and their DNA will be screened to determine if the KAI2 gene is present. If KAI2 are present, further germination assays will be used to compare the rates between transgenic and wildtype Arabidopsis and Triphysaria versicolor. While Triphysaria is not harmful, it is a useful model of parasitic plants. The completion of this project will provide more information into the impact of KAI2 genes in parasitic plants.

The Impact of Adaptive versus Maladaptive Strategies for Coping with COVID-19 Related Stress on Mental Well-Being in College Students

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Psychological Sciences

Georgia College and State University
Sponsor: Dr. Stephanie E. Jett

The ongoing COVID-19 pandemic has left both physical and psychological scars. Data from the 2023 American College Health Association National College Health Assessment (ACHA NCHA) indicates that at Georgia College & State University, 37.1% of students report anxiety and 39.6% reported stress as being impediments to their academic performance, which is a slight increase from the 2021 data at 33.5% for anxiety and 39.1% for stress. Social isolation, financial concerns, fear of loved ones or themselves getting sick, and food insecurity are some explanations for these trends (Knolle et al., 2021). At present, we are grappling with the long-term effects of the pandemic and processing what we have witnessed and experienced. We addressed two broad questions in the current study: 1) How have college students been coping with COVID-19 related stress both in the past and presently and 2) What is the impact of different coping strategies on mental health during the COVID-19 pandemic? We asked college students to reflect on the coping strategies they used to cope with COVID-19 related stress in the past, defined as from March 2020 to July 2022, as well as what strategies they were currently using, defined as from August 2022 to May 2023. We used the 28-item Brief COPE scale and separated the subscales into two categories for analysis: Adaptive and maladaptive strategies. We measured emotional, social, and psychological mental well-being using the Mental Health Continuum Short-Form (MCHC-SF). We predicted that students who use more adaptive coping strategies, both in the past and present, would demonstrate higher scores in all three domains of the MCHC-SF than students who use more maladaptive coping strategies. This research is an important piece for building a better understanding of the impact of the pandemic on mental health in vulnerable populations.

The Impact of Loneliness, Parental control, Friendship Conflict, and Covid-19 on Anxiety Symptoms in Children and Adolescents during the Pandemic

Savannah French and Reemah Hazama
Psychology

Mercer University
Sponsor: Dr. Amber Ingram

Research has estimated that the prevalence of anxiety symptoms in children and adolescents doubled during the COVID-19 pandemic (Racine et al., 2021). This study sought to examine this phenomenon further by exploring which factors contributed to youths' anxiety symptoms during this time. In particular, we focused on children and adolescents' reported experiences specific to the pandemic as well as their perceptions of their interpersonal relationships (i.e., parental control, friendship conflict, and feelings of loneliness). While research on how parental control affected the mental health of children and adolescents during the COVID-19 pandemic is limited, the effect of parental control on children's anxiety, in general, has been amply documented (McLeod et al., 2007). Outside of the family, research has consistently demonstrated that the conflict in youths' friendships influences their levels of general anxiety, indicating that there are multiple relationships that need to be assessed to better understand what is affecting children's anxiety symptoms (Kong, Cui, Li, & Yang, 2022). Interestingly, research on anxiety and loneliness during the pandemic is mixed. Some research shows that loneliness increased during the pandemic, resulting in higher anxiety levels (Cena et al., 2023). Other research shows that loneliness decreased, perhaps because technology allowed people to stay in frequent communication with others (Juvonen et al., 2022). Based on previous research, we hypothesized that COVID-19 experiences, parental control, friendship conflict, and loneliness would significantly contribute to youths' reports of anxiety. As part of this study, 214 youth (ages 10-15) were recruited as part of a larger study on the impact of COVID-19. Each participant completed online questionnaires assessing each of the variables mentioned. A multiple linear regression analysis revealed a significant combined effect on anxiety, $F(4, 206) = 38.60$, $R2 = .428$, $p < .001$. Individually, loneliness ($p < .001$) and friendship conflict ($p = .011$) were the only significant predictors of anxiety. Parental control ($p = .148$) and COVID experience ($p = .105$) had no significant effect. These results and implications will be discussed.

The Impact of Metaphors on Perception

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Psychology and Sociology

Oxford/Emory
Sponsor: Dr. Sarah Higinbotham

We often use metaphors to oversimplify people: women are sweet, people are snakes, athletes are beasts. My research focuses on colloquial examples of metaphor use and their implications on the perceptions of others. Many studies have demonstrated that stereotypes and labels tend to generalize personalities, devaluing people's characteristics and resulting in oversimplified assumptions. Metaphorical schemata associated with labels produce strong, often inaccurate, judgments about others and any subsequent actions appear to fit within the label to which they are assigned. Considering that figurative language is much more influential than being direct, biases based on these perceptions are prevalent. Brain images depict more emotional responses to metaphorical language than its literal counterparts. Metaphors are familiar, resulting in easier processing, but associated imagery produces descriptive schemas that paint people in inaccurate lights. As thought associations correlated with metaphors connect topics for ease, there is a large influence on the initial assessment of someone's character. These perceptions are limited, but the entire character of a person can be evaluated and judged accordingly. In my research, I delve into particular examples of labels used in everyday language and how thought associations can unintentionally result in skewed perceptions of others. Though stereotypes and labels are used often, they continue to diminish individuality by oversimplifying others' personalities in the mind. The impact of metaphorical labels on perception is something that people must be more aware of as it plays such a large role in decision-making and is an innate mechanism resulting in judgments. If people continue to be unaware, perceptions of others will continue to be unintentionally skewed.

The Importance of Oral Reading in Relation to the Elementary Classroom and Students Behaviors

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Education and Elementary Education

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Sponsor: Dr. Forrest R. Parker III

Background: In recent years, electronic read-aloud software has gained popularity as an educational tool in elementary classrooms. While it offers benefits in terms of accessibility and exposure to diverse literature, concerns have arisen regarding its potential negative behavioral impact on young students. This poster presentation explores these behavioral issues and offers practical solutions to mitigate them.

Methods: We conducted a comprehensive literature review to identify the common behavioral problems associated with electronic read-aloud software in elementary classrooms. We also interviewed teachers and observed students during reading sessions to gather firsthand insights. Our research aims to highlight the challenges faced by teachers and students when utilizing electronic read-aloud software.

Results: Our research uncovered several negative behavioral impacts of electronic read-aloud software, including Reduced Engagement: Students often become passive listeners, leading to decreased active engagement with the text and diminished critical thinking skills.
Distraction: The presence of electronic devices can tempt students to engage in unrelated activities, such as gaming or social media, during reading time. Impaired Social Skills: Excessive screen time may limit opportunities for peer interaction and hinder the development of vital social skills. Dependency on Technology: Students may become overly reliant on electronic read-aloud software, impacting their ability to read independently. Possible Solutions:
To address these challenges, we propose the following solutions: Balanced Use: Limit the use of electronic read-aloud software to a set time each day, ensuring a healthy balance between digital and traditional reading experiences. Interactive Activities: Incorporate discussion questions, comprehension quizzes, and activities that encourage active participation while using the software. Tech-Free Zones: Designate areas within the classroom where electronic devices are not allowed, fostering a distraction-free environment during reading time. Promote Independent Reading: Encourage students to read physical books independently, fostering a love for reading outside the digital realm. Teacher Guidance: Provide teachers with training on effective integration of electronic read-aloud software and strategies to address behavioral challenges.

Conclusion: Electronic read-aloud software can be a valuable tool when used thoughtfully. However, its negative behavioral impacts on elementary age students should not be overlooked. By implementing the proposed solutions, educators can harness the benefits of technology while promoting positive reading behaviors and healthy classroom dynamics among young learners.

The Role of Adenovirus Protein E4 11k in P Body Protein Relocalization

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Biology

Georgia College and State University
Sponsor: Dr. Kasey A. Karen

Adenovirus serotype 5 (Ad5) is a double-stranded DNA virus that can cause upper respiratory infections and conjunctivitis. One of the viral proteins, E4 11k, supports early viral infection by promoting late gene expression. E4 11k has been shown to disrupt cellular function by relocalizing processing body (p body) proteins to cytoplasmic aggresomes. Aggresomes are perinuclear formations that are sites of misfolded protein storage and only arise when there is cellular stress. The scaffolding p body protein, Ddx6, has been shown to colocalize with E4 11k in aggresomes during a wild-type Ad5 infection. Ddx6, however, was not relocalized to chemically induced (cadmium chloride-treated) aggresomes. This suggests that E4 11k is necessary for the relocalization of Ddx6. We observed the localization of additional p body proteins, Lsm1, Edc3, and Pat1b, in human lung carcinoma cells following wild-type Ad5 infection and cadmium chloride (CdCl2) treatment. Lsm1 and Edc3 were relocalized to both infection and chemically induced aggresomes. Pat1b, however, was not relocalized to either infection or chemically induced aggresomes. To further characterize the role of E4 11k in p body localization, we will infect with E4 11k only, L103A mutant, and D105A L106A mutant viruses and observe the localization of several p body proteins. Currently, the ability of L103A and D105A L106A mutant viruses to induce aggresome formation has not been studied. The L103A mutant cannot oligomerize but has the ability to dimerize. Using this mutant virus, we hope to determine if the oligomerization from E4 11k is required for aggresome formation. In addition, we want to observe the different p body proteins to determine if their localization during mutant virus infection is altered. The significance of this study is to understand better the dynamics of p body and aggresome formation in human cells

The Synthesis of Analogues of p-Cresylphenyl Acetate Under Solvent Free Conditions

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Georgia College and State University
Sponsor: Dr. Ronald Okoth

The esterification of p-cresol with phenylacetic acid yields p-cresylphenyl acetate, a commercial chemical with floral properties largely demanded by perfume-related industries. The purpose of this study is to conduct the benign synthesis of a perfumery grade product with the use of a heterogeneous acid catalyst, rather than a traditional problematic homogeneous acid catalyst, under solventless conditions. Furthermore, the reaction we present is aligned with the principles of green chemistry, which emphasizes benign reagents, minimum waste, and allows for the recycling of recovered and unreacted reagents. The reaction was carried out with an excess amount of various analogues of p-cresol with phenylacetic acid via a reflux system with the addition of amberlyst-15 to enhance the rate of the reaction and the yield of the desired product. Proton Nuclear Magnetic Resonance (H^1 NMR) was used to confirm the formation and purity of the product. Currently, studies are being carried out to reuse the recovered p-cresol and recycled catalyst in future reactions.

The Synthesis of Mesalamine and Curcumin Capped Metal Nanoparticles for the Treatment of Inflammatory Bowel Disease (IBD)

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Chemistry, Physics, and Astronomy

Georgia College and State University
Sponsor: Dr. Peter Rosado

Silver nanoparticles are innovative materials which have been found to have applications in antiseptics and drug delivery systems. IBD (Inflammatory Bowel Disease) is a term used to describe the series of chronic illnesses that are characterized by inflammation of the intestinal track lining. The two main diseases are Ulcerative Colitis (UC) and Crohn's' disease (CD). UC affects mainly the entirety of the colon while Crohn's affects the entirety of the digestive system (from mouth to anus). To aid in the remission, 5-ASAs (Mesalamine, balzalaside etc.) and curcumin are beneficial, alongside corticosteroids (prednisone) and biologics (Adalimumab and Infliximab). 5-ASAs (Mesalamine) are used to halt and avert flare-ups within the digestive tract while steroids and natural supplements such as curcumin assist in the management of inflammatory and oxidative conditions. An effective synthesis of silver nanoparticles involves the use of silver nitrate, a capping agent (such as mercaptosuccinic acid) and a strong reducer (such as sodium borohydride). UV-Vis was utilized to verify the presence of mesalamine and curcumin capped metal nanoparticles. Signals around the 350-400 nm area confirmed the presence of silver nanoparticles in the two experiments. This research explores conditions that are used to synthesize these nanoparticles, that could be beneficial someday, in the delivery of therapeutic agents straight to intestinal lesions in the colon or digestive track. Pre-liminary results on the synthesis of a mesalamine stabilized copper nanoparticle are also introduced.

The Usage of Deep Eutectic Solvents for Aerobic Myoglobin Biocatalysis

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Chemistry

Valdosta State University
Sponsor: Goppkrishnan Sreenilaym

Deep Eutectic Solvents (DESs) have many favorable properties such as low volatility, low flammability, a wide liquid state, low toxicity, ease of preparation, cost-effectiveness, and partial biodegradability. These sustainable solvents are formed from a mixture of a hydrogen bond acceptor, typically a quaternary ammonium salt, and a hydrogen bond donor. Extensive research suggests that DESs are safe and functional solvents in numerous enzyme reactions, but no conclusions have been made about the effectiveness of these solvents in myoglobin-catalyzed organic reactions. Due to these promising attributes, we are exploring DESs as an option for myoglobin biocatalysis. Biocatalysis is a renewable and economical process with high regio-, chemo-, and stereo-selectivity, and it has many industrial and pharmaceutical applications. This process employs enzymes to efficiently complete complex organic reactions under mild reaction conditions. Engineered sperm whale myoglobin variants are used as green catalyst to test the viability of aerobic biocatalysis using C-C and C-N bond forming reactions. These reactions will be performed under usual aqueous buffer solutions and in a number of novel green deep eutectic solvents. Because myoglobin's active site contains an oxygen-storing Heme group, both aerobic and anaerobic conditions will be studied. The presence of atmospheric oxygen may limit the enzyme's ability to perform the desired reaction. The aim of this experiment is to find out if myoglobin-catalyzed reactions are possible in DESs and comparable or superior to aqueous solutions in aerobic and anaerobic environments.

The Use of Quantitative Structure: Activity Relationships to Increase the Efficacy of Medication for a T-Lymphotropic Virus-1 Viral Infection

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Sponsor: Dr. Thomas Manning

T-Lymphotropic Virus-1, HTLV-1, is a DNA, enveloped virus that is approximately 100 nm in diameter. Its replication process is an infectious cycle involving virus budding, infection of new permissive target cells, and mitotic division of cells harboring an integrated provirus. This virus is known for causing rapid progressive hematological malignancy, adult T-cell leukemia, neurological diseases, and inflammatory based diseases. Current medications that are used to treat it or some of its symptoms are Zidovudine (AZT), Interferon Alfa, and Valproic Acid. It is typically transmitted by breastfeeding, sexual contact, and blood transfusions. HTLV-1 originates from a simian reservoir, STLV-1(Simian T-Leukemia Virus type 1). This is a derivation of an interspecies zoonotic transmission from non-human primates to humans. The region it is most prominently found in is Africa. It is estimated that two to five million of the estimated ten million global infections are infected in this region. Historically, some noteworthy facts of HTLV-1 is that it has an immuno-stimulating effect that overproduces Th-1 cells causing overall immunosuppression in the infected individual, and HTLV-1 was the first oncogenic human retrovirus to be discovered, originating in Africa, brought to America during the slave trade between the 16th and 19th centuries. My project uses QSAR (Quantitative structure–activity relationship) calculations to take existing medication's such as Zidovudine, Interferon Alfa and Valproic Acid to enhance both their water solubility and their medical efficacy.

The Use of Quantitative Structure: Activity Relationships to Increase the Efficiency of Medication for Dengue Virus

Isabella Najar
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Dengue virus is a viral infection that is transmitted from mosquitoes to humans. The virus is a single-stranded positive-sense RNA that is enveloped. It is 40-60 nm in size and has a spherical shape. The dengue virus replication cycle involves the translation of RNA into proteins and the creation of a negative and positive strand of RNA. From here the active virus is made and released. Currently, the region that the virus is prominent in is the Americas. Approximately 2.8 million people in the Americas in 2022 had dengue virus and there was an increase compared to 1.2 million in 2021. Historically, dengue has had a heavy impact on the world. In 2019 dengue virus peaked in terms of cases reported for the virus in its history. In this research project, QSAR (Quantitative structure-activity relationship) calculations are being used to take existing medications such as HIV-1 and HIV-2. They are enveloped RNA viruses that replicate via a DNA intermediate. We will modify treatments for HIV/AIDS via QSAR for drugs such as AZT and Atazanavir and adapt them to Dengue.

The Use of Quantitative Structure–Activity Relationships to Increase the Efficacy of Medication for an Epstein-Barr Viral Infection

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Sponsor: Dr. Thomas Manning

Epstein-Barr virus (EBV) is a DNA, enveloped virus that is 120-150 nm in diameter. Its replication process is negative sensed, and it is responsible for diseases such as nasopharyngeal carcinoma and infectious mononucleosis. Medications that are used to treat EBV or some of its symptoms are general pain relievers such as Tylenol and Advil, and acyclovir. It is transmitted primarily through saliva, and its host is terminated via the lytic cycle. EBV is found commonly throughout the world with no region faring better than others. EBV was derived from a cell line of Burkitt lymphoma in 1964, and in 2022, approximately 90% of all people were infected or had evidence of infection. My project uses QSAR (Quantitative structure–activity relationship) calculations to take existing medication's such as Tylenol, Advil and acyclovir and enhance both their water solubility and their medical efficacy. For example, by functionalizing the molecule acyclovir with fluoride, its logP value or water solubility increased from -1.61 to -1.13. From a medicinal activity perspective, its kinase inhibitor value increased from -0.8 to -0.72.

Trait Impulsivity and Alcohol Use: Resting State Functional Connectivity Analysis

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Neuroscience

University of Georgia
Sponsor: Dr. Lawrence H. Sweet

Trait impulsivity is a personality-based multidimensional construct that has been shown to predict externalizing behavior such as problematic alcohol use. Analyzing specific RS networks associated with cognitive and reward processing can reveal differences in those who heavily use alcohol. This study aims to elucidate the interplay between impulsivity and distinct resting-state networks (RSNs), specifically exploring their mediating role in explaining the frequency of alcohol use. We assessed different facets of impulsivity, including negative and positive urgency, sensation seeking, lack of premeditation, and lack of perseverance, coupled with functional magnetic resonance imaging (fMRI) analysis. Participants, who were identified as being either high risk drinkers (=>3-4 drinks per occasion for at least 90 days) and low risk drinkers (0 heavy drinking days in the past 90 days), completed the Negative Urgency, Premeditation, Perseverance, Sensation Seeking, and Positive Urgency (UPPS-P) trait impulsivity questionnaire as well as the timeline followback assessing previous 28-day alcohol use prior to fMRI. Seed and target regions were empirically defined for the salience network, default mode network (DMN), executive control network (ECN), approach network, and avoid network. Random Forest Classification analysis indicates that increased overall impulsivity and subscale impulsivity measures are significantly related to decreased drinking frequency. Furthermore, we found that increased total impulsivity is associated with decreased network synchrony, except for the salience network. Lastly, all increased impulsivity subscales are negatively associated with decreased drinking frequency. By demonstrating the mediating role of these networks, it enhances our understanding of the neural mechanisms underlying impulsivity and its link to problematic alcohol use. These findings contribute to the broader field of addiction research, offering potential avenues for targeted interventions and prevention strategies.

Two-Step Synthesis of a Novel Phthalein Based pH Indicator

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Chemistry

Georgia College and State University
Sponsor: Dr. Wathsala Medawala

Conventional phthalein dyes are used as pH indicators due to their distinct color change in solutions of different pHs. For example, a solution of phenolphthalein in water turns from colorless to pink as the pH of the solution is increased from acidic to basic. Here, we propose a two-step synthesis of a novel phthalein based pH indicator from commercially available materials that utilizes reactions commonly encountered in undergraduate organic chemistry courses. In step one, the pure product of 1-phenyl-2,3-naphthalenedicarboxylic anhydride was obtained which was used in step two by reacting it with phenol. The final product obtained contained acid base color change indicator properties similar to phenolphthalein. Currently, we are attempting to purify the final indicator product to better characterize it through NMR and melting point analysis. Once the pure indicator product is obtained, the synthesis will be incorporated into the organic chemistry and quantitative analysis laboratory curriculum at Georgia College with the aim of enhancing student learning outcomes through a student-centered hands-on pedagogy.

Understanding How Anuran Acoustic Data Indicates the Environmental Conditions of an Area

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Biology

Valdosta State University
Sponsors: Dr. John Phillips and
Dr. Erin Grabarczyk

Using acoustic data as an indicator of the biodiversity and conditions of an environment is a crucial tool for researchers in conservation. The state of environmental conditions is extremely valuable information to know and adding a way of gaining insight into these conditions can be beneficial to researchers. In our study, we are getting data about the biodiversity of different areas in South Georgia, and this will be compared to environmental factors in the areas. By comparing the diversity of anurans and environmental factors, we will get a better understanding of the possible correlation between pollution and the presence of anuran species. The testing of anuran presence in the area will be carried out using acoustic data. We have automated recording devices throughout certain areas in South Georgia. They record in five-minute intervals every twenty-five minutes beginning in the afternoon till late in the night. Audio recordings will be analyzed by Kaleidoscope software to see if there is evidence of anuran calls. The areas that we have chosen have various levels of proximity to anthropogenic structures. The differences in these areas will be represented as environmental factors such as pH, turbidity, salinity, phosphate, nitrates, and ammonia. Collection of water samples will be done in each of these areas. Then they will be tested for the factors previously listed. Once we have this data, we will determine the health of the areas we are studying. This will be compared to the presence of anurans and the level of diversity of the species observed. Through having these sets of data, we will be able to determine if there is a connection between the overall health of an environment and the biodiversity of anurans. The results will aid us in knowing the validity and value to researchers that this tool has and that will expand the ways that conservational researchers can infer information about an environment and its anuran inhabitants. Further research can lead to testing on different reptiles and amphibians to see if their acoustic prevalence is affected by their environments.

Unraveling the Mysteries of Plant Defense Hormones, Methyl Jasmonate Signaling

Morgan Wynn
Biology

Valdosta State University
Sponsor: Dr. Ansul Lokdarshi

Plants represent the ultimate source of nutrients for many organisms including bacteria, fungi, and animals. Therefore, understanding how plants defend themselves from pathogens and herbivores is critical to sustainable food supply. Even though 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 most versatile hormones that is actively engaged in plant defense towards different types of abiotic and biotic stresses is Methyl Jasmonate (MeJA). While the signaling events involved in MeJA mediated defense responses have been centered around transcriptional management (DNA to messenger RNA), the details of much faster translational (messenger RNA to protein) regulation remains unknown. My work provides fresh insights into the MeJA 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 module for regulating translation in all plants. Using immunoblotting, we show that eIF2alpha is phosphorylated in response to MeJA treatment in a GCN2 dependent manner in the plant model, *Arabidopsis thaliana*. As anticipated, transgenic plants with knock-out mutation for the *GCN2* gene show reduced growth under prolonged MeJA stress suggesting GCN2-eIF2alpha as an essential component of the MeJA signaling. Ongoing work is focused on understanding the biochemical and molecular events leading to GCN2-eIF2alpha activation in response to MeJA. These results will provide deeper understanding of MeJA signaling in plants and in the future aid in the development of plants with better stress residence/adaptation.

Use of Trail Cameras on Sub-Adult Gopher Tortoise Burrows to Monitor Activity

Maeghan McIe
Biology

Valdosta State University
Sponsor: Dr. J. Mitchell Lockhart

The Gopher tortoise (Gopherus polyphemus) is an endangered reptile species native to longleaf pine forests in the southeastern United States. Their endangered status is largely due to habitat loss (longleaf pine deforestation), along with predation from humans and animals, human activity, and introduced diseases. Gopher tortoises are a keystone species within longleaf pine forests with their burrows housing more than 350 different species including the endangered Eastern indigo snake, Gopher frogs, and the Florida mouse. The goal of this research is to monitor the survival rate of 179 tortoises that were hatched, tagged, and released at Reed Bingham State Park, Cook County, Georgia in 2008-2009, as well as monitoring the reliability of PIT tags placed in these tortoises. Burrow use by species will be monitored via means of camera trapping. Sub-adult tortoises will be identified by camera trap and captured to determine if they are from the studied cohort. 10 sub-adult burrows have been identified and each has a trail-cam camera placed outside the entrance to monitor the activity at these burrows. Camera SD cards have been replaced every 2-3 weeks and photographs of visitations have been evaluated and catalogued. More than 19,000 photographs and 8,000 videos have been collected and evaluated. Few sub-adult tortoises have been documented and the single captured tortoise of appropriate size was not PIT tagged. Common species encountered included Gopher tortoises, nine-banded armadillos, striped skunks, Virginia opossum, raccoons, foxes, and various small bird species. Failure of recruitment is a significant factor in declining Gopher tortoise populations and our findings support this perception.

Using Hair Cortisol Levels to Understand the Effect of the COVID-19 Pandemic on Stress in Healthworkers

Madison Williams
Psychological Sciences

Valdosta State University
Sponsor: Dr. Kristin Kirchner

Our goal was to investigate the impact of the COVID-19 pandemic, in combination with other stressors, on cortisol (a hormone released in response to stress) in healthcare workers. A combination of self-report and biomarker data was used to help understand how individual differences impacted one's stress response throughout the COVID-19 pandemic. Using biological data (hair samples) that is still present from the major milestones of the COVID-19 pandemic, the results of the present research have shed light on the lack of recovery from pandemic-induced stress in healthcare workers.

The design of this project is a mixed-model experimental design that explores various factors that may contribute to cortisol changes during the COVID-19 pandemic. Participants completed an online survey containing the Reduced Copenhagen Burnout Inventory, the Depression, Anxiety, and Stress Scale, UCLA Loneliness scale-8, demographic information, and questions about their experiences as a healthcare worker. Using ELISA methodology, cortisol was extracted from hair samples from two time points: the most recent three months (April-June 2023), and the three-month timespan that contained the participant's self-reported "most stressful month(s)."

It was found that participants who indicated that they did not feel recovered from the COVID-19 pandemic showed increased levels of loneliness, depression, anxiety, stress, and burnout as compared to those who indicated that they did feel recovered. Despite these findings, cortisol levels did not seem to fluctuate between the two time points, nor was there a difference in cortisol between the group who felt recovered and did not feel recovered. These findings could be an important consideration for practitioners attempting to diagnose high stress in healthcare workers. Cortisol levels should not be the only indicator when attempting to diagnose high stress, and an approach that takes into consideration the emotional state of the patient should carry as much weight as a cortisol test.

Using Multi-Step Synthasis for the Production of Hydrogels with Adhesive Properties

Cole Smith
Chemistry, Physics, and Astronomy

Georgia College and State University
Sponsor: Dr. Catrena Higginbotham Lisse

Hydrogels are composed of networks of hydrophilic polymer chains, which make great in aqueous enviornments and extremely biocompatible. Today, hydrogels are being used for controlled drug delivery, fluid control, nerve regeneration and tissue engineering.1 This undergraduate research project will demonstrate the experimental design and multi-step synthesis for the production of remote-activated, polyacrylamide hydrogels utilized for wound care. The first step is the synthesis of the DOPA derivative monomer, N-(3,4-Dihydroxyphenethyl) methacrylamide (DMA). This was achieved a reaction starting material dopamine hydrochloride reacted with methacrylic anhydride with sodium tetraborate decahydrate and sodium bicarbonate as reaction mediators. The second step in the synthesis is a free radical polymerization of Acrylamide, N-isopropylacrylamide and, N-(3,4-dihydroxyphenethyl) methacrylamide, with azobis- (isobutyronitrile) as a catalyst under a nitrogen atmosphere to synthesize Poly(dopamine-methacrylamide-co-N-isopropylacrylamide-co-acrylamide). The third step being the gelation of a hydrogel composed of this polymer in a pH sensitive complex with aqueous iron with the inclusion of a photoacidproducer to allow for remote deterioration of the hydrogel structure through exposure to intense UV light. This presentation will highlight the experimental design and preliminary results of the project.

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Utilizing Virtual Reality (VR) to Provide Accessible and Immersive Rock-Climbing Experience

Emily Jacobson, Abigail McDowell and Samuel Sherman
Industrial Engineering

Mercer University
Sponsor: Dr. Amro Khasawneh

Around 14% of the total U.S. population live with mobility disability causing serious difficulty walking, thus, preventing them from engaging in physical activity outdoors which can help improve their mental health and well-being. The objective of this project is to design, develop and test an immersive virtual rock-climbing experience that allows individuals with mobile disabilities to be immersed in an outdoor environment. We will apply a user-centered design approach to design the content of the experience. We will be conducting interviews with experienced rock climbers and individuals with disabilities to design the content of the experience. We will then use multiple two-dimensional (2D) and 360 cameras to film the climbing experience. Following, we will edit the captured clips and integrate them into two videos (2D and 360). We will recruit individuals with mobile disabilities to participate in the testing of the experience. Participants will be divided into two groups. The first group will watch the 2D video of the rock-climbing experience from the perspective of a person on the ground. The second group will watch the rock-climbing experience through a virtual reality (VR) head-mounted display. After watching the videos, participants will be given an online survey to fill out. The survey will include validated satisfaction, usability, and presence scales from the literature. We will use multiple t-tests or ANOVAs to compare the mean satisfaction, usability, and presence scores between the two groups. We expect the VR experience to provide high presence and satisfaction.

Voltametric Response of Antiarrhythmic Drugs

Denetria Thomas
Chemistry

Valdosta State University
Sponsor: Dr. Linda de la Garza

Electrochemical methods are characterized by high selectivity, sensitivity, reproducibility, rapid response of detection, and low cost of equipment. Voltametric techniques are frequently employed to identify a variety of medicinal compounds. Procainamide, quinidine, and disopyramide were studied using cyclic voltammetry in a three-electrode electrochemical cell. The current signal was monitored with glassy carbon and platinum electrodes. Silver/silver chloride electrode served as the reference electrode, and platinum wire served as the counter electrode. Compounds showed irreversible oxidation tendencies at voltages between 0.8 and 1.3 V. At similar concentrations, procainamide showed a higher current signal than quinidine and disopyramide in buffer solutions at pH 7. Further analysis at several concentrations and a lower pH value will be presented.

Who Loves Which Cat?
Processing of Mandarin wh-in-situ in RPVP

Jill McLendon
Linguistics

University of Georgia
Sponsor: Dr. Dustin A. Chacón

A key question in neurolinguistics is the neural correlates of sentence processing. One important test case is wh-dependencies (e.g. which book did she read?), in which the wh-phrase (who) must be associated with a later verb (read). When participants' brain signals are recorded by electrencephalography (EEG), anterior sensors record sustained negativities after the wh-phrase, and a positive response 600ms after the verb. This research primarily used rapid serial visual presentation (RSVP) to present stimuli, in which participants read sentences slowly, word-by-word. We investigate the processing of wh-dependencies in Mandarin Chinese. Unlike English, Mandarin Chinese is a wh-in-situ language, meaning that wh-phrases are pronounced in their canonical syntactic position and are theorized to move 'covertly' (Xiang, Dillon, Wagers, Liu & Guo 2014; Xiang, Wang & Cui 2015), thus relating the left-edge of the sentence and the verb. In-situ constructions may involve similar memory mechanisms as those found for wh-movement, but it is unclear what neural responses are shared for wh-movements and in-situ constructions. This project investigates what neural responses result in interpreting wh-sentences in Mandarin. Instead of the unnatural RSVP paradigm, we use rapid parallel visual presentation (RPVP). Participants are given a full sentence on screen to read at once (–Wh-Subj, -Wh-Obj 她看这本书 'she read this book', –Wh-Subj, +Wh-Obj 她看哪本书 'she read which book', +Wh-Subj, -Wh-Obj 谁看这本书 'who read this book', +Wh-Subj, +Wh-Obj 谁看哪本书 'who read which book'), for 200ms, with 600ms of blank screen, for a total of 800ms per second. In preliminary testing (N = 1 out of planned 25), noun phrase objects and wh-in-situ objects appear to diverge from each other at around 200ms, suggesting brain activity in this time window might be sensitive to the presence of wh-objects.

Yellow Fever Virus

Kalen C. Allen
Chemistry

Valdosta State University
Sponsor: Thomas Manning

Yellow fever virus is a mosquito-borne viral illness caused by an arbovirus of the family Flaviviridae. The viral disease is transmitted to humans by the bites of infected mosquitoes. Yellow fever is an RNA, enveloped virus that is 40nm by 50nm in size. It is a virus that replicates in the cell's cytoplasm throughout seven contiguous stages. Yellow fever virus is responsible for hemorrhagic disease. Currently the region it is most prominent to is tropical areas in Africa and last year approximately 200,000 people were infected by it. Historically, some noteworthy facts are that the mortality rate has been estimated as 20-50% in patients with severe symptoms, accounting for 78,000 death every year. The most common symptoms are fever, muscle aches, headaches, nausea, or vomiting. A major gap in knowledge about yellow fever is how to manage and treat patients with this disease. There are no specific drugs to treat the disease or severe reactions to the vaccine. Three drugs that have been used to help with the yellow fever symptoms are Oseltamivir, Doxycycline, and Amoxicillin. While a significant amount has been learned over the years, clearly there is still much more to be discovered about yellow fever.

Full Panel

"I Do Not Want to be a Repeating Machine" A Collaborative Self-Study of Undergraduate International Teaching Assistants' (ITAs) Challenges, Negotiations, Learning, and Needs

Wenye Song, Xinyue Yan, and Weishan Deng
Applied Linguistics

Oxford/Emory
Sponsor: Dr. Zheng Gu

Onsite

The International Teaching Assistants (ITAs) system has been applied widely in various fields at different universities in the U.S. for decades. Existing research predominantly focuses on graduate TAs or domestic peers as mentors to explore their experiences, identity conflicts, challenges and opportunities (e.g., Gorsuch, 2016; Ashavskaya, 2015; Park, 2011). However, little attention has been paid to undergraduate ITAs, who came to a different cultural and academic context at a young age, at liberal arts colleges. What are some challenges they encountered? How do they process their identity as a foreigner, a learner, a cohort, and a xiǎolǎoshī （little teacher）? What do they learn through this TA experience, and which kind of support can institutions provide to better support their growth?
To address this gap, the current penal of studies employed collaborative self-study as the research method to explore:

1. challenges that Chinese ITAs encountered when facilitating a foreign language class (Wenye Song);
2. their identity negotiation within a different cultural and academic context for the first time (Xinyue Yan);
3. skills and knowledge they developed after one year of assistant teaching, negotiation, discussion, and reflection (Weishan Deng).
   Using collaborative self-study (Pinnegar & Hamilton, 2009), we, three Chinese ITAs, put ourselves at the core of this reflective inquiry. We employed three ways to document our reflections and changes for one year:

1. Wrote reflection journals after conducting focused practices weekly with students in a small-class setting, as well as offering office hours weekly;
2. Read and comment on each other's journals and conduct individual and group discussions with our supervisor;
3. Wrote thematic reflection at the end of our service terms. Through a recursive process of experiencing, writing, reading, and sensemaking, the findings emerged from three perspectives:

1. Regarding challenges and needs, we noticed that we all needed more metalinguistic knowledge and were eager to get more professional training in the Chinese language teaching. Moreover, with minimal autonomy, we encountered numerous moments of questioning ourselves and being confused about the correct direction to provide appropriate instruction. (will be present by Wenye Song)
2. Regarding identity negotiation, we commonly showed conflicts arising from dual roles as students and teachers, notably manifested in their apprehension of imparting incorrect information and their perceived lack of authority. In addition, we experienced a sense of disappointment stemming from the disparity between their imagined teaching role and their actual real identity. (will be present by Xinyue Yan)
3. In terms of our learning, the findings indicated that (1) as native speakers, we developed metalinguistic skills because we became consciously aware of grammar and character patterns in order to answer students' questions better; (2)as international students, we improved intercultural communication skills and confidence when hosting small group oral practices and office hours as we were given direct opportunities to fit in the new cultural environment; and (3)as undergraduates, we also enhanced our instructional skills because we had to use concise language to explain concepts to students. (Will be presented by Weishan Deng) While there are limitations since the current studies rely mainly on self-report, we believe this study can shed light on preparing and support undergraduate ITAs and will provide information for institutions to better support undergraduate ITAs' learning and growth as whole persons through liberal arts education.

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An Affordable Planar Laser-Induced Fluorescence System for the Hydraulic Mixing Performance in Scaled Serpentine Chambers

Wren Kalin, Christalle Bristol, Shahanaz Abdul, and Sumia Alam
Civil and Environmental Engineering

Georgia State University
Sponsor: Andrew Kim

Webinar

This paper investigates the effect of baffle geometry on the mixing performance of a disinfection contactor. A disinfection contactor is a multi-chamber device that uses baffles to create a meandering flow path for the wastewater and the disinfectants. Previous studies have proposed various geometric modifications to the baffles, such as slots, T-shapes, and perforations, to enhance the mixing efficiency. In this study, we compare two distinct baffle configurations: vertical baffles and inclined baffles. We used two transparent scaled models of a disinfection tank with around 16-inch-length scale. We employed a planar laser-induced fluorescence (LIF) system to measure the transport of a fluorescent tracer in the water flow. The LIF system consists of a 405 nm wavelength blue laser pointer pen, a concave water prism lens, and dissolved yellow highlighter ink. We recorded the dispersion of the tracer using a DSLR camera with manual-focusing and manual-brightness-adjustment features. We converted the video clips to image sequences and analyzed them with a mono-spectrum conversion algorithm to obtain the concentration distribution. We used four well-known parameters to quantify the mixing performance: T10, T90, MO, and AD indices. We found that the inclined baffles significantly improve the mixing performance compared to the vertical baffles. The improvement is more pronounced at the second compartment's exit than at the fourth compartment's exit.

Visual Presentations

Collaborative Performance: The Integration of Musical Expression in German Lieder

Aryn Hendon and Rebeca Sierra
Music

Valdosta State University
Sponsor: Dr. Joshua K. Pifer

In the music world, live performance is the culmination of research. The learning process for a musician continues even while they stand on a stage. This project is based on one of Mozart's Fantasias. Wolfgang Amadeus Mozart was an Austrian classical composer, considered one of the greatest composers in the history of Western music. In this research project I will explain my rehearsal process for the Fantasia, which includes decisions about 1) background: how to interpret a fantasia and Mozart's music, taking into account the differences between Mozart's piano and today's piano; 2) technique: how to achieve the clarity and performance tempo in an efficient way; and 3) character: thinking about what Mozart would have liked the Fantasia to sound like, while adding my own artistry. I will talk about and play each section of the Fantasia, demonstrating how all these decisions come into effect during a performance.

Enhancing ADA Compliance for Websites and Online Applications: A Heuristic Evaluation Approach

James Jarrett
Management and Engineering

Mercer University
Sponsor: Dr. Amro Khasawneh

As accessibility for disabled populations is increasingly mandated and integrated in public sector services, ambiguities persist as to how these requirements apply to websites and other online services. Despite lacking a clear directive, many such sites and services have adopted the Web Content Accessibility Guidelines (WCAG) 2.0 and Section 508 of the Rehabilitation Act of 1973 (Section 508) as standards to facilitate accessibility. Although these guidelines are helpful, their application is often cumbersome and would benefit from streamlining to better support equitable access by individuals with disabilities. The purpose of this article is to describe a heuristic approach developed by the authors for the purpose of testing compliance with ADA guidance. The assessment integrates guidance from both WCAG 2.0 and Section 508 into a tool that builds on the proven success of other usability heuristic evaluation standards. The article first describes the methodology for developing the compliance heuristics, followed by discussion of the tool's recommended application.

More than Just a Sport

Madison Connolly
Art and Design

Valdosta State University
Sponsor: Lindsay Godin, MA, MFA

Since 2021, I've been an assistant sports photographer for Valdosta State University Athletics while I complete my degree in Art & Design. I drew an interest in the University's historical archives, specifically sports photography. I started to compare the old photographs with my new images and this comparison made me appreciate the history of athletics and the numerous changes the university has made to it over time. I wanted to showcase these comparisons concretely, so I created a handmade photo book inspired by Rephotography: a genre in photography where a photographer recreates photographs at the same location to showcase a comparison of time. In my process, I designed the photobook strategically by placing historical archives and new photographs in an assortment of ways to demonstrate changes throughout time in sports. By researching these archives, I became aware that my photographs will also become archives in the future. This project serves as a document, both as an art form and as a historical artifact, for the university body and Valdosta community to appreciate the history of our athletics. Going forward, I plan to create a professionally printed photo book for the school to look back on.

Performing Mozart's Fantasia in C minor, K.475

Rebeca Sierra
Music

Valdosta State University
Sponsor: Dr. Joshua K. Pifer

Music is a universal language that musicians use to communicate thoughts and emotion. Collaborative performance is one of the most challenging and rewarding aspects of a musician's career. In our presentation, we will demonstrate our experience while collaborating on a selection of German Lieder. Lied is a type of song setting in which the singer and pianist share

the expressive responsibility of communicating the poetic concepts of the piece. We will follow this by describing our individual learning processes, which include background, technique, and

interpretation. Subsequently, we will explain how we approach the final stage: collaboration, as we determine how to convey our expressive ideas together. To conclude, we will perform two German Lieder composed by Brahms and Schubert, which will showcase the end product of our research.

Unspoken Truths

Phylisicia J. Lundy
Art

Valdosta State University
Sponsor: Prof. Lindsay Godin

Americus, GA is a small traditional southern courthouse town in southwest Georgia. As a native of Americus, GA, and an advocate for social change, I am exploring past events and how controversy feeds division within the community. I drew inspiration for *Unspoken Truths* (c. 2023) from African American woman artist Elizabeth Catlett's 1946 *Negro Woman* print series that visualizes events between dominant and minority groups in the South that grow generational distrust, and Hannah Hoch's 1919 *Cut with a Kitchen Knife* inspired the collage placement process, where I have compositionally organized a variety of visual objects to convey a message or story. I fuse graphic design, photography, and craft arts using a textural approach by doing 5 photomontages depicting stories aiding generational distrust in Americus' community while expressing through symbolism how I was impacted in my youth and early adult years. Each symbol acts as a social cue in American culture that provides familiarity and spreads social awareness in the local and regional southern communities. With a combination of social and personal aspects of my southern culture I can promote dialogue that can defuse the cycle of distrust. Overall, the promotion of social investigation with conversation will open the dialogue for change.