
28TH ANNUAL
Symposium
of
Student Scholars
APRIL 17TH-19TH

KENNESAW STATE UNIVERSITY

CONGRATULATIONS

ANNA POOLE

mentored by

Dr. Ryan Ronnenberg

as the winner of
the Undergraduate Research Award!

for

"Honor, Violence, and Recovery:
The Stripping of Female Agency During
the Partition of India"

CONGRATULATIONS

Andrew Bramlett

mentored by Dr. David Parker

Ingrid Baker

mentored by Dr. Albert Way

AS THE RUNNERS-UP

All will be published in
The Kennesaw Journal
of Undergraduate
Research!

Program

Wednesday April 17, 2024

9:00am – 9:50am: **Oral Presentations in the Wellstar College of Health and Human Services**
(Prillaman Hall – Indoor Plaza)

10:00am – 10:50am: **Oral Presentations in the College of Science and Mathematics**
(Prillaman Hall – Indoor Plaza)

11:00am – 11:50am: **Oral Presentations in the College of Computing and Software Engineering**
(Prillaman Hall – Indoor Plaza)

1:00pm – 1:50pm: **Oral Presentations in the Southern Polytechnic College of Engineering and Engineering Technology**
(Prillaman Hall – Indoor Plaza)

2:00pm – 2:50pm: **Oral Presentations in the College of Architecture and Construction Management**
(Prillaman Hall – Indoor Plaza)

3:00pm – 3:50pm: **Oral Presentations in the College of the Arts**
(Prillaman Hall – Indoor Plaza)

4:00pm – 4:50pm **Oral Presentations in the Radow College of Humanities and Social Sciences**
(Prillaman Hall – Indoor Plaza)

5:00pm – 5:50pm **Oral Presentations in the Coles College of Business**
(Prillaman Hall – Indoor Plaza)

Thursday April 18, 2023

9:00am – 9:50am: **Oral Presentations in the Bagwell College of Education**
(Convocation Center, Room 2007)

10:00am – 10:45am: **Poster Presentations**
(Convocation Center, East & West Activity Wings)

11:00am – 11:45am: **Poster Presentations**
(Convocation Center, East & West Activity Wings)

12:00pm – 12:45pm: **Poster Presentations**
(Convocation Center, East & West Activity Wings)

1:00pm – 1:45pm: **Poster Presentations**
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2:00pm – 2:45pm: **Poster Presentations**
(Convocation Center, East & West Activity Wings)

3:00pm – 3:45pm: **Poster Presentations**
(Convocation Center, East & West Activity Wings)

4:00pm – 4:45pm **Poster Presentations**
(Convocation Center, East & West Activity Wings)

Friday April 19, 2023

12:00pm – 5:00pm: **Virtual Presentations**
(Microsoft Teams)

Bagwell College of Education

Educational Leadership

An Exploration into the Grief Experiences of International College Students
Oral Presentation (Convocation Center Room 2007)
Thursday, April 18th
9:00am - 9:50am
Undergraduate Student(s): Soleis Ohonde & Gideon Bennett
Graduate Student: Sharon Korir
Research Mentor(s): Chinasa Elue

International student attrition is a rising concern in higher education given the various challenges that have arisen over the past couple of years (Donohue et.al, 2021). The onset of the COVID-19 pandemic, the racial justice movements, and the current social political climate have significantly impacted our college students like never before (Borgstrom & Mallon, 2022). Of growing concern is the rising mental health crisis that is sweeping through higher education which deserves an urgent response, especially for international students navigating unfamiliar academic and cultural terrains (Lee et al., 2021). International students are currently facing dire financial constraints, food and housing insecurity, and many other challenges that further complicate their college experiences (Duke et al., 2021). For incoming international freshman students, their college transitions are considerably different from traditional students. Specifically, international students' college transitions are muddied from their various high school experiences in other countries, assimilation difficulties, and living sometimes hundreds of miles away from home. Further, the grief, loss, and trauma experienced by these first-year international college students during the pandemic warrant special attention as we contemplate the resources and support required for their successful matriculation and degree completion (Sirrine et al., 2021). The lingering remnants of grief and trauma from the global pandemic continue to impact the college experiences of international students and their ability to successfully navigate their academic and professional goals. Hence, through a qualitative research design, our research explores the lived experiences of international college students in navigating grief and loss. The goal of this research is to provide an opportunity to explore and identify strategies for better supporting international students as they navigate the complexities of their academic journey, fostering an inclusive and nurturing environment that promotes their academic and personal growth.

Elementary & Early Childhood Education

Asian and Asian American Girls in Children's Picture Books
Poster #2 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm – 4:45pm
Undergraduate Student(s): Amanda Lindsey
Research Mentor(s): Jinhee Kim

In society, children are generally perceived as socially competent individuals, but girls are often expected to maintain a reserved demeanor and perform domestic tasks such as cooking and childcare, which contributes to the stereotype of being shy. However, girls, particularly those of color, frequently face biases and stereotypes. Despite the growing population of Asians and Asian Americans in the United States, there is a conspicuous absence of positive discourse surrounding Asian and Asian American girls. This project examines the experiences of Asian girls of immigrant families by analyzing 25 out of 70 sampled picture books. The picture books for this study were chosen based on the following criteria: 1) fictional picture books published between 2009 and 2023, 2) featuring protagonists who are East and South Asian girls of immigrant families, 3) targeting PreK to 3rd graders, and 4) written in English. Through the content analysis (Cohen et al., 2007), we examined the representation of girls and girlhood in the sampled books. The findings revealed that girl protagonists often follow a trajectory of being followers to leaders (44% books), being bullied and put down (40%), and receiving main support from their mothers (36%). Additionally, young girls are more involved in domestic chores compared to their male counterparts. The study also found that girls and women are still expected to follow the traditional gender roles and succumb to harmful stereotypes. This study offers insights into the challenges of Asian/Asian American girlhood, while also acknowledging the beauty of togetherness and bonding.

Experiences of Latinx Pre-Service Teachers in the State of Georgia
Oral Presentation (Convocation Center Room 2007)
Thursday, April 18th
9:00am - 9:50am
Undergraduate Student(s): Libna Amaro, Brenda Villa, Rosa Diaz Jarquin, Betsy Barron, Salome Carmona, Evelyn De Santos, and Roxanna Villegas, & Jennifer Castellanos
Research Mentor(s): Sanjuana Rodriguez and Paula Guerra

This qualitative study examines the experiences of Latinx Pre-service teachers in colleges of education in the state of Georgia, a state in considered to be part of the New Latinx South. Aligned with critical scholarship, this study seeks to learn about what support pre-service teachers are receiving, what they need, and what barriers they encounter in their journey to becoming teachers. Data sources for this study include interviews with pre-service teachers in the state of Georgia. This interview protocol seeks to learn and understand these implications

through the firsthand experiences and stories of Latinx pre-service teachers. Results from this study suggest Latinx pre-service teachers experience many barriers on their journey to becoming a teacher, including navigating institutions of higher education on their own, working full time while studying, and attending colleges that provide limited support. Additionally, the interviews displayed common themes such as seeking a sense of belonging and representation in the classroom. Implications for this study have the potential to inform how colleges of education provide support to Latinx pre-service teachers.

Latinx Pre-Service Teachers
Poster #31 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am – 10:45am
Undergraduate Student(s): Salome Carmona
Research Mentor(s): Sanjuana Rodriguez

Even though the Latinx community composes a significant portion of the American population, especially in public schools, the representation within the teaching workforce remains disproportionately low. In the state of Georgia, Latinx teachers make up only 2.6 of the population while the number of Latinx students in schools is close to 11% (Flammini & Steed, 2022). This survey analyzes and addresses the experiences of pre-Latinx teachers as they navigate higher education. Mostly highlighting the challenges and obstacles they are meant to encounter and the support networks that are needed. Survey data was collected from pre-service teachers in institutions in the state of Georgia. Data was collected related to the experiences of pre-Latinx teachers in their journeys to becoming teachers. Findings indicate that pre-service teachers in Georgia experience a myriad of barriers in their pursuit to become teachers, and explicitly showcases how the majority expressed a need for more support networks and a broader understanding of their experiences and need The goal of this research is to highlight the urgent need for educational institutions and policy makers to address the challenges that are currently faced by the pre-Latinx teachers and help establish support networks that might be able to help advance success in the workforce for these teachers.

Learning About the Experiences of Pre-Service Teachers in Georgia
Poster #32 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am – 10:45am
Undergraduate Student(s): Salome Carmona
Research Mentor(s): Sanjuana Rodriguez & Paula Guerra

Even though the Latinx community composes a significant portion of the American population, especially in public schools, the representation within the teaching workforce remains

disproportionately low. In the state of Georgia, Latinx teachers make up only 2.6 of the population while the number of Latinx students in schools is close to 11% (Flammini & Steed, 2022). This survey analyzes and addresses the experiences of pre-Latinx teachers as they navigate higher education. Mostly highlighting the challenges and obstacles they are meant to encounter and the support networks that are needed. Survey data was collected from pre-service teachers in institutions in the state of Georgia. Data was collected related to the experiences of pre-Latinx teachers in their journeys to becoming teachers. Findings indicate that pre-service teachers in Georgia experience a myriad of barriers in their pursuit to become teachers, and explicitly showcases how the majority expressed a need for more support networks and a broader understanding of their experiences and need. The goal of this research is to highlight the urgent need for educational institutions and policy makers to address the challenges that are currently faced by the pre-Latinx teachers and help establish support networks that might be able to help advance success in the workforce for these teachers.

Pre-service Teachers' Perceptions of STEM Before and After an Integrated Science Course

Oral Presentation (Convocation Center Room 2007)
Thursday, April 18th
9:00am - 9:50am
Undergraduate Student(s): Anna Elizabeth Clark
Research Mentor(s): Preethi Titu

Science, technology, engineering, and math or STEM subjects have become a topic of discussion in education. There is a societal expectation for children to be "better prepared in [those] areas" (Madden et al., 2016). Recent educational reforms have advocated for "restructuring curricula that emphasize explicit integration of STEM" (NRC, 2014, Ring et al., 2018). However, the definition of STEM remains unclear, and people's perceptions have evolved overtime. In recent times, the acronym has become closely associated with integrated STEM education (Moore et al., 2014). Pre-service teachers (PSTs) are not an exception from varying perceptions of STEM. Understanding PSTs perceptions of STEM can assist in identifying gaps in current teacher preparation programs and inform efforts to enhance their education. Tracking their evolving understanding of STEM throughout their academic journey is essential. Determining the effectiveness of current integrated science courses in offering a comprehensive understanding of what STEM is can improve future attempts in furthering teacher education. Thus, we used a single case study design (Yin, 2014) to explore PSTs perceptions of STEM and how they change over time within the context of an integrated science course. Through qualitative analysis of pre & post-survey responses that included multiple-choice and extended-response questions, themes surrounding PSTs perceptions were identified using Dedoose software. The preliminary findings indicated a notable shift in PSTs perceptions of STEM shifting from viewing it solely as an acronym to recognizing STEM as hands-on and beneficial in fostering problem-solving skills.

They went from focusing on the perceived limitations, such as STEM being too "hard" or expansive for younger students, to emphasizing on the many benefits, such as promoting essential skills. The theme of "What is STEM?" in the post-survey data included codes like "hands-on," "deeper thinking," and "creativity." The research provides useful insights into the perceptions of PSTs regarding STEM education.

Inclusive Education

Advancements in South Korea's Multilingual and Multicultural Initiatives: Perspectives from Bilingual Immigrant Coaches and Korean Government Officials working in Health Family Support Centers
Poster #34 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am – 10:45am
Undergraduate Student(s): Seongyo Gwon
Research Mentor(s): Jayoung Choi

Health Family Support Centers in South Korea play a pivotal role in promoting multilingualism and multiculturalism in South Korea that practices Korean-only assimilation policies. With an increased influx of multicultural immigrants, these centers provide assistance and services to immigrants. These centers also serve as a hub for both immigrants who have gained proficiency in the Korean language and culture also work there as bilingual coaches and translators, and dedicated Koreans fostering cultural harmony. Thus, it is crucial to examine experiences and perspectives of employees striving for immigrant equity in South Korea at these centers.
This study explores the perspectives and experiences of employees in Health Family Support Centers across South Korea, specifically eight bilingual coaches in different cities and five government officials in the northwest region of Seoul. Data was collected through individual interviews lasting 70 to 120 minutes with the bilingual coaches, originating from countries like China, Japan, and Vietnam, along with a 130-minute focus group interview with government officials. It aims to understand how these experiences contribute to our knowledge of challenges and opportunities in promoting equity for immigrants and implications for policies related to multilingualism and multiculturalism in ethnolinguistic minority family contexts.
Thematic coding in our qualitative analysis revealed that the coaches found their work rewarding but faced challenges like heavy caseloads, lack of early childhood education expertise, and coaching in incompetent languages. Korean government officials, drawing on their experiences as directors, noted issues such as insufficient resources including funds for employees, heavy caseloads with both proficient and non-proficient tasks, employee numbers, awareness, and the need to support immigrant mothers. This research has broader implications for policies and

programs supporting ethnolinguistic minority families and children in promoting multilingualism and multiculturalism beyond South Korea.

The Fight for Harmonious Multilingualism: Literacy Practices of Two Trilingual Families in the United States
Poster #7 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am – 10:45am
Undergraduate Student(s): Brianna Arias & Anaya Stinson
Research Mentor(s): Jayoung Choi

Immigrant parents have long been concerned about the loss of their children's heritage languages (HL) due to lack of effort from monolingual society to provide resources and incorporate multilingual practices. Language and literacy competency in HLs along with community language is challenging especially for trilingual families compared to bilingual families. We need to know more about how growing trilingual families in U.S. context promote language and literacy in all three languages in their children and how they work towards reaching harmonious multilingualism where all family members feel content regarding their language use. In this presentation, I first examine the language and literacy practices of three trilingual children from two immigrant families in the Southeastern U.S. One child, 6, uses Romanian, Turkish, and English. The siblings, 7 and 10, in another family use Farsi, Korean, and English. I also explore the immigrant parents' successes and struggles with supporting their children's language/literacy development in the three languages. Data collected over the last two years include interviews of the children and parents, the children's audio/visual recordings and writing samples in all three languages. The qualitative analysis of the data has led to preliminary findings. First, the children voluntarily engaged in literacy practices, such as writing names of and texting to family members in all three scripts and reading graphic novels in HLs for pleasure. Second, the parents supported their children's trilingualism through word and sound decoding activities in HL to replicate the school's English practices and reading to their children. Both families also grappled with the amount of HL linguistic surveillance and English language censorship, as well as their own emotional reactions to their children's language practices. The study raises questions about how to promote harmonious multilingualism. This presentation will benefit multilingual families who are fighting linguistic colonialism in the U.S. and beyond.

Secondary & Middle Grades Education

Building Citizens in Classrooms: Examining the Impact of Developmentally-Appropriate Civic Discourse Curriculum
Poster #19 (Convocation Center, East & West Activity Wings)

Thursday, April 18th
10:00am – 10:45am
Undergraduate Student(s): Isabelle E. Gomez
Research Mentor(s): Johari Harris

Civic discourse is a crucial element of democracy that seems to have disappeared in America's polarized political climate, replaced with baseless claims & tenuous arguments. Lost in such debates are the abilities to compromise and find common ground, the cornerstones of democracy. To ensure the health of our democracy, researchers argue we must develop civic discourse skills in children and adolescents rather than waiting until adulthood (Byrd, 2012). Social domain theory (SDT) asserts that children and adolescents understand issues of fairness, social norms, and human welfare (key elements of citizenship & democracy) differently at various stages of development (Nucci, 2008). Deepening students' understanding of these politically-relevant issues is most effectively through peer-to-peer discourse. There has been limited application of SDT in K-12 classrooms, which greatly inhibits students' potential moral and civic discourse development. The Educating For Democracy initiative (EFD) addresses these gaps by providing K-12 students developmentally-appropriate opportunities to exercise empathetic thinking regarding historical inequities through civic discourse with peers and synthesize their collective positions into writing. Given the lack of research into developmentally-appropriate civic discourse activities for K-12 students, this current study examined students' thoughts about engagement with EFD materials. Through the use of focus groups, the exploratory qualitative study examined fifty 3rd-8th grade students' experiences with EFD curriculum (i.e. units, lesson plans, writing prompts). Using the constant comparative method (Kolb, 2012), thematic changes were identified across focus groups (Braun & Clark, 2006). Three themes emerged in preliminary data: that participants valued engaging with peer-to-peer civic discourse around issues of race and justice, participants appreciated conversations around racial implication and racism, and that participants enjoyed learning about topics typically prohibited in schools (e.g. confederate monument debates). This suggests that students not only understood developmentally-appropriate curriculum, but, through interaction with EFD materials, felt empowered to become justice-oriented, cooperation-focused citizens of democracy.

Coles College of Business

Economics, Finance & Quantitative Analysis

Cardiovascular Disease Hospitalization Outcomes in Atlanta 2022
Poster #28 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm – 2:45pm
Undergraduate Student(s): Sarah McCubbins & Caleb Wright
Research Mentor(s): Weiwei Chen

What is the leading cause of death for Americans today? Is it the fentanyl opioid crisis, or car accidents? What about STDs? Even these are all rising causes in today's society, studies show that cardiovascular disease is the number one killer for Americans. About 695,000 people died of heart disease in 2021. That's 1 in every 5 deaths. But why? The purpose of this study is to examine the healthcare outcomes for patients with cardiovascular disease in Atlanta's hospitals. Because of this common disease, our goal is to determine what hospitals produce better results when treating cardiovascular diseases patients. The method that we will be using to collect the bulk of the data is through literature reviews of patients directly impacted by cardiovascular disease. To analyze the data, we will classify which type of facility each of these hospitals is located in, then compare the data sets to find differences in the patient outcomes. What makes this facility different from the next? It is expected that private hospitals will have better patient outcomes for patients with cardiovascular disease because it is assumed that these facilities will have more staff and resources available to allocate towards patients. The significance of this study is understanding where the best care is being provided for the leading cause of death in the United States. It will also allow those suffering from cardiovascular disease to be treated where the best care can be received.

Solutions to the Nursing Staffing Crisis Amidst a Global Pandemic
Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
5:00pm – 5:50pm
Undergraduate Student(s): Savannah Edmonds
Research Mentor(s): Weiwei Chen

Due to the current global health crisis, the healthcare industry is currently facing a healthcare personnel crisis. This issue has led to heavier workloads, a shortage in staff, which then causes major burnout, thus compromising care for the patients in need. Solutions are needed to address this crisis in order to reverse the shortage. The objective would be to find solutions and

incentives that we believe would help improve the healthcare personnel shortage. To create specialized recruitment tactics, such as providing incentives, chances for profession growth, and flexible work schedules, in order to draw in and keep an extensive number of healthcare providers. Our method would be doing a literature review to find the cause of the shortage. Once recognized we will then be able to address and create actionable insights for healthcare facilities and policymakers to put in place to address this current crisis and other challenges. If we increase incentives for healthcare professionals to stay working within their respective fields, we would see higher retention in healthcare personnel within the field. In addition to this, we anticipate healthcare professionals to be happier and give quality care to their patients. Our findings would help us and healthcare professionals understand the reasonings behind the healthcare staffing shortage. With these findings, strategies will be created in hopes of addressing and mending the shortage.

Information Systems and Security

Advancing Patient Safety: A Framework of Best Practices Utilizing Virtual Sitters and Remote Patient Monitoring to Prevent Falls in Hospitalized Patients.
Oral Presentation (Microsoft Teams)
Friday, April 19th
12:45pm – 1:00pm
Graduate Student(s): Oghoreye Colette Obazee
Research Mentor(s): Govind Hariharan

Hospitalized patients face a heightened risk of falls, which can result in injuries, prolonged hospitalization, and increased healthcare expenses. This paper presents a robust framework of best practices aimed at preventing falls in hospitalized patients by leveraging virtual sitters and remote patient monitoring (RPM) to enhance patient safety. Falls in healthcare settings pose significant challenges to patient well-being and healthcare systems. Through a thorough literature review, this study consolidates current research to outline effective strategies for integrating virtual sitters and RPM systems into fall prevention initiatives. Emphasizing proactive surveillance, early risk detection, and timely intervention, the paper delves into the pivotal role of virtual sitters and RPM in averting adverse events associated with falls. Additionally, the study evaluates the efficacy of these technologies in fall prevention while addressing implementation barriers and facilitators. By providing healthcare professionals with a practical roadmap for deploying virtual sitters and RPM successfully, this paper aims to reduce fall-related incidents, enhance patient outcomes, and streamline care delivery in hospitals. Offering evidence-based recommendations, this research contributes to advancing patient safety efforts, fostering a culture of continuous improvement and proactive risk management within

hospital environments. The proposed framework serves as a valuable resource for healthcare providers, administrators, and policymakers dedicated to elevating patient safety standards.

Management, Entrepreneurship & Hospitality

Corporate Governance Factors and Financial Performance of Restaurant Companies
Poster #36 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Suki Lewis, Abeer Kayser, Carter Pengelly & Memphis Fitzegerald
Research Mentor(s): Melih Madanoglu

The restaurant industry is a major player in the service sector in the United States. The industry sales are predicted to reach 997 billion dollars in 2023. The industry is characterized by a large number of minority managers and owners, a large percentage of single-unit businesses, and numerous chains. For publicly listed restaurant companies, corporate governance issues are critical determinants of firm success. The purpose of this study is to investigate the relationship between corporate governance characteristics and company financial performance. The sample of this study will consist of restaurant companies in Security Codes 5810 and 5812. The observation period will be between 2010 and 2022. The total sample will include around 70 restaurant firms. Data on corporate governance characteristics will be manually obtained from Def 14A (Proxy statements) and SEC annual filings (10-Ks) by a team of researchers. The dependent variables in this study will be firm financial performance measured by Return on Assets and Stock Returns. This study also uses control variables such as company size (number of restaurant stores), liquidity, debt to equity etc. Data for the dependent and control variables will be obtained from the Center for Research in Security Prices (CRSP) and Compustat. Potential independent variables in our study are corporate governance measures such as board diversity, franchising proportion (number of franchised stores to total stores), shareholder rights, etc. The variance in firm financial performance will be captured through multiple regression analysis. This research study expects to find the financial effects of corporate governance characteristics such as board of directors' independence, franchising proportion, and board diversity on company performance. The results of this study will provide implications for company executives about how to achieve better corporate governance that leads to company success.

Marketing & Professional Sales

CEO Compensation and CSR Linked Initiatives: An Exploratory Study
Oral Presentation (Microsoft Teams)
Friday, April 19th
4:00pm – 4:15pm
Undergraduate Student(s): Neema Desamu-Thorpe
Research Mentor(s): Nik Nikolov & Pramod Iyer

Using a hand collected sample of annual corporate ESG reports, I propose to study the link between CEO compensation and ESG performance and its implications for firm performance. Using stakeholder theory, I propose that companies that link CEO pay with ESG outcomes would perform better in the stock market. This is conditional on other variables, such as diversity of the board and ESG report status.

College of Architecture and Construction Management

Architecture

Applicability and Sustainability of 3D Clay Materials in Construction
Poster #21 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm – 3:45am
Undergraduate Student(s): Jocelon Smith
Research Mentor(s): Giovanni Loreto & Amaal Al Shenawa

The pursuit of sustainable architecture has become increasingly crucial in mitigating environmental impact. This abstract delves into the realm of sustainable building materials, focusing on their significance in both structural design and architectural forms. This study explores the attributes of sustainable materials such as recyclability, renewable sourcing, and low carbon footprint, through a process of mimicking modern construction technology using a 3D clay printing with a device called 3D Potter. This process tests different architectural forms, 3D printed on a smaller scale, strength, durability, and sustainability. Testing the integration of new and recycled clay material, and the design process, helps understand the impact it would have on 3D printing life-size structures with concrete. The research hopes to promote energy efficiency but also enable innovative and aesthetically pleasing architectural forms. This abstract underscore the imperative of sustainable building materials in shaping a more resilient and eco-

friendlier built environment. This study offers insight into engineering and mechanical performance difficulties that may come with printing more complex organic and geometric forms and suggests engineering technological advancement to decrease construction risk.

Architecture of the Second Sense: Inclusive Educational Spaces for Students who are Deaf or Hard of Hearing
Poster #25 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am – 10:45am
Undergraduate Student(s): Lizzy Johnson
Research Mentor(s): Robin Puttock

Educational settings in the United States are primarily geared towards hearing individuals, posing challenges for those with hearing impairments. In 2020, 95% of school-age students with hearing loss attended conventional schools, while only 47 schools nationwide catered specifically to the deaf or hard of hearing. This oversight in design leads to issues such as inadequate spatial acoustics and limited sign language space in classrooms. My thesis proposes "Architecture of the Second Sense," advocating for a holistic approach to educational design, particularly targeting pre-kindergarten through 5th-grade schools. Drawing from phenomenological principles and the five key DeafSpace design elements—Proximity, Sensory Reach, Light, Color, and Acoustics—it aims to address the educational needs of the hard of hearing community. Motivated by my personal experience of sudden sensorineural hearing loss, I aim to raise awareness that hearing impairment affects individuals of all ages, including young children. Through collaboration with experts and the hard of hearing community, I aim to identify specific educational, communicative, and environmental needs of young hard of hearing students, particularly within traditional educational settings. Located 25 miles Northeast of Atlanta in Lilburn, Georgia, my proposed site aims to cater to the needs of hard of hearing students, building upon the existing Deaf and Hard of Hearing program in Gwinnett County Public Schools. By investigating the challenges faced by thousands of American children in mainstream classrooms, my goal is to bridge the gap between traditional educational environments and the requirements of the hard of hearing community. Ultimately, my thesis seeks to create inclusive spaces that promote a sense of belonging and facilitate cognitive development for all children, including those with hearing loss. By integrating DeafSpace design elements, phenomenology, and holism, it aims to empower young students whose voices may otherwise go unheard.

Balancing Aesthetics and Sustainability in Architecture Through a Comparative Study of Alberti and Loos
Oral Presentation (Microsoft Teams)
Friday, April 19th

12:30pm - 12:45pm
Undergraduate Student(s): Jaylin Patterson
Research Mentor(s): Ehsan Sheikholharam Mashhadi

This paper addresses the central problem of reconciling architectural aesthetics with sustainability by exploring the question: How can us as designers achieve beauty in design without unnecessary material waste? Previous work has failed to adequately address this question, overlooking the potential for integrating historical architectural philosophies with modern sustainable practices. My research tackles this question by examining the writings and thoughts of Leon Battista Alberti and Adolf Loos, highlighting their similarities and differences, and proposing a practical and impactful approach to ornamentation. It will explore how architects can draw inspiration from Alberti's principles of harmony and proportion while embracing Loos's minimalist approach to design in order to create buildings that are visually appealing yet environmentally responsible. The intersections of aesthetics, ornamentation, style, technology, and ethics, will be analyzed aiming to guide future designers in creating beautiful, useful, and sustainable built environments. By analyzing historical works and their use of ornamentation across different time periods, I aim to offer insights into designing for a more sustainable future while preserving an architectural beauty of today.

Bringing Biophilic Design to the Art Farm at Serenbe
Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
2:00pm - 2:50pm
Undergraduate Student(s): Neeya Yahaya, Hager Ahmed, Ahmed Shaker, & Jordyn Willis
Research Mentor(s): Robin Puttock

People are drawn to nature, therefore are genetically biophilic. As third-year architecture students working on the future expansion of the Art Farm at Serenbe, we are investigating the incorporation of biophilic design concepts into architectural practice. This project sheds light on the effectiveness of biophilic strategies in improving human well-being and environmental sustainability through a comprehensive analysis of biophilic design principles.Through their seamless integration, our architectural strategies seek to improve people's physical, mental, and overall health and wellness, as well as reduce stress levels and promote a deep connection with nature. Based on the scientifically proven research that the built environment has a significant impact on people's health, this research studio aims to apply biophilic design techniques to establish built environments that are healthier, connected to the natural environment, and more harmonious for occupants. Based on the influential studies of "Designing Resilient Communities for the Future" by Dr. Phill Tabb, "14 Patterns of Biophilic Design" by Terrapin Bright Green, and "The Practice of Biophilic Design" by Stephen Kellert, this literature review of the emerging

field of biophilic design addresses demands such as urbanization, environmental deterioration, and the increasing awareness of the role of nature. Employing a multifaceted research methodology, this study integrates various techniques to explore the complexities of biophilic design in architectural contexts. Biophilic pattern languages are utilized to distill design strategies rooted in nature's inherent patterns and processes. Three-day on-site research in Serenbe, GA was conducted where ethnographic and phenomenological data gathering and analysis were performed as well as pre-design tasks and first-hand encounters with community members. The project aims to influence architects to create communities that support holistic health and create a closer connection with nature by clarifying effective design techniques and pointing out areas for the development of the Art farm at Serenbe.

Bridging the Epochs of Ledoux and Da Vinci
Poster (Microsoft Teams)
Friday, April 19th
1:00pm - 1:15pm
Undergraduate Student(s): Nancy Sanchez
Research Mentor(s): Ehsan Sheikholharam Mashhadi

From two different periods of time, Claude-Nicholas Ledoux and Leonardo Da Vinci have transformed the history of architecture and art. Their work has helped shape the two eras they were a part of. Leonardo Da Vinci was from the 16th century and was coined as the 'Italian Polymath of the High Renaissance era', due to his extensive knowledge in engineering, painting, architecture, and science. Claude-Nicolas Ledoux was an 18th century neoclassical architect from France. Ledoux produced architecturally innovative work that influenced social changes in pre-revolutionary France. In particular, his most notable work, Salines de Chaux, helped represent the future of urban design by adopting utopian societies and ideology. This utopian ideology challenged the traditional concept of design and introduced a new standard of thinking in rational architecture. On the other hand, Leonardo da Vinci's extraordinary methods and ways of thinking were reflected in his works of art, such as the Mona Lisa and the Last Supper. His methods of drawing set new standards in forms of artistic expression. His thoughts and methods in science and technology were far ahead for his time, but were highly influential in Da Vinci's era and in the subsequent modern period. By comparing the works of both Ledoux and Da Vinci, readers will have a better understanding of the significance their works had made in architecture and the artists' receptive fields.

Community Wellness: An Intentional Design Concept Through the Analysis of Biophilic Patterns
Poster #39 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm

Undergraduate Student(s): Azizi Ivey, Curie McInnis, & Roberto Handal
Research Mentor(s): Robin Z. Puttock

Community planning impacts the built environment politically, culturally and socially. In addition, there has been an influx of concern for community stability, public health and human well-being. Serenbe, a community developed to tackle these issues, uses biophilic principles to advocate for creative solutions to these problems created in Atlanta's metropolitan area. This research aims to contribute to the field of community development demonstrating how biomorphic architectural elements, sustainable, landscaping solutions, and overall spatial organization inform a synergistic design concept of a campus using immersive multi-sensory experiences that stimulate the senses, support cognitive function, and reduce stress -resulting in an environment that promotes a holistic and enriching experience. The design of our research methodology was informed by Dr. Philip Tabb's master plan of Serenbe and Bill Brownings 15 patterns of biopic design. We applied ethnological analysis of the pre-existing site. Then conducted a design challenge to interrogate the limitations and opportunities of our findings, held by a juror of staff and board members of Art Farm, members of the Biophilic Institute and the Serenbe community. Our qualitative research also included immersive social interaction within the community that informed our conscious awareness of the daily lived experiences of residence. While the study successfully demonstrates how the unique contribution, the biopic patterns can significantly impact the well-being and creativity, ultimately, enhancing the quality of life means addressing all political, social economic issues, created from the demand and profitability of real estate development. Equitable access to resources and amenities preservation of cultural, heritage community identity and social cohesion are also crucial issues that have not been addressed Bio patterns, offer design solutions that align with the values of diverse communities contribute to a sense of belonging and promote the well-being of urban dwellers while creating sustainable and culturally resonant environments.

Contrasting Architectural Philosophies: Andrea Palladio and Adolf Loos Through the Lens of Ornamentation, Aesthetic, and Techniques
Oral Presentation (Microsoft Teams)
Friday, April 19th
1:45pm - 2:00pm
Undergraduate Student(s): Neeya Yahaya
Research Mentor(s): Ehsan Sheikholharam Mashhadi

Through the eyes of ornamentation, aesthetic, techniques, this research investigates the contrasting architectural philosophies of Andrea Palladio (1508 -1580) and Adolf Loos (1870 - 1933) . Even though they were 4 centuries apart they builders represent opposing viewpoints that had a significant impact on how each time period developed. Loos who despised ornamentation at the start of the modernist movement, is known for saying that "ornament is

crime." Palladio's Italian Renaissance development of Classical ornamentation was in complete contrast to Loos's practical and stern aesthetics. Palladio used elaborate carved elements, columns, and pediments into his designs. Influenced extensively from the architectural style of the ancient Greek and Roman cultures. Stylistically Loos started a new minimalist way which coincided with his "Raumplan" concept of spatial planning, while Palladio revived and reinterpreted Classical orders and proportions. Loose dropped non-essential elements, preferring to use simple cubic forms and industrial materials like steel and glass. Inversely Palladio's famous villas and churches gave the essence of elegance and refinement with their symmetry, correct proportions, and traditional masonry construction. Although the two architects had a philosophical difference both were admirers of the technological advances that broadened the scope of design. Loos applied construction techniques like reinforced concrete, whereas Palladio used the sophisticated stonecutting and structural methods that produced domes, vaulting and monumental scales that were impossible before ornamentation Loose and Palladio had opposing views. Loos aimed to rid architecture of excessive embellishments in order to place function at the forefront. Palladio on the other hand added decorative elements to achieve a classical feeling of grandeur and beauty. This comparison demonstrates the variety of ambitions that different historical periods have for architecture. This analysis reveals the diverging philosophies of ornamentation, styles, and integration of the contemporary methods as the movements of modernism and Renaissance go through their processes.

Daylighting in Buildings: Investigating the Relationship between Daylight Levels and Building Compactness in Various Contemporary Architectural Types. [Efficient Typology classification]

Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
2:00pm - 2:50pm
Undergraduate Student(s): Andrew Welch
Research Mentor(s): Ermal Shpuza

One of the key ways of improving the energy efficiency of a building is to enhance the daylight levels and reduce the need for artificial lighting. Good daylight levels are also associated with increased productivity and the well-being of a building's occupants. Daylight levels are often a direct function of the floorplate depth, where locations near the windows receive more daylight, and those deep inside the buildings receive less. As a result, shallow floorplates and elongated buildings are usually related to higher daylight levels. However, shallow buildings that have more natural light are also associated with greater construction costs due to larger envelope areas, as well as greater operating costs due to the energy loss through the envelope. This research addresses the question of identifying basic design strategies for buildings that optimize between two opposing trends: enhancing daylighting in buildings while also reducing the amount of building envelope and energy transfer loss. We analyze a sample of fifty floorplates of

key buildings of the 20th century, considering best practice examples of architectural precedents, and inquire about the effect of building size on the complex relationship between natural lighting and building compactness, which is linked to cost. First, all the buildings are scaled and brought to the same floorplate size in order to evaluate the effect of the building's formal typology on daylighting. Second, the shapes of building floorplates are analyzed and categorized according to their shape, compactness, and fragmentation. The statistical analysis of the sample enables the identification of the cases that perform best regarding both daylight levels and the extent of the outer envelope. The findings can be used to propose architectural design guidelines that highlight the importance of daylighting with implications for the sustainability of the built environment, well-being, and feasibility.

The Feasibility of Utopia
Poster #25 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Korine Dorval
Research Mentor(s): Ehsan Sheikholharam Mashhadi

Thomas More, an Englishman, introduced the concept of utopia in 1516. A utopian society is envisioned as one in which everyone coexists peacefully, harmoniously, and with equality and tolerance for all racial, gender, and religious groups in a clean environment. This idea has piqued the interest of numerous writers, thinkers, and architects. While many have imagined or created their own versions of Utopia, the question remains whether they are realistically achievable. This essay will examine the works of Frank Lloyd Wright and Paolo Soleri, the novel architectural approaches they created in response to utopian society, and ultimately the effectiveness of these approaches in the modern world. The ultimate goal is to learn more about the challenges and barriers that stand in the way of building such a perfect society and to acquire a more profound comprehension of the feasibility of utopia.

From Silence to Thriving: Architecture as a Voice for the Wayuu Tribe
Oral Presentation (Microsoft Teams)
Friday, April 19th
12:30pm - 12:45pm
Undergraduate Student(s): Angie L. Son Pulido
Research Mentor(s): Arief Setiawan

This research explores how stories and music intersect to shape the built environment, with an emphasis on spotlighting the Wayuu tribe, a resilient culture facing extinction in the arid desert of La Guajira, Colombia. The Wayuu people have endured centuries of adversity, including colonialism, exploitation, drug trafficking, and internal conflict. In this place, water and food are

scarce, and child mortality rates are very high. Despite hardships, they preserve a culture of resilience thanks to their tradition of oral storytelling. Drawing from the tradition of storytelling, the works of writer Gabriel García Márquez, particularly his Magical Realism, serve as a source of inspiration. His words dance on the line between fantasy and harsh realities, mirroring the delicate balance the Wayuu people navigate. This research is guided by architects like Francis Kere, Doshi, Gregory Burgess, Toshiko Mori, and Jane Drew, as well as the writings of Frampton and Moholy-Nagy. Their work integrates sustainable practices, celebrates cultural narratives through innovative forms, and adapts traditional techniques and materials to contemporary challenges. Their design principles are applied to translate structures and patterns from Wayuu's musical stories into form and space. Based on Wayuu music, key rhythms will inform spatial arrangements, while tonal qualities will inspire materials and surface patterns. By translating these musical stories into design elements, the Wayuu spirit is celebrated architecturally. This research highlights the importance of the Wayuu culture beyond a mere academic pursuit, serving as a platform to break silence, raise awareness, and share the rich heritage of the researcher. 'From Silence to Thriving: Architecture as a Voice for the Wayuu Tribe,' aims to use architecture as a tool for social change that will offer a shedding light on a culture that deserves to thrive.

The Genealogy of Architecture Pedagogies
Poster #27 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Nadirah Ali
Research Mentor(s): Ehsan Sheikholharam Mashhadi

Different architectural pedagogies play a vital role and have shaped the practice of the discipline through time. However, the schools themselves have been shaped by aesthetics, technology, and ethics during their time. The 1800s and 1900s presented drastic movements in architecture that began to emerge based on the typology and buildings in demand. The Beaux-Arts style was indulged in an authentic grandiosity of French style in the late 17th century but its aesthetic re-emerged in the early 1800s when heavy ornamentation and representation of character were an important aspect of a building at the time. Then through the teaching of the style, it expanded to Gothic and Renaissance pursuits. Around a century later, the Prairie style emerged to move away from European standards to create buildings that were compatible with the newly understood American life. To move away from the massive highly oriented structures to forms that elongated horizontally was a key notion taught by its academy. The Prairie School of Architecture and École des Beaux-Arts both embody different movements of architecture and were both formed in a distinguishing manner pertaining to the demands of each era. The practices of each respective school have directly been influenced by the aesthetic demand, response to technological advancement, and incorporation of ethics at their time to later influence

the movements of architecture they established. This paper traces the genealogy of architecture schools by investigating standards that cultivated each school of thinking, and ultimately looks at the schools of the modern world like the Southern California Institute of Architecture and the University of São Paulo have developed their own styles in response to the standards set by the schools of the past. This comparative research analysis aims to present an understanding of how historical formations of different pedagogies in architecture developed and its teaching that provides continuous evolution for the discipline.

Harmony in Nature and Community: The Biophilic Union of Art, Design, and Well-Being in the Serenbe Art Farm Expansion
Poster #22 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Kayla Metts, Denisse Rosa, & Steve Cruz Rojas
Research Mentor(s): Robin Puttock

How does the integration of biophilic design principles and the concept of Union contribute to the enhancement of community well-being in the expansion of The Art Farm Campus in the Serenbe Community? Serenbe, located in Georgia, is a renowned biophilic community that fosters connections between individuals, nature, and the community. Within this community, the Art Farm is a unique location that hosts various events, programs, and workshops centered around the celebration and exploration of the arts. This semester, third-year architecture students are collaborating with stakeholders from Serenbe, The Biophilic Institute, and the Art Farm to embark on designing proposals for phases 1 and 2 of the expansion of the Art Farm Campus. This endeavor represents a holistic approach to community outreach; the students conducted thorough research, including site visits, engaging with residents, and interviewing professionals involved in Serenbe's development. The scope of exploration delves into the surrounding areas for cultural insights. Along with detailed measurements to inform our design decisions. The concept of Union emphasizes bringing elements together to achieve balance and tranquility among people and between people and nature. We drew inspiration from Dr. Phillp Tabb's book on biophilic patterns, particularly Sensory Connections, Inside-Outside Relationships, Numinous and Noetic Moments, and Centering and Nucleation. Union is demonstrated through spatial arrangements and circulation, creating interconnected spaces and paths that foster communal experiences and artistic freedom. Our design prioritizes central communal spaces, encouraging guests to share experiences, connect with nature, and engage in the artistic offerings along the artwalk. Our objective is to foster well-being by creating environmentally sustainable structures that align with Serenbe's commitment to sustainable living. This project embodies Union, blending cultural vibrancy, social connectivity, and sustainability. Our designs responds to Serenbe's unique context and supports the community's vision of creating spaces that celebrate nature, culture, and social interaction.

The Ideals of Two Men
Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
2:00pm - 2:50pm
Undergraduate Student(s): Coraima Perez
Research Mentor(s): Ehsan Sheikholharam Mashhadi

Architecture has represented the ideas, morals, and biases of society since humanity started to use their hands to create, due to this, architecture has divided people and their interpretation of how architecture should serve civilization. Donato Bramante (1444-1514), an Italian architect, was known for introducing High Renaissance architecture during his time in Milan; he was influenced by classical Roman architecture and developed a style consisting of precise ratios of width and height. John Ruskin (1819-1900), a British writer, believed Gothic architecture represented an ethical way to live, which led him to heavily criticize Classical and Renaissance architecture on the principles of The Seven Lamps of Architecture. They are from different periods and speak to the movement of architecture that they helped create. With this in mind, the project aims to compare the prominent architectural figures Donato Bramante and John Ruskin based on their stances on ornamentation, ethics, and character. To explore each of these men's ideologies, reading each of their important works and diagramming specific architecture that represents them will be crucial to understanding how they impacted their time through ornamentation, ethics, and character. I expect that with my findings there will be a distinction in how Gothic architecture and High Renaissance architecture express themselves visually to embody the time period that they were in; additionally, these figures would have contradicting ideas as to how architecture should shape society.

Influence of Christianity and Industrialization Technics on the Ornamentation of Architecture
Poster #30 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Rachel Pickert
Research Mentor(s): Ehsan Sheikholharam

Over the past six centuries, a decline in the influence of Christianity and an increase in modern technology has led to the development of contemporary architecture that is devoid of the craftsman's touch. The present-day desire for architecture that integrates nature and artistic expression is mirrored by the Gothic Revivalists' want for the return of hand-crafted material. This paper will focus on architectural movements during the 15th century through 19th century and how they respond to each other and the social changes of the time. The earliest examples will

begin with the Renaissance's humanist shift from the focus on the importance of God to the importance of science and humanity. Then the Protestant Reformation and the following response of the Catholic church in the Baroque period will continue to exemplify the awe-inspiring ornamented style. In the 18th and 19th century we find another call for return to focus on God in the Gothic Revival movement which highlights the importance of allowing God's creation to craft. This is especially sought after during the Industrial movement in which production was becoming increasingly defined by the capability of machinery rather than man. By outlining the correlation between the influence of Christianity and the resulting detail and focus on craftsman versus the increasingly austere architecture of the industrialization movement, we can see how a focus on the sacredness of nature and man's craft and production techniques influence the styles and ornamentation of architecture.

Leadership in Energy and Environmental Design: Cases of LEED Certifications for Fulton County School Buildings in GA
Oral Presentation (Microsoft Teams)
Friday, April 19th
12:00pm - 12:15pm
Undergraduate Student(s): Ashley Gentles & Kaden Johnson
Research Mentor(s): Pegah Zamani

The Research Center for Sustainable Communities (RCSC) *at Kennesaw State University (KSU) has been conducting analytical studies on how to enhance sustainability and reduce the carbon footprints of school infrastructures statewide in GA. The RCSC seeks ways in which the state could advance healthier and more sustainable, equitable, and cost-effective learning environments. Rooted in this initiative and funded by the* KSU Office of Undergraduate Research*, this research aims to examine the employment of Leadership in Energy and Environmental Design (LEED) certification as an outline for promoting the existing operation of school buildings. LEED is a globally recognized rating system with a set of rigorous standards developed by the* U.S. Green Building Council (USGBC)*. There are 808 high schools in Georgia, 18 of which are LEED-certified. Centered on Fulton County, the team will inquire about what measures were taken by these certificated high schools in the County that were not implemented in the rest of the County. The research will encompass a multi-faceted methodology, including a literature review, interviews (i.e., with county officials), and analysis of building certificate data. The findings will provide insights into the economic and environmental aspects of such certificates and the role of county decision-makers and stakeholders. Ultimately, the research will underline sustainability through environmental stewardship, economic prosperity, and social responsibility.*

Modernism and National Identity in Architecture
Poster #3 (Convocation Center, East & West Activity Wings)

Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Ahmed Shaker
Research Mentor(s): Ehsan Sheikholharam Mashhadi

This paper discusses a comparative analysis of the architectural views of the Egyptian architect Hassan Fathy and the Swiss French architect Le Corbusier in terms of aesthetics, national identity, and materiality. This analysis will be reviewed from various perspectives regarding politics behind their projects, their architectural visions, and an analysis of their main projects: Fathy's New Gourna Village and Le Corbusier's Chandigarh Capitol Complex. In the 20th century, Fathy, emphasized on sustainability, vernacular architecture, social awareness, and the Egyptian identity. However, Le Corbusier worked on modern urbanism, functionalism, and the usage of industrial materials. In terms of aesthetics, Fathy favored the usage of local materials and traditional environmental techniques from the diverse building cultures in Egypt. He emphasized on building communities that are sustainable with a great highlight on the sense of belonging. On the contrary, Le Corbusier was fond of the usage of geometric shapes and minimal ornamentation, which emphasized his vision of modern aesthetics. Concerning national identity, Fathy refused modernism and celebrated the local Egyptian heritage with a connection to the past, while Le Corbusier focused on creating universal principles of modernism that can be applied in various locations worldwide. Finally, the materials used by Fathy were sustainable and locally available like mud brick, lime plaster, wood and palm fronds. Le Corbusier, however, mainly used industrial materials like steel and reinforced concrete. Therefore, this paper will contribute to an in-depth understanding of two of the most iconic architects from Egypt and France, which will help future architects consider the usage of the local materials and tectonics to preserve the national identity.

Natural Reflection: Reducing the Environmental Impact of Architecture Through Biomimetic Design
Poster #19 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Keenan Doricent
Research Mentor(s): Robin Puttock

For my fifth year architecture thesis study, I researched how typical building projects contribute to our environmental issues today and possible ways to reduce that contribution moving forward. In my literature review, I discuss the potential of biomimetic design as a possible solution for more environmentally considerate architecture techniques. Building operations and the construction process are two of the leading contributors to energy consumption and our growing ecological footprint as an industry. Everything from sourcing materials, to site

preparation, and ultimately building occupation, factor into the effect of a structure's life on the environment. The embodied and operational energy use of our expanding infrastructure continues to have a negative impact on the global environment through greenhouse gas emissions and rapid site excavation. Biomimetic architectural design offers opportunities to develop construction techniques and integrated building systems that reduce energy consumption while having a less detrimental impact on the site. This thesis project is a study of life in five major ecosystems: tundra, mountainous, desert, forest, and aquatic landscapes, to find natural inspiration for developing architectural strategies. Learning how plants and animals interact within their respective domains can inform the way we design and show us how to build more cohesively with nature. Each ecosystem will showcase a biomimetic source, biomimetic solution, and an architectural application for a small two-bedroom home. The goal of this project is to discover and apply architectural opportunities from each environment that focus on site preservation and reducing energy consumption throughout the lifecycle of a building. I am exploring these biomimetic solutions with the intent of creating environmentally-friendly and engaging designs that highlight the possibilities of architecture in the future.

The Psychological Impact of Spatial Design: Virtual Technology as a Catalyst for Understanding Human Behavior

Poster #26 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Samuel Ryan, Lily Chappell & Noah Evans
Research Mentor(s): Selen Okcu

In society today there has been a widespread rise in anxiety, stress, and burnout. While there is increasing awareness about the consequences of these negative emotions, available resources are either lacking or inaccessible. Architecture presents a unique and unexplored solution to this rising problem. Evidence from interdisciplinary research studies suggest an inextricable interconnectedness between spatial design and human psychology and physiology. This study aims to expand the ongoing efforts exploring this link between design and wellbeing by integrating an emerging state of the art technology as a reliable means to allow the immersion of the human participants in virtual spaces and systematic study of the design features conducive of wellbeing. With the use of high-fidelity virtual reality (VR) applications in architecture, volunteers can get a highly realistic sense of the architectural spaces and assess the implications of intended architectural atmospheres enabled with the strategic use of different architectural features. This study aims to assess key architectural elements along with auditory and other sensory cues. After being immersed in virtual spaces, participants will be asked to self-report their assessments with the use of an online questionnaire. Based on this data, the design of the virtual spaces will be further evolved by integrating the findings of the existing neurological, psychological, and architectural studies. To allow a systematic comparative analysis, the

improved design will be presented to the study participants and their feedback will be collected via the same online survey. Overall, the study aims to enhance our understanding of the psycho- and physiological effects of spatial design, and how we can harness these design features to enhance wellbeing and reduce anxiety and stress.

Queer Underground: A Spatial Re-imagination of Underground Atlanta
Poster #34 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Ty Lawrence
Research Mentor(s): Trace Gainey

In the 1980s, stumbling upon the Imperial Lodge of Elks by night would have immersed one in an atmosphere characterized by expression, love, and cultural vibrancy. This locale, nestled within the ballroom culture of Harlem, NYC, has since evolved into a celebrated bastion of queer culture, serving as both a historical touchstone and a wellspring of inspiration for contemporary pop culture and the LGBTQ+ community. Drawing parallels between the architectural and functional dynamics of this bygone era and present-day queer spaces reveals intriguing insights.In downtown Atlanta, the once-thriving Underground Atlanta district grapples with the challenge of maintaining its relevance amidst evolving urban landscapes. While steeped in a rich cultural heritage, its significance often remains overlooked by many. Despite this, the area has become a haven for thriving queer nightlife, hosting renowned DJ parties and showcasing the talents of emerging artists within spaces originally designed for conventional retail ventures. However, as the specter of gentrification looms, Underground risks losing the very essence that has defined it for decades: its underground culture. Critical to the revitalization efforts for Underground Atlanta is the integration of spatial configurations that embrace fluidity and adaptability, thereby challenging conventional retail norms. Additionally, the creation of innovative public spaces designed to foster social interaction and community cohesion emerges as a pivotal consideration. Through a meticulous examination of successful queer spaces, this thesis endeavors to distill design principles uniquely suited to the distinctive context of Underground Atlanta.Central to this endeavor is the recognition of the intrinsic relationship between queer spatial dynamics and architectural principles. By delving into this symbiotic connection, this study seeks to inform a transformative strategy for the adaptive reuse of the Underground Atlanta site.

Quietude
Poster #33 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Shelby Ball, Kai Joseph, & Jose Salazar-Reyna

Research Mentor(s): Robin Puttock

The idea of the Art Farm is to create a two phase design for a small performing arts campus which is made of community based design and nature with my two teammates Kai and Jose. The location of our site is in Serenbe, Georgia focused on a community based project at the Art Farm for our third year studio project. The primary objective is to introduce elements of Quietude, aiming to enhance mental health and overall well-being. Quietude, defined as a state of tranquility and calmness, serves as the focal point for our exploration into how these serene moments in nature impact mental health. According to Terrapin Bright Green's articulation in the 14 Patterns of Biophilia encompasses four inspiring facets of Quietude—visual connection with nature, non-visual connection with nature, biomorphic forms and patterns, and dynamic and diffused light. It's important to bring Quietude moments into the Art Farm at Serenbe to increase the health and well-being of both the community and its visitors. During our three day trip we noticed the energy of Serenbe on the walkability, tight-knit community, and thoughtful urban planning. The local general store exuded intimacy, creating a welcoming atmosphere where familiarity among residents was palpable. The freedom to explore outdoor pathways away from residences and businesses further enriched our connection with the surroundings. We plan to achieve what Serenbe has created for their community into the Art Farm. Visual and nonvisual connections with nature have helped to enhance the beauty, scent, and patterns into the concept of our Quietude moments inspired by Serenbe. These spaces include serene ponds, meditation spots, and a firepit area, each catering to small gatherings for individuals to immerse themselves in nature. Our project encourages a symbiotic relationship with the environment, promoting the act of walking outside and appreciating the natural surroundings.

Sculpting the Senses: Architecture for the Body in Place
Poster #33 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Trammel Crowley
Research Mentor(s): Trace Gainey

Architecture has the ability to engage the human body and its senses from a holistic standpoint. However, there is a growing presence of architecture that is created with a bias toward the visual sense, lacking sensuality and leaving the other senses unstimulated. Negative emotions, like anxiety, experienced by an individual within a particular space can be attributed to various factors, including the sensorial qualities encountered and the memories associated with that space. Within the field of study, there have been architects who have confronted the issues of contemporary architecture neglecting the holistic experience of the body within space. An example of this can be seen in An Architecture of the Seven Senses by Juhani Pallasmaa, where he gives significance to the role of the senses through materiality and spatial experiences. Similar

themes can be found in the book Atmospheres by Peter Zumthor, where he extracts the elements of the impactful experiences, or atmospheres, that he has encountered, providing a framework for the process of creating architecture that moves its inhabitants. Embodied examples of these ideas can be seen in Therme Vals, a project by Zumthor that uses the sensorial qualities to define circulation, placing an emphasis on movement and its role in creating impactful experiences. Using these ideas and principles, an exploration will be conducted to explore how the sensorial qualities of different experiences can be used to create body-centered and memory-evoking architecture. This approach will involve incorporating principles from the literature, themes of everyday atmospheric experiences formulated within an index, and qualities of the precedents. The architecture being designed in order to address the issue at hand exists as a community center located in Atlanta, Georgia. This community center will house programs that encourage moments of both introspection and communion amongst individuals using the sensorial qualities of the atmospheres.

Stitching Spaces
Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
2:00pm - 2:50pm
Undergraduate Student(s): Michael Toache
Research Mentor(s): Arief Setiawan

Haute Couture or 'high dressmaking' is a term used for fashion designers to implement one-of-a-kind designs custom fit for an exclusive collection. Within the realm of design, there lies a relationship between fashion and architecture. Humans formed the earliest iterations of spatial boundaries by implementing weaving techniques made with plant fibers and posts. We created fences before we clothed ourselves. Weaving these boundaries or textile walls was instituted in some of the earliest forms of architecture still used today. The process of design that drives the creation of the spaces we inhabit today is created by the same beginnings as the processes that we use to create textiles and develop fashion. We see many thought processes crossover from fashion into architecture. "dress design as a form of engineering, rather than a mere synthesis of existing elements" (Chris Breward 34). How can the process of fashion design as an expression be replicated or manipulated into the design of space? This thesis has analyzed a variation of architectural works and designs of masterful fashion designers. Looking at a range of designers who use different techniques to develop respected and historical moments in fashion in terms of form, technique, materials, and narrative. Architecturally, works of design that display similarities to the same aspects of fashion are analyzed. From there, a series of abstractions and iterative drawings, photographs, models (physical and digital), and diagrams. are carried out to bring one end of design to the other and the result of these studies is a method or procedure on the development of Architectural space using methods of Haute couture and fashion design.

Sustainability and the Reuse of Materials in Screening Systems
Poster #12 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Dulce Hernandez
Research Mentor(s): Trace Gainey & Giovanni Loreto

Erwin Hauer, an innovative Austrian sculptor, revolutionized architectural design through his pioneering continua screens. Inspired by Henry Moore's biomorphic sculptures, Hauer's screens transcend the traditional interpretation of biomorphic forms in art to embrace functionality within architectural contexts. Unlike Moore, whose sculptures primarily explore spatial relationships without serving additional functions, Hauer envisioned and realized biomorphic forms as integral, functional elements in buildings. His continua screens, composed of modular elements forming infinite, continuous surfaces, are not only aesthetic but also practical. The modules are designed based on the use of saddle surfaces, which modify light reflection and shadow play, creating illusions of enhanced sunlight penetration compared to conventional flat screens. This effect not only enriches the visual experience but also contributes to the energy efficiency of the spaces they inhabit. By altering the penetration of sunlight into buildings, they offer thermal comfort across seasons—blocking direct sunlight to cool interiors in summer, while inviting ample sunlight for warmth in winter. Building upon Hauer's legacy, the focus of this research is to enhance the sustainability of these screens. By investigating alternative concrete mixtures and formwork systems, this research aims to preserve the unique geometric and design characteristics of Hauer's screens while improving their environmental footprint. The goal is to find configurations of materials and systems that maintain the screens' aesthetic and functional qualities but with reduced environmental impact, and in doing so to bridge the realms of art, architecture, and sustainability. The project aims to highlight the potential of biomorphic forms as a basis for functional, eco-friendly design solutions. This exploration not only honors Hauer's vision but also addresses the pressing need for sustainable architectural practices in the face of global environmental challenges.

Sustainable Impact of Arabia Mountain High School
Poster #35 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Tiffany Chen
Research Mentor(s): Pegah Zamani

This research aims to present the study of the sustainability development of Arabia Mountain High School, Academy of Engineering, Medicine, and Environmental Studies, in Lithonia, Georgia. According to the 2017 EnergyStar, United States schools spend 8 billion dollars every

year on energy and 30% of it is wasted. The 229,860 square feet school is a 2012 Green Ribbon award-winning and Silver LEED Certified by the U.S. Green Building Council (USGBC). This school shows multiple benefits of sustainable infrastructures and environment relating to the consumption of produce and energy of the school, which hopes to further the study of the architecture of schools, such as its design elements, and in-depth the positive impact of minimization energy and resources efficiency; As well as its cost savings. This sustainability mainly focuses on healthier occupation and benefiting its surroundings, not only the environment but also the students. Arabia Mountain High School offers programs such as the Air Quality Index, EIC Model, and Energy System, which enlightens the conditional knowledge of sustainability for the students. To show the benefits, the methodology process analyzes the review of Arabia High School's LEED scoreboard, recent Facility Condition Assessment report, and its Green Ribbon survey report. The Research Center for Sustainable Communities (RCSC) at Kennesaw State University (KSU) has been conducting analytical studies on how to enhance sustainability and reduce the carbon footprints of school infrastructures statewide in GA. The RCSC seeks ways in which the state could advance healthier and more sustainable, equitable, and cost-effective learning environments. Rooted in this initiative and funded by the KSU Office of Undergraduate Research, the research highlights Arabia Mountain High School as a potential exemplary model for designing future schools.

Virtual Reality in Architecture
Poster #24 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Noah Evans
Research Mentor(s): Selen Okcu

Virtual Reality (VR) has the potential to revolutionize architecture, especially by enabling immersive collaboration in virtual architectural settings among different stakeholders. However, the use of VR in professional and educational settings particularly for immersive collaboration purposes is still in the early stages. There is a growing need for more architects across the country to embrace immersive collaboration as a method to engage all stakeholders simultaneously in the proposed design space to allow design discoveries, virtual spatial interactions, and multi-faceted design assessments. Even though from anecdotal evidence, we anticipate the results of immersive collaboration through VR can be very promising; we still need more in-depth studies to characterize in what ways it can further enhance collaboration and communication compared to other conventional means. This research aims to provide more insight into the potential implications of immersive collaboration in architecture by examining how people work together in virtual environments, explore new ideas, and engage in multi-faceted design assessments. To allow systematic observations during individual explorations and group interactions, a virtual design space called the Guaju Pavilion was created. Each study

participant will be immersed in the virtual space and explore the design characteristics of the Pavilion on an individual basis before engaging in immersive group collaborations. A self-administered online questionnaire will be administered to collect information about their experiences. The survey results will be used to assess the extent of the explorations and the nature of the thought processes from group interactions and individual explorations. Overall, the findings of this study aim to provide more insight into how people can work together in VR environments that can lead to unique discoveries, and explain the advantages of being immersed in virtual settings as a group as compared to individual presence.

VR Enhanced Evaluation of Green Architecture in Hot Urban Environments
Poster #20 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Lily Chappell
Research Mentor(s): Selen Okcu

Growing evidence in sustainable design research enhances our understanding of energy-efficient architectural applications and sustainable urban forms. The integration of emerging state-of-the-art technologies such as virtual reality not only improves the collaboration between architects, and sustainability experts but also offers reliable means to engage users in the design process in a more effective fashion, With the use of high-fidelity VR tools in architecture, the occupants can get a very realistic sense of the architectural spaces allowing researchers to assess occupant outcomes and perceptions systematically and reliably. This study particularly focuses on hot and humid urban environments and aims to systematically evaluate the implications of green architectural features on environmental performance and also inquire about perceived qualities of resulting architectural atmospheres By utilizing high-fidelity VR technology, subjects will be immersed in different pavilion designs that incorporate systematically varying green design features to maximize thermal comfort. The comparative analysis of the data collected from study participants will be utilized to assess how green design features focusing on thermal comfort can influence the formation of architectural atmospheres. Overall, this study aims to enhance the understanding of the environmental and emotional dynamics of architecture in hot and humid urban environments through the integration of state-of-the-art tools in architecture. The findings of this research can help designers discover the link between occupants' responses to their environment and energy-efficient design solutions while providing architects and urban planners with new tools for the development of sustainable and inspiring architectural atmospheres.

Construction Management

3D Printed Models
Poster #1 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Graduate Student(s): Adeshola Bankole
Undergraduate Student(s): Jocelon Smith
Research Mentor(s): Amaal Al Shenawa, Giovanni Loreto

Three-dimensional printing technology has brought significant changes in the field of construction design, providing unprecedented opportunities for innovation and creativity in interior and exterior contexts. This study examines the far-reaching effects of 3D printing on the aesthetics, functionality, and sustainability of construction design. In interior construction design, 3D printing creates customized furniture, architectural elements, lighting fixtures, and partition walls. This technology allows architects and designers to explore their creativity and produce innovative structures with new possibilities by efficiently prototyping their concepts with precision and speed. Externally, 3D printing transforms the process of creating facade elements, architectural decorations, and modular building components. Complex geometries that were impossible with traditional construction methods can now be achieved, enabling architects to push the limits of architectural expression. However, architects and designers need help integrating 3D printing into their workflow, including high costs and limited availability of suitable materials. Sustainable materials and manufacturing processes further enhance the eco-friendliness of 3D-printed structures, which aligns with the growing demand for environmentally conscious design solutions. This study provides a comprehensive overview of how 3D printing technology is used in interior and exterior construction design. By embracing this transformative technology, designers and architects can unlock new realms of creativity while addressing the ever-changing needs of the construction industry.

College of Computing and Software Engineering

Computer Science

Developing Experimental Framework of Cloud-Enabled Mobile App with ML Algorithms
Poster #35 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Mahimna Patel
Graduate Student: Samhitha Challagundla Subbarao
Research Mentor(s): Ahyoung Lee & Hoseon Lee

This study presents an experimental framework for developing a cloud-enabled mobile application incorporating Machine Learning (ML) algorithms. The framework aims to integrate advanced ML techniques into a mobile application architecture to enable real-time data analysis and decision-making capabilities. The proposed system leverages cloud computing infrastructure for data storage and processing, facilitating seamless scalability and accessibility. Key components of the framework include the integration of ML algorithms for predictive modeling and anomaly detection, along with cloud-based storage and communication protocols. The experimental setup encompasses the design and implementation of the mobile application, incorporating features for data visualization, user interaction, and real-time alerts. Through this experimental framework, we explore the potential of cloud-enabled mobile applications in enhancing the effectiveness of ML algorithms for various applications, including water quality monitoring and environmental management.

Exploring Neural Networks for Breast Cancer Tissue Classification
Oral Presentation (Microsoft Teams)
Friday, April 19th
1:15pm - 1:30pm
Graduate Student(s): Stephen Jacobs
Research Mentor(s): Md Abdullah Al Hafiz Khan

Last year, more than 240 thousand women in the United States were diagnosed with breast cancer. These patients are benefitting from decades of data that have been collected by cancer research institutions around the world. Tissue samples are analyzed and cataloged by these institutions, and several facilities like the University of Wisconsin are sharing this historical data to promote the advancement of new cancer treatments. Deep learning and neural network

models are being built for this data to help doctors diagnose faster and design treatment options for patients by comparing their tissue samples with these historical datasets. We will use the data from the Wisconsin cancer study to evaluate different deep learning models and analyze their effectiveness in the classification of malignant versus non-malignant tissue samples. By sharing and discussing the models developed during this study, we hope to raise awareness of breast cancer research and raise educational interest in exploring AI-based deep learning techniques to assist with cancer identification.

Human-AI Collaboration for Mental Health: Combining AI and Human Expertise to Understand the Underlying Causes of Mental Health Concerns
Poster #15 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Geovanni Cuevas & Yousef Hasan
Graduate Student: Adm. Adnan Azmee
Research Mentor(s): Md Abdullah Al Hafiz Khan

In today's era, mental health has become a concern impacting millions of people globally. Mental well- being influences an individual's thoughts, emotions, and social interactions. With the increasing use of social media platforms for connections and support, understanding mental health discussions on these platforms has gained importance. Social media sites like Reddit offer a glimpse into how users perceive and deal with mental health issues. The rise of natural language processing and artificial intelligence techniques has shown potential in analyzing data. However, interpreting the post on Reddit and verifying it is quite challenging due to the nature of the data. In this study, we aim to collaborate human expertise with artificial intelligence to identify the reasons behind mental health issues. Our proposed approach involved annotating posts from Reddit based on the reason behind mental health conditions. Utilizing our rigorously annotated dataset, we aim to train our developed advanced deep neural network model for analyzing and interpreting the post. By combining human expertise in the loop, we believe that our comprehensive framework will be able to identify issues behind mental health effectively. Moreover, our research would provide insights for health professionals, researchers, and policymakers to develop effective strategies for supporting mental well-being in the digital realm.

Leveraging a Generative Model to Protect Machine Learning Frameworks
Poster #32 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Mercy Olaniran
Research Mentor(s): Xinyue Zhang

With its countless applications, machine learning has become an integral part of our lives. Moreover, our increasing dependency on machine learning applications presents a growing need to safeguard sensitive data. Machine learning models, dependent on large datasets, can inadvertently memorize training data, making them vulnerable to threats like model inversion and membership inference attacks. For example, in model inversion attacks, even with only public API access, attackers can potentially reconstruct training samples. This research aims to propose a privacy preservation approach from a different perspective that is to protect the privacy of training data samples from the source. We investigate the feasibility of training machine learning models using only synthetic data produced by Generative Adversarial Networks (GANs), eliminating the use of real data samples. Given the sensitivity of medical data, we employ the CheXpert dataset, a standard collection of 2D and 3D biomedical images such as chest X-rays, breast ultrasounds, and abdominal CTs. By utilizing GANs to generate synthetic data for training, we aim to bypass the use of real medical data, thus safeguarding the patient's private information. In the experiments, we will evaluate the efficacy of synthetic data against CheXpert data in training machine learning models and gauge the protective capabilities of GANs. Through risk assessments derived from empirical evaluations, we'll employ various inference attack models, such as membership inference and model inversion attacks, to measure the model's security when integrating GANs. Using the CheXpert dataset, we will also examine the potential trade-offs between privacy preservation and the robustness of a machine learning model.

Leveraging Neural Machine Translation Models for Japanese to English Translation Prediction

Oral Presentation (Microsoft Teams)
Friday, April 19th
3:00pm - 3:15pm
Undergraduate Student(s): Tyler Sutherland
Research Mentor(s): Md Abdullah Al Hafiz Khan

Neural Machine Translation (NMT) has revolutionized the field of language translation, offering unparalleled accuracy compared to traditional statistical approaches. The mid-2010's brought about a resurgence in the NMT model because of better computation power that could process these larger datasets and using CNN and RNN model alongside NMT model. This study explores the efficacy of NMT models specifically, in the context of Japanese to English translation. Using the Japanese-English Subtitle Corpus (JESC) dataset to train, we will be leveraging the learning architecture of NMT to predict our English translation. We investigate the performance of various NMT frameworks on this language pair, considering facts such as vocabulary size, model architecture, and training data size. Through experimentation and evaluation, we assess the capability of NMT models accuracy when predicting translations from Japanese to English across a diverse range of texts and linguistic nuances that are find in media

and within the JESC dataset. Our findings will shed light on the strengths and limitations of NMT when performing predictive translation.

Security in AI based US Healthcare System
Poster #31 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Sanjaykrishnan Ravikumar
Graduate Student: Sumaiya Tasneem
Research Mentor(s): Kazi Aminul Islam & Nazmus Sakib

The growing use of AI in healthcare enables doctors to swiftly uncover illness patterns that they might have overlooked initially, especially in medical images such as X-rays. However, health records are meant only for patients and their doctors. Yet, with advancing technology, attackers can manipulate sensitive data, risking undetected life-threatening diseases due to adversarial attacks on AI models. An attacker can manipulate state-of-the-art medical image classification models using the Fast Gradient Sign Method (FGSM) attack. For instance, attackers might introduce subtle changes to medical images, e.g., skin cancer moles [1], to misguide a deep convolutional neural network (CNN) to produce incorrect decisions. Although this attack is undetectable to the human eye, it is still strategically designed to mislead the CNN model into misclassifying the images. As a result, the model misdiagnoses the underlying disease leading to erroneous treatment recommendations or decisions. Our purpose for this project is to identify adversarial attacks' impact on healthcare systems and then to identify prevention techniques for these attacks, especially in healthcare systems where solutions are scarce, and attacks are constantly increasing. We will build a framework for diagnosing adversarial attack threat vectors (data source, machine learning model, and machine learning pipeline) in healthcare systems and propose mitigation techniques against these adversarial attacks. This study will guide us in ensuring safe and secure healthcare systems.

Utilizing Natural Language Processing to Identify Suicide Attempt and Ideation in Text
Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
11:00am - 11:50am
Undergraduate Student(s): Ibrahima Gueye
Research Mentor(s): Md Abdullah Al Hafiz Khan

Amidst a rising mental health crisis, accurately identifying signs of suicide attempts and ideation in emergency communications remains a critical challenge. The purpose of this research is to leverage the capabilities of Natural Language Processing (NLP), particularly the Prodigy

annotation tool, to create and refine classification models capable of detecting signs of suicide risk within 911 transcripts. The methodology involves: 1) utilizing data from a cleaned text file comprising five thousand records; 2) annotating in Prodigy, an interactive NLP tool that will be used to identify key patterns indicative of suicide involvement; 3) upon creating a comprehensive, annotated dataset, the final step involves training machine learning models to learn from the intricacies of the annotated dataset. The anticipated outcome of this research is the creation of a highly robust and sensitive classification model, thoroughly annotated using Prodigy, which is expected to significantly improve the detection of suicide risks.

Data Science & Analytics

Reducing Fatalities on the Road: Georgia's Hands-Free Law and Other Possible Solutions
Oral Presentation (Microsoft Teams)
Friday, April 19th
3:00pm - 3:15pm
Undergraduate Student(s): Elaine Pollard
Research Mentor(s): Susan Mathews Hardy

It is important to know the conditions that make driving deadly. Georgia instituted the Hands-Free law in July 2018 that requires drivers to not touch their cell phone while driving. Did the number of fatal accidents or the number of fatalities in those accidents change after the law? Websites tally fatalities, but do not study how these fatalities are associated with road conditions and structures before and after the law. The purpose of this study is to address this need and to research factors that could decrease fatalities in Georgia and the nation. Data from 10,166 fatal accidents from 2015 to 2021 in Georgia from the Fatality Analysis Reporting System's website were divided into groups before and after the Hands-Free Law. Whether the relationships changed before and after the Law were considered between these two sets of variables: Weekday, Road Type (Interstates, Metropolitan, Lower Density Roads), Collision Direction, and Weather Conditions versus the Number of Fatal Accidents and the Number of Fatalities in those accidents. In addition, 39,508 fatal accidents nationally in 2021 were also considered for the relationships between these factors and fatalities. Chi-Square Tests, Analysis of Variance, and nonparametric methods were performed. Georgia findings for 2015 to 2021 included that there were significantly more fatal accidents per day after the Hands-Free Law was implemented. However, the number of fatalities within a fatal accident was not significantly changed. After the Law, fatal accidents on interstates increased. Some of the national findings for 2021 included (1) most fatal accidents and the most fatalities occur on Friday, Saturday, and Sunday, and (2) head-on collisions on interstates are the deadliest. As a result, drivers should increase caution

when driving (1) on Friday, Saturday, and Sunday, and (2) reduce speeds on roads that do not have medians.

Multiple Myeloma: Increase Longevity and Quality of Life through Early Detection
Poster #14 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Desyne Martinez
Research Mentor(s): Susan Mathews Hardy & Gene Ray

Multiple Myeloma is a rare form of bone marrow cancer where plasma cells accumulate in the blood stream attacking the skeletal system, nervous system, and kidneys of predominantly African Americans. The disease results in high mortality rates within 5 years of initial diagnosis. Multiple Myeloma has subtle symptoms of bone pain; doctors often send people to physical therapy missing the diagnosis. Current research on the International Myeloma Foundation website includes summaries of blood tests of Multiple Myeloma patients. This study seeks to identify the best blood test predictors of Stage 3, the most aggressive stage of Multiple Myeloma. The cost savings are also considered of using these blood tests as an initial screening as compared to a bone marrow biopsy. Using 21 blood test results and demographic information on 203 Multiple Myeloma patients from 2008-2019 in Algeria, Logistic Regression was conducted to identify the best predictor of Stage 3 Multiple Myeloma versus Stage 1 and 2. Wald Confidence Intervals were used to estimate the odds ratios. Cost savings were calculated by determining the cost differential of less invasive blood tests versus the more invasive bone marrow biopsy. The Logistic Model was able to distinguish 65.43% of the time between whether patients have Stage 3 versus Stages 1 and 2. The odds of having Stage 3 Multiple Myeloma increase 1.04 to 1.56 times for each one g/dL decrease in MCHC. Lower patient MCHC levels are more indicative of the patient having Stage 3. Using an MCHC blood test has an estimated cost savings of $1734 per patient as compared to a bone marrow biopsy. Testing a patient with bone pain for MCHC can facilitate earlier Multiple Myeloma diagnosis, allowing physicians to administer earlier treatments, thereby improving patients' longevity and quality of life while coping with the disease.

Information Technology

Evaluation of Thermal Stress on IoT-based Federated Learning
Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
11:00am - 11:50am
Graduate Student(s): Yi Gu

Research Mentor(s): Liang Zhao

Federated Learning is a novel paradigm allowing the training of a global machine-learning model on distributed devices. It shares model parameters or gradients instead of the private raw data during the entire model training process. While Federated Learning enables machine learning processes to take place collaboratively on the Internet of Things (IoT) devices, compared to data centers, IoT devices are with limited resource budgets and typically have less security protection. This makes IoT devices more vulnerable to potential cyber-attacks. Current research on the evaluation of Federated Learning is mainly based on the simulation of multi-client or multi-processed Federated Learning Systems deployed on a single machine or device. However, when it comes to understanding the performance of Federated Learning Systems under cyber-attacks, there is a gap between simulated Federated Learning Systems and real-world distributed Federated Learning Systems on low-power IoT devices. In this paper, we are among the first to evaluate the performance of Federated Learning Systems under thermal stress on real-world IoT-based distributed systems. We conducted comprehensive experiments using the CIFAR-10 dataset and measured various performance metrics including training time, CPU and GPU utilization rate, temperature, and power consumption. The experimental results demonstrate that thermal stress is effective in IoT-based Federated Learning systems. In general, thermal stress can negatively impact the entire global model and cause device performance to degrade even when even a small ratio of IoT devices is being impacted. The negative impacts are amplified while the ratio of IoT devices impacted goes up.

Exploring the Spectrum of Non-Invasive Blood Glucose Monitoring: Wavelength and Physical Factors
Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
11:00am - 11:50am
Undergraduate Student(s): Tahsin Kazi & John Oakley
Research Mentor(s): Maria Valero

Diabetes and metabolic diseases are among the most pressing health concerns of our time. Currently, monitoring blood glucose, a pivotal indicator of these conditions, involves the cumbersome process of frequent blood drawing or subcutaneous needle injections. Fortunately, the drive for precise, non-invasive glucose monitoring methods has intensified, leveraging technological advancements in diverse wavelength multispectral imaging. These devices adopt lasers with photodiodes or cameras to correlate blood glucose with imaging data, building safer, cheaper, and more reusable procedures for measuring blood glucose. Nonetheless, numerous facets of this process remain unexplored. Light wavelength exerts a substantial influence on the accuracy of estimations due to the diverse interactions between wavelengths and skin.

Additionally, there are several patient-related physical factors, including skin color, temperature, humidity, and skin texture, that further impact the light's transmittance and absorption. To examine these variables, we engineered a device that harnesses a range of light wavelengths, from 650nm to 980nm, to gather data from human subjects. Concurrently, we measured physical factors, including skin temperature, humidity, skin color, and skin texture. Our methodology starts with the collection of physical factors, followed blood glucose measurement with traditional glucometers, ending with the capture of image data from all wavelengths. Then, we construct estimation models for each wavelength. Performance is compared through three distinct methodologies and metrics: statistical accuracy with Mean Absolute Error, clinical accuracy through correlation with Clarke Error Grids, and clinical accuracy through agreement with Bland-Altman Plots. Subsequently, we extend this evaluation across all physical factors, exploring their impact on overall model performance across our chosen metrics. After reviewing recent literature, we anticipate a weak, positive relationship between wavelength and the accuracy and precision of models. Moreover, we anticipate skin color and humidity to influence performance the most with a negative relationship between wavelength and the influence of factors.

Towards a Resilient Federated Edge Intelligence: A Testbed for Design, Analysis, and Validation of Federated Learning

Poster #28 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Leo Janse van Rensburg
Research Mentor(s): Liang Zhao

Federated learning (FL) is an efficient, privacy-preserving distributed learning paradigm that enables massive edge devices to train machine learning models collaboratively. Although various communication schemes have been proposed to expedite the FL process in resource-limited wireless networks, the unreliable nature of wireless channels was less explored. In addition, current research on the evaluation of FL is mainly based on the simulation of multi-clients/processes on a single machine/device. However, there needs to be more understanding of the performance of FL under unreliable communication in real-world distributed low-power IoT devices. This research aims to develop a testbed for evaluating FL under unreliable communication. The core of the proposed testbed will constitute Heterogeneous physical devices (e.g., IoT devices) that can be configured to mimic the operation of real FL operations with application software that can be set up to test communications between the devices. The testbed will allow performing effects of different network conditions, such as latency, jitter, packet loss, and bandwidth. The testbed being developed by this project will provide researchers and practitioners with an open and adaptive environment for measurement and experimentation in the FL context. It will also enable opportunities to design and test effective techniques that

provide robust FL solutions. In addition, this project can help analyze and validate issues related to FL security.

Understanding the Mechanisms of Uracil-DNA Glycosylase Using Computational Methods
Poster #34 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Toni Kamau, Kareigh Gammon & Johaan Kathilankal Jis
Research Mentor(s): Chloe Yixin Xie

DNA mutations can happen as many as 1x10^5 to 1x10^8 times a day. Uncorrected DNA damage causes genetic alterations with unknown consequences. These mutations are commonly the cause of lung cancer, but UDG is a protein that can fix this damage. Understanding how this process occurs and how the body repairs the damage is an important part in furthering cellular science. This project is designed to study this process, more specifically focusing on the BER method of DNA repair by examining Uracil-DNA glycosylase, also known as UDG, with AP: A and AP: G containing DNA. We utilized ChimeraX to visualize the electrostatic surface of both versions of UDG (PDB ID: 2DDG and 2DEM). We found that these two models form different surfaces, indicating that the binding processes and interaction mechanisms with DNA are different. DNA is overly negatively charged while only the pocket of UDG is positively charged. The back of UDG is negatively charged and the sides have mixed charges to repel the DNA. The advantage of this distribution is that the DNA and UDG pocket are more likely to bond accurately. From our observation 2DDG is more positively charged in the pocket area. There is also a slight shape difference between the two UDG models. This can be attributed to the different amino acids in the model which can affect the bonds between the molecules in each model. The process is not fully understood but these charges aid the removal of uracil. This work brings insight for DNA researchers to understand the differences in binding mechanisms. This project will continue researching DNA-Protein interactions to gain useful insight for DNA researchers about the difference in binding mechanisms.

Unpacking Children's Brain Development Challenges Due to Screen-Addiction
Poster #24 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Morgan Bennett, Peter Souder, & Rachel Wilson
Graduate Student(s): Nafisa Anjum
Research Mentor(s): Nazmus Sakib

The surging occurrence of extended screen time (ST) exposure amongst children during middle childhood has emerged as a critical concern, given its compound impact on their holistic development. In response to this era's acute child health and development challenges, this study delves into the adverse effect of ST on cognitive, physical, mental, and social development, while simultaneously recognizing the potential advantages of digital media engagement in this technology-driven era, highlighting the need for a balanced approach within the domestic setting. The purpose of this study is to conduct a systematic review, investigating the relevant studies on ST duration, viewing content, implications, and associated challenges among children aged 6-12 years old. The idea is to establish a scientific basis for designing a practical screen time intervention approach that incorporates recommended ST guidelines into smartphones, facilitating parental control and progressing a balanced digital media engagement for children. We believe that such an approach can flawlessly align with the busy lifestyles of modern parents, while improving prevailing guidelines tailored to the often overlooked 'forgotten years' of childhood. By addressing the underlying research gap in comprehending the dynamics of ST intake, this study advocates for effective digital media management during middle childhood, thereby supporting healthy development of the younger generation.

Software Engineering and Game Development

Enhancing Street Art Expression: A Mixed Reality Approach
Poster #26 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Joel Metukmebong
Research Mentor(s): Henrik Warpefelt

This research project demonstrates the use of Mixed Reality as a medium to showcase art, primarily for public street art. Shown through an application prototype, the app allows people to scan image markers and superimpose digital artworks. The primary objective of this project is to provide artists with an alternative digital platform for self-expression while offering a unique way for people to experience and learn about each piece and artist through the addition of descriptions, giving those unfamiliar with the culture a chance to understand different aspects of each piece. Through exploring how artists utilize this technology, we seek to understand its impact on the way they express themselves and the way their artwork is comprehended. This research is done to contribute valuable insights into the relationship between technology and street art, shedding light on the transformative power of Mixed Reality in fostering global artistic dialogue.

Exploring the Use of the Physiological Signal for Weight Perception in VR

Poster #14 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Fareedah Ashiru
Research Mentor(s): Sungchul Jung

This research aims to investigate the use of physiological signals as a metric for measuring human perceptual responses to virtual weight in Virtual Reality (VR) experiences. Physiological signals, along with questionnaires, have been actively used to assess the quality of VR simulations. Previous research has shown a correlation between physiological signals and perceptual responses to physical stimuli. However, it is unclear whether physiological signals correlate with the perception of mentally augmented weight rather than physical weight. To address this gap in knowledge, we aim to investigate whether physiological signals can measure weight perception in virtual reality experiences. In this study, participants will engage in a VR gym simulation with an isometric contraction task, holding their arm position without movement while varying the size of the virtual dumbbell or providing tactile feedback. We will attach a physiology device to collect heart rate (HR), heart rate variability (HRV), and galvanic skin response (GSR) data. Participants' hand positions will be calibrated by the system while holding a lightweight dumbbell steady for one minute, and their physiological signals will be collected before and after they perform isometric contractions for 30 seconds. We expect to find a positive relationship between physiological signals and the perception of weight. This research aims to support the development of innovative at-home workout experiences and reduce the risk of muscle harm due to inefficient use of real equipment.

FIX-IN
Visual Art #12 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Ben Scholl, Adam Tucker, Noah Stephens, Adam Palmer & Connor McDonald
Research Mentor(s): Henrik Warpefelt

FIX-IN is a singleplayer arcade style game that takes the original game of Breakout and swaps the role of the player from the paddle side to the brick side. In FIX-IN, the player avatar, Green Guy, must defend his side from the ball by placing and fixing bricks to keep the ball away, as well as bumping into the ball with his head. The game investigates the impact of a new base-building mechanic, where the player must strategically place their own layers of bricks with the resources they are given each round. The ability for the player to customize their own brick layout creates many opportunities for players to experiment and find out the best layout for the highest score.

The focus of the prototype is on finding a balance between difficulty and engaging gameplay by applying the base-building mechanics to allow for more opportunities for puzzle-like gameplay.

Frog Fight
Poster #23 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Jane Day, Han Thi, Robert Papasidero & James Ross
Research Mentor(s): Henrik Warpefelt

Frog Fight *is a unique mashup of the 1981 arcade game* Frogger *and 1997 space shooter game* Subspace*. It is a battle between 2 frogs to collect the most flies. Players can keep the other frog away from flies by shooting them with projectiles. The game also features a split-screen display and a colorful, cutesy art style. Interaction design for this game focuses on increasing challenge by spreading just a few flies over a large arena. The small number of flies encourages players to engage in PVP combat and use their full attack arsenal, rather than just race to collect the winning number as quickly as possible. The team has worked to ensure PVP combat is the heart of the game's experience*

The Novel Game Design Lab
Game Design Booth (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 5:00pm
Undergraduate Student(s): Joshua Whorton, Joel Metukmebong, Stephen Pangilinan, Donovan McGregor, Jessica Susanto, Anaiya Tucker, Ryan Whisenhunt, Logan Haines & Angela Okafor
Graduate Student: Jhané Dawes
Research Mentor(s): Henrik Warpefelt

The Novel Game Design Lab studies how we can combine new technology and novel approaches to game design to create new and interesting gaming experiences. For this year's symposium, we will be exhibiting three games: Relic 2D, TechnoWizard, *and* Wildling Rumble. Relic 2D *is a platform for a variety of studies, including studies of engaging minimalist narratives and game play, as well as player performance and accessibility issues.* TechnoWizard *is a VR game aimed exploring how we can implement gesture-based interfaces for rhythm games and pushing the boundaries of interaction design for VR.* Wildling Rumble *is a hybrid card/digital game built to investigate how to design games to transfer cognitive load from the player to a computer. Lastly, we will be hosting a number of games from the Game Design and Development program for visitors to play.*

Wildling Rumble
Poster #30 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Logan Haines & Ryan Whisenhunt
Research Mentor(s): Henrik Warpefelt

When it comes to the combined field of digital board games, there needs to be a balance of what is necessary for the physical space and what is necessary for the digital space. The game must be justified as a combination of the two elements and not be able to shift completely to either side. In this study, we are exploring a new modality that uses Near Field Communication cards for transferring game data to the application. Our new method eases the requirement on players to keep track of the game state that is tracked separately from the program. We conducted playtests with other hobbyists of varying experience with physically complex board games. Over iterations, we developed a simulation and card game, inspired by collectible monster games, that employs all the engagement of a board game, while outsourcing the heavy cognitive load on the computer. Visitors at the Symposium will given a chance to play a short version of the game.

Radow College of Humanities and Social Sciences

Communication & Media

About a Bowshot Away Documentary
Visual Art (Microsoft Teams)
Friday, April 19th
12:00pm – 12:15pm
Undergraduate Student(s): Marisa Behan, Nelly Koz, Sofia Cupertino, & Olivia Chaney
Research Mentor(s): Sangsun Choi

How can the processes of documentary filmmaking be used to tell a story through a subject? The first documentary, led by Professor Choi with the team as production assistants, consists of a story highlighting a young Korean-American girl whose family is determined to help her reach her aspirations in competitive archery. In the pre-production phase, analysis of other documentaries was conducted to pinpoint strengths and weaknesses to implement or avoid in our documentary. Professor Choi's previous documentaries were also studied to gain a sense of his unique poetic and participatory styles to replicate that in the current documentary. Through

these processes, a sense of teamwork and production skills were developed, which is at the heart of producing a successful documentary. Then, field-work was executed by utilizing a mirrorless camera and other equipment to capture the subjects in person with various shots including establishing shots of the overall surroundings, the practice session, and her dad instructing her. Finally, each member composed an opening sequence to help Professor Choi implement the best aspects of each in his own, with feedback given to Professor Choi on his final version of the documentary prior to submission to various film festivals. The second documentary showcases a KSU baseball player who shares his story of setbacks and family values while trying to make it to the MLB. Following the processes learned from previous experiences, we are currently in the production phase, capturing interviews and footage at games, with the goal of submitting to the KSU Film Festival. Through the course of our research, we discovered that to successfully tell a story through a subject: B-roll should be sequenced with a precise beginning, middle, and end, different paced shots capture the attention of the audience, and an inciting incident is necessary to thrust the story forward.

Courtroom Communication - Making a Complicated Process Clear
Poster #28 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Makayla Culpepper
Research Mentor(s): Robin Mathis

This qualitative study examines the core elements of communication clarity in the legal field. Many people who have gone through the legal system find communication challenging. Recognizing the critical importance of good communication in the legal setting, our study aims to better understand the opinions and points of view of people who have received legal assistance about the clarity and efficiency of communication during their legal interactions. Previous scholarly texts highlight that one of the main problems in professional fields are communication issues/boundaries. Little to no communication studies before has delved into aspects of the legal field. Utilizing a survey distributed to a diverse sample of individuals with legal representation experiences, we aim to analyze the survey responses to gain insights into the communication dynamics between legal professionals and their clients. The survey focuses on aspects such as the use of legal language, the accessibility of information, and the overall satisfaction with communication during legal proceedings. Although the data is still being collected, I can identify a few developing trends. Some of the themes include inadequate time management, a communication barrier, unaffordability, and distrust between the client and the attorney. This study will add to the continuing debate about communication in the legal field by providing a complex perspective that promotes a more open-minded approach to building effective communication in the courtroom.

Relationships Between Final Conversations with Self-Esteem and Relational Satisfaction
Poster #12 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Ella Smith
Research Mentor(s): Emily Scheinfeld

Death is taboo and families underestimate the need to talk about final wishes and wills, among other end-of-life (EoL) related issues. Having EoL conversations allows final wishes to be better satisfied, alleviates needless suffering, and creates an opportunity for a good death. EoL communication can also impact outcomes for family members and caregivers alike. Personal growth (PG) allows family members to say goodbye, connect, show love, and explore their own identities. Additionally, EoL conversations can contribute to PG and coping following the death of a parent, however, there is a lack of research on just how having these final conversations (FC) are related to self-esteem and relational satisfaction following the death of a parent. Analyses revealed that there appears to be significant relationships between EoL conversations with self-esteem and relational satisfaction. Implications are discussed along with limitations and future directions of research.

English

Ketamine-Assisted Therapy and its Accessibility to Communities in Georgia
Poster #29 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Shamiah Hill
Research Mentor(s): Amanda Pratt

Ketamine therapies, clinics, and resources are unobtainable to those most in need of their potential benefits due to the barriers of price, availability, and clinic location. This is proven through the recent ketamine drug shortages, the biased locations of ketamine clinics in high-income areas, and the excessive costs of ketamine. Demographic and geographic data has been collected from ten ketamine clinics to compare the greater access that certain communities have over others in the state of Georgia. The research techniques used are the collection of quantitative data and qualitative data from clinics in Georgia to analyze ketamine costs and treatment protocols in the context of geographic and demographic information. In addition, a rhetorical analysis of ketamine patent products will be conducted to further illustrate the presence of barriers associated with limiting access. When research is completed, it is expected that

communities in most need of ketamine treatment will be excluded through its inaccessibility. This research will bring awareness to the effects of ketamine shortages and its impact on many communities in Georgia and beyond.

Reflections on the Atlanta Student Movement Project
Oral Presentation (Microsoft Teams)
Friday, April 19th
1:30pm - 1:45pm
Undergraduate Student(s): Ahlan Filstrup
Research Mentor(s): Jeanne Law

This project will provide an overview of my work with the Atlanta Student Movement. The ASM was a civil rights group that was predominantly active in the 1960s, and over the past year I have been working to create educational resources based on the primary sources of the Movement. I want to use this space to discuss my role as a steward of the Movement's history. Transforming primary sources from the 1960s into practical, engaging resources for contemporary students has been a rewarding journey. In addition to reviewing my methods in creating this curriculum, I will discuss preliminary results from anonymous student surveys. These surveys, conducted at KSU, provide early feedback as to the efficacy and engagement of the curricula. I intend for this project to be a summary of 15 months of research, as well as an invitation to further explore the Movement's history. I will use clips from the Oral Histories of Movement Elders to enhance my virtual presentation. Secondary resources may include studies on student engagement and the history of civil rights education.

Rhetorical Analysis of the 1985 MDMA Rescheduling Trial and Reverberations in Contemporary Georgia
Poster #32 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Thomas Stephens
Research Mentor(s): Amanda Pratt

In our society, "hype" or hyperbole surrounding psychedelics is ubiquitous, especially as they return to being more commonplace within the medical field. This study will consider the impact of historical and ongoing hype, negative and positive, that surrounds the scheduling of psychedelics, and how these rhetorical dimensions have impacted the legal process of scheduling. The primary object of analysis within this study is testimony from the 1985 DEA trial regarding the rescheduling of MDMA, as seen in archival documents in the Betsy Gordon Psychoactive Substances Research Collection at Purdue University. Additionally, I reflect on this analysis within the contemporary rhetorical landscape of biomedical psychedelic resurgence in the state of

Georgia. For context, I draw on field interviews conducted with Dr. Emile Risby (Chief Medical Officer and Director, Division of Hospital Services of GA Departments of Behavioral Health), and Dr. Boadie Dunlop (Co-Director of the Emory Center for Psychedelics and Spirituality), as well as analysis of the Georgia Controlled Substances Act. The result of this analysis will contribute to an understanding of how the 1985 testimonies were rhetorically constructed to sway perceptions and influence the legal narrative around scheduling psychedelics, and how that legal narrative may be reflected in contemporary Georgia.

Social Media for Visual Artists: A Multi-Case Study
Oral Presentation (Microsoft Teams)
Friday, April 19th
4:00pm - 4:15pm
Graduate Student(s): Vivian Carol Huntington
Research Mentor(s): Laura McGrath

Historically, visual artists relied largely on galleries and art shows to sell their work, but with the rise of social media, more artists are taking advantage of its reach to increase their exposure, invite commissions, and generate sales. Previous research suggests that the number of galleries is staying constant while the number of artists is growing, leaving many talented artists with few choices other than online marketing. Little scholarly research exists studying social media marketing for artists. The purpose of this multi-case study is to examine social media marketing strategies of individual artists. This quantitative and qualitative multi-case study of three painters was conducted using content analysis of their Instagram and Facebook activity from November 1, 2023 to February 23, 2024. The research questions were 1) how do they use the affordances of Instagram and Facebook to build community and interact with their followers 2) how do they use social media to boost their exposure and sales and 3) how do they maintain their brand images with authenticity and confidence, and do they adhere to a recognized "style" of painting? For the quantitative research, the number of posts, comments, replies to comments, hashtags, Instagram stories, and Instagram Highlights were calculated. Average caption length for each artist was also calculated. For the qualitative research, the similarities and differences between their target audiences, marketing strategies, brand identities, consistency of content, levels of personalization, goals of social media, authenticity, and confidence were analyzed. The conclusions indicate that even though each artist had unique goals and marketing strategies, connectivity, authenticity, and confidence were critical to success. Furthermore, having a distinct artistic "style" was evident with each artist. The results of this limited case study suggest that more study is needed to benefit artists who use social media to market their art.

Trapped: A Television Pilot
Performance (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th

4:00pm - 4:50pm
Undergraduate Student(s): Olivia Smith
Research Mentor(s): Anna Weinstein

A single mother begins life anew in 1970s Central Florida but quickly finds herself entangled in the swampy criminal underbelly of America's burgeoning tourism capital. Years before the era of glitzy amusement parks and family-friendly attractions, Trapped chronicles how one woman's fight for survival puts her center stage in the shadowy story of betrayal, bribery, and bloodshed that helped make the Sunshine State what it is today.

Unraveling Rhetorical Landscapes: DemeRx's Communication on Ibogaine for Addiction Recovery
Poster #23 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Miles Duncan
Research Mentor(s): Amanda Pratt

This research seeks to explore the intertwining of rhetorical strategies and visual elements used by DemeRx, a player in the field of addiction recovery, in their communications regarding the use of ibogaine. As an incredibly innovative yet controversial treatment option for addiction, ibogaine's safety and efficiency are the subject of ongoing debate. By looking at the multitudes of communication materials, which include public statements, patent applications, published website materials, and visual representations, this study aims to decode the linguistic and visual choices made by DemeRx. The central focus is on understanding how these choices influence public perception and impact the acceptance of ibogaine as a viable treatment for addiction recovery. By conducting an extensive analysis, this research plans to shed light on the complex uses of language and visuals to change society's receptiveness to alternative addiction recovery methodologies.

Foreign Languages

Evaluating Multimodal Conversational Agents in Second Language Learning: Lexical Proficiency Enhancement with bespoke LLMs
Poster #8 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Cheryl Nguyen & Chloe Johnson
Research Mentor(s): Dylan Goldblatt

This research evaluates the German Language Coach (GLC), a bespoke intelligent agent powered by OpenAI's fourth-generation Generative Pre-Trained Transformer (GPT-4), focusing on its efficacy in second language learning enhancement, through an analysis of student communicative proficiency and perceptions of the tool. Central to our methodology is a survey designed to collect, on a voluntary basis, text and voice conversations between participants and the GLC, providing a rich dataset for analysis. This survey, conducted at several intervals throughout the study, measures key outcomes such as lexical proficiency, user engagement, and the integration of this AI tool into study practices, especially in scenarios where direct instructor involvement is minimal. By examining the interactions with the GLC and assessing lexical proficiency as a primary metric, the research sheds light on the potential and limitations of employing advanced large language models and bundled technologies in educational settings, contributing crucial insights for the development of effective, technology-assisted second language education strategies.

Geography and Anthropology

Topographical Analysis of a Stream Bank Along a Small Stream
Poster #24 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Liam Mills
Research Mentor(s): Ranbir Kang

In this research project, I analyzed the bank of the Vishnu Springs watershed and the effect that moss treatment may have on the bank erosion. This is part of a long-running research project. Many research sites were identified along the bank of the watershed. Each site contained several plots that were either control plots or treatment plots. The control plots were either bare or moss covered, while the treatment plots were made bare or had moss introduced. From 2015 to 2018, each site was scanned in the spring and fall of each year, using a Leica C10 LiDAR scanner. The scans were then used to create several point cloud renderings of each site. For each site, every scan was aligned with the subsequent scan taken. After alignment, each plot was separated from the point cloud and converted into a 3D mesh, which then had its volume measured. They were then each subdivided into four sections, which individually had their volumes measured. These volumes were compared with each other over three years. These comparisons will be used to determine the role of moss in affecting the bank stability along small rivers.

3D Printed Skeletal Models for Anthropology Student Use
Poster #11 (Convocation Center, East & West Activity Wings)
Thursday, April 18th

12:00pm - 12:45pm
Undergraduate Student(s): Bailey Walton
Research Mentor(s): Susan Kirkpatrick Smith & Uli Ingram

Anthropology students study the human skeleton to observe similarities and differences between modern humans and our hominid ancestors, to determine how the human body is affected by cultural practices, and to even identify injuries and potential causes of death. These students rely on the access to 3-Dimensional (3D) skeletal models, usually purchased from anatomical supply companies, such as Bone Clones, or France Casting. There are several studies on whether 3D anatomy models are beneficial in the classroom setting, in comparison to plain teaching methods. In addition, numerous studies have attempted to determine whether 3D printed models used in teaching human anatomy are accurate when compared to those that can be purchased. The purpose of our research is to determine whether 3D printing skeletal models is cost effective, time and user friendly, and overall, accurate. We created several skeletal models using a combination of open source (free) files and some that required purchase to download. We also tested out the printing of these models using different types of 3D printers and with various settings, to determine which ones yielded the best results. Once our models have been printed and processed to our liking, we will compare them to the models that have been purchased for department use.

3D Print Geography: Mountains, Terrains, Cityscapes, and Landscapes
Visual Display (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Sebastian Philbin & Will Conner
Research Mentor(s): Uli Ingram

3D printing has become an important tool for Kennesaw's GIS department. 3D printers allow the department to print detailed models of terrains and cityscapes as educational aids. Printing multicolor terrains and cityscapes, however, has not been largely not been explored by the department. Using Bambu's X1C multicolor 3D printers, we set out to discover the best methods to use multicolor 3D printing as a teaching and community engagement aid. This would allow the department to further develop student understanding of emerging technology, create career development opportunities, and build community understanding of what the GIS department does. In our research, we sought to develop tutorials on how to make multicolor 3D prints, develop ways these prints can be used as teaching aids, and develop physical, multicolor, prints as proof of concept. We found that multicolor 3D prints are an effective tool for teaching, allowing students to partake in a multitude of different projects. That being said, making multicolor prints with more complex data, such as sediment type or vegetation will require further research. Multicolor 3D printing is an important tool in the arsenal of GIS educators to enhance education and outreach for the department.

AI as a Teacher's Aide
Poster (Microsoft Teams)
Friday, April 19th
4:45pm - 5:00pm
Undergraduate Student(s): Kathryn Schuetze
Research Mentor(s): Uli Ingram

This presentation examines current AI tools and solutions, establishing that AI is capable of simplifying a teacher's workload through tasks such as summarizing lesson content, identifying trends in student feedback and quiz results, and research. The "best" AI model varied by task– Claude being preferred for summarizing from PDFs and websites, while Google's Gemini was preferred for more general use questions and information, such as generating project ideas.

Analyzing Artwork Along the Atlanta Beltline
Poster #9 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Cameron Platto
Research Mentor(s): Ranbir Kang

The Atlanta Beltline is an evolving project that has blossomed in Atlanta, and not only serves as a source of recreation but also to connect different surrounding communities. More specifically, the vast amount of artwork along the Atlanta Beltline is a clear representation of how welcoming and supportive of others the communities are. This research recorded every piece of artwork along the Atlanta Beltline on the Eastside segment. A photograph was taken for each piece of artwork along. It was followed by recording various attributes of each piece of artwork, such as date, time, location, direction, and whether the artwork was crafted from recycled materials. These attributes were entered into an excel spreadsheet. All photos were named and sorted in order of time and date. Similarly, all spreadsheet data was organized according to the corresponding location of each piece of artwork. Since the photos were taken with a smart phone, each photo was geotagged with the location of the respective piece of artwork. Using the geotagged location, each piece of artwork was mapped in Google Earth. The distribution and pattern of photographs was then analyzed according to different themes. This project increases our understanding of the dominant themes covered in the public artwork. The future work will focus on other similar landscapes.

Battling Curation at Pickett's Mill
Poster #29 (Convocation Center, East & West Activity Wings)
Thursday, April 18th

3:00pm - 3:45pm
Undergraduate Student(s): Reagan D. Earnhart
Research Mentor(s): Terry Powis

Foundationally, archaeology is defined as the scientific study of material remains, uncovered through survey and excavation. Material remains, such as ceramics, stone tools, natural material, historic artifacts, etc., are essential to archaeologists for understanding the past. In order to analyze these remains, they must be dealt with properly. One way in which site assemblages are dealt with is through the process of curation, which is the storage and care of assemblages for extended periods. This is a varying process across nations, states, and institutions. In the context of the United States, the National Preservation Act (1966), Reservoir Salvage Act (1960), and Archaeological Resource Protection Act (1979) provide standards for the long-term storage and management of archaeological material; however, curation standards tend to vary between institutions. Materials within collections are passed through the hands of three groups within this process: field technicians, lab technicians, and curators. How do these varying standards compare to one another? What types of problems arise during the curation process? How do too many hands on one collection impact the curation process? How does the curation process vary with different cultural materials? To explore these issues, an assemblage from Pickett's Mill, a Civil War battlefield site located in Paulding County, Georgia, is to be prepared for curation at a state-recognized institution. Following the steps involved in the initial qualification for curation will provide insight into the issues lab technicians encounter in the curation process, as well as how to overcome them.

Beyond the Findings: An Anthropological Approach to Solving Crimes
Poster #21 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Madison Conner
Research Mentor(s): Alice Gooding

Most people may be unaware of what an Anthropologist does. Unfortunately, the answer to that question is not that simple. There are several types of Anthropologists and they each work to accomplish different goals. For example, a Forensic Anthropologist can use their ability of analyzing human remains to help assist law enforcement. They are an important piece of a giant puzzle when it comes to criminal investigations. The overall purpose of this research is to discover what main areas anthropologists contribute to in criminal cases. This study will help determine the many ways an Anthropologists work can impact a case. This project will explore just how much law enforcement officials depend on Anthropologists during the criminal investigation process. The data will be collected by researching over twenty separate homicide cases. They will be chosen from different true crime documentaries. I will take notes on the

anthropological findings that were mentioned in the films. As well as taking the opportunity to go beyond the documentaries, and discover more information that was not originally mentioned. This will involve going into the deep web to find the missing information, and the anthropologists published reports. The results will include the different ways anthropological findings can influence the speed and overall decision making of a case. Whether the findings were absolutely needed in order to continue on with the investigation? If any of the Anthropologists had changed their original statements, and how that affected the case overall. Also, what seemed to be the most common evidence that was discovered?

From Burnt Post Marks to Broken Pottery Vessels: Encouraging Signs of Early Woodland Life at the Cummings Site in North Georgia
Poster #13 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Ellie Sutherland, JR Tadin, & Ian Foster
Research Mentor(s): Terry Powis

Cummings (9BR710) is a multi-component site with occupations dating from the Late Archaic (BC 3000-1000) through the Middle Mississippian (AD 1200-1375) periods. It is located about three kilometers northwest of the Etowah Indian Mounds in Bartow County, Georgia. The site is situated about 500 meters from the Etowah River. Over the past five years archaeological investigations have focused on the Early Wilbanks Phase (AD 1250-1375) occupation and the site's relationship to Etowah in the 13th century. Current research however has identified an Early Woodland (BC 1000-300) component based on the recovery of significant quantities of Dunlap Fabric Impressed pottery. The presence of steatite fragments and Savannah River points may indicate a transitional Late Archaic-Early Woodland manifestation. The occurrence of Cartersville Series ceramic types, including Cartersville Check Stamped and Cartersville Simple Stamped (but no Cartersville Linear Check Stamped) suggests this occupation continued into the Middle Woodland period. Three possible Early Woodland features have been identified, and the authors plan to compare Dunlap content with other recovered ceramic sherds to confirm whether they primarily date to this period of occupation. Based on the ceramic and lithic artifacts and the presence of pit features, possibly associated with domestic habitation, Cummings likely represents a small settlement, perhaps representing a nuclear family or two, engaged in the harvesting, processing, and storage of forest resources. A comparison of results with other nearby sites and elsewhere in north Georgia will also be provided.

Garment Worker's Rights: A Sustainable Clothing Issue
Poster #37 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm

Undergraduate Student(s): William Tyson & Mitchelll Purvis
Research Mentor(s): Jason Rhodes

In this project, we have done careful research regarding the current state of fast fashion & mass-produced clothing in countries like Bangladesh. The purpose of our project is to answer the following question: what are the societal impacts of mass-market clothing production? We conducted this research through careful analysis of prior research done on garment workers' lives and their experiences as well as research on the production of clothing. We expect our work to shed some light on how the clothing industry has unfairly treated its workers and ultimately endangered their lives.

Generating Channel Morphology Data Through ArcGIS Pro
Poster #13 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Ethan Manigbas
Research Mentor(s): Ranbir Kang

River cross-sections are often extracted using field surveys at measured intervals. This field-oriented approach allows for a tangible relationship between the data and its collector but at the expense of finance, time, labor, and potentially the environment. With the advancement of geospatial tools, such data can be found online, extracted, and even analyzed with contemporary Geographic Information Systems (GIS) in a completely virtual setting, transcending the need for fieldwork in select project topics. We tested this approach with the help of ArcGIS Pro software on the Vishnu Springs headwater stream located in the Western Illinois region of the Upper Mississippi River Basin. The process first consisted of downloading a United States Geological Survey (USGS) digital elevation model (DEM) of the stream from the National Science Foundation's OpenTopography online database. The resulting file was imported into ArcGIS Pro for geoprocessing, where the "Derive Stream As Line" tool within their Hydrology toolset generated an aligned line of the stream. The aligned streamline was then split into reaches at a uniform interval of 5 meters in the downstream direction. From the upstream direction, cross-sections were drawn perpendicular to each interval in the stream with a dedicated polyline feature-layer. The "Interpolate Shape" from the 3D Analyst toolset was then utilized to produce profile graphs of each cross-section, and these graphs were exported to Microsoft Excel for analysis. Using the horizontal and elevation values across each cross-section, morphology data was extracted on bank full width, average bank full depth, thalweg, cross-section area, bank full width and thalweg ratio, and bank slope. Our method provided consistent cross-section data of our target stream, Vishnu Springs, with a high spatial resolution in a more efficient process. The large amount of data generated in this manner is highly effective for freshwater management and research applications such as channel morphology.

A Geospatial Survey of Artwork on the Atlanta BeltLine
Poster #7 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Cambell Pierce
Research Mentor(s): Ranbir Kang

The Atlanta Beltline is a 22-mile public trail that wraps around the Atlanta Metro Area and features a large amount of artwork created by local artists. From intricate murals to simple graffiti, the artwork is constantly being added to and painted over by the artists. This project conducted a geospatial survey of the artwork themes with a special focus on the organic themes. My survey was conducted westward from Glenwood Avenue, which is the starting point of the Southside Trail of the Beltline. I took pictures of each individual artwork, recorded the attributes of each artwork along with the location. I continued South through the entire Southside Trail and the Southern end of the Westside Trail, stopping at I-20. We then organized all our data in a Microsoft Excel spreadsheet and then spatially displayed our data using points on Google Maps. I found that nearly all of the artwork of the Southside Trail did not contain any organic content and was overall much less organized than the artwork of the neighboring Eastside Trail. The Southern end of the Westside Trail did contain some organic content but was still unorganized compared to the Eastside Trail, which overall had the most artwork and the most organic content.

Landscape Change Analysis at High Spatial Resolution with Point Cloud Data
Poster #18 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Ian Schroers
Research Mentor(s): Ranbir Kang

This study looks at the topographical change in response to vegetation treatments at selected sites along Thompson Creek located in Lorton, Virginia. As a part of a long-term research project, plots on the banks of a headwater stream were selected for analysis. The repeat scans of each plot were conducted by the other team members over a duration of 4 years at an interval of six months. This data was collected using a Leica C10 laser scanner. The raw data was imported into Leica Cyclone suite. The point clouds were then aligned by fall and spring seasons for each site. A mesh was then created for each plot which was then broken into four subsections. From these meshes, the volume was determined for the whole plot as well as the four subsections. The difference in volume between the seasons can be compared to show how the volume changes over time in the whole plot and each of the subsections. The subsection analyses would also help

determine if the slope of the plot affects the topographic change over time and the extent of that change. These results can be used to determine vegetation treatment outcomes at high spatial resolution.

A Photographic Analysis of Artwork on the Atlanta Beltline
Poster #30 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Sophie Galvani
Research Mentor(s): Ranbir Kang

The Atlanta BeltLine is a unique restoration project which seeks to build an accessible urban green path on top of discontinued rail lines, connecting corridors to many of Atlanta's major neighborhoods. Some portions are still under construction, but we can see how the built sections completely renovated areas of the city, most notably on the Eastside trail. Once the Eastside was finished, many shops, restaurants, and other local businesses popped up; this transformed the once run-down area into an affluent and gentrified hub. Public art often embodies local cultural, political, environmental, and social ideas in such gentrified landscapes. This project conducted a photographic census of all art works and recorded various attributes of each piece located on the Westside Trail, Westside Connector, Northwest Trail, and Northside Trail of the BeltLine. These attributes include organic or inorganic features, as well as political, religious, racial, or LGBTQ+ representation. Each photograph was organized and labelled in an excel spreadsheet along with the respective attribute data. It was followed by mapping the spatial distribution of the artwork found across the Westside, Northwest, and Northside trails. Different types of art were separated according to their respective categories to determine the distribution of art with organic-based content. The result augments our understanding of dominant themes in the artwork along the BeltLine and furthermore emphasizes the extent of environmental components in such displays.

Spatial Associations of Lung Cancer Rates and Socioeconomic, Health, and Environmental Factors in Georgia
Poster (Microsoft Teams)
Friday, April 19th
2:00pm - 2:15pm
Undergraduate Student(s): Nguyet Le
Research Mentor(s): Jun Tu

According to CDC, Lung and Bronchus Cancer ranks the highest by the rate of cancer deaths among different types of cancers in the United States with the rate of 31.8 per 100 thousand people, and also for Georgia with the rate of 33.4 per 100 thousand people. Thus, to reduce the death rate of lung cancer, it is quite important and urgent to understand its risk factors.

Smoking and inhaling radon are among the top risk factors of lung cancer for individuals. The socioeconomic, health, and environmental characteristics of communities might be also related to the likelihood of getting lung cancer for the residents in the communities, but their associations are not well understood.The overall objective of this study is to analyze the spatial associations of lung cancer rates andsocioeconomic, health, and environmental factors at county-level in Georgia using GIS (Geographic Information System) and statistical analyses. GIS is used to map and compare the spatial patterns in lungcancer rate, socioeconomic, health, and environmental factors by counties. GIS-based hot spot analysis is used to identify the spatial clusters of the lung cancer rate. Statistical analyses, especially correlation analysis, are used to quantify and compare the associations of the lung cancer rate with each of the studied socioeconomic, health, and environmental factors. The lung cancer rates between male and female, and among specific age groups are also compared. This study is expected to reveal the spatial patterns and hot spots of the lung cancer rate and its associations with risk factors across counties in Georgia. It will contribute to a better understanding of the associations of lung cancer rate with the health, socioeconomic, and environmental conditions of communities and provide useful information of health policy making.

Spatial Interpolation and Analysis of Silting in Frey Lake
Poster #19 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): James Greene
Research Mentor(s): Ranbir Singh Kang

Local lakes and other freshwater bodies provide crucial habitat to various forms of ecological life. Silting of such water bodies can worsen water quality and reduce their capacity. Silting can be caused by natural and anthropogenic influences. This project uses Spatial Interpolation methods within ArcGIS to analyze the pattern of silt distribution in Frey Lake, Kennesaw Georgia. Field data on Silt Depth was used to conduct Empirical Bayesian Kriging with the help of ArcGIS Pro Software. Silt thickness and distribution models for the lakebed were generated in Vector format. The results show varying silt thickness that trend along the downstream orientation of the lake. In this lake, the thickest silt sink is located closest to the dam, where the water depth is the deepest. Our results contribute to a better understanding of the problem of silting in local reservoirs which are also the sources of fresh water across the globe.

Spatial and Temporal Associations of Climate and Public Health Indicators in Georgia
Poster (Microsoft Teams)
Friday, April 19th
2:45pm - 3:00pm
Undergraduate Student(s): Stephen Dilts

Research Mentor(s): Jun Tu

The impact of climate change on public health is an emerging issue but is not well understood. To better understand this issue, the associations of climate and public health indicators for different regions must been examined. The overall objective of this study is to analyze the spatial and temporal associations of climate and public health indicators over the past 30 years in Georgia using GIS (Geographic Information System) and statistical analyses. Public health indicators included in the study are county-level mortality rates, emergency room visits, fetal deaths, and asthma. Climate indicators are average high temperature, average low temperature, number of hot days per year (90 degrees F+), and the presence of the urban heat island effect. GIS is used to map and compare the spatial patterns in climate and public health indicators. Statistical analyses, especially correlation analysis, are used to quantify and compare the associations of the climate indicators with public health indicators. This study is expected to reveal the spatial and temporal patterns in public health indicators and their associations with climate indicators in Georgia. It will contribute to a better understanding of the impact of climate change on public health from a regional perspective.

Psychological Science

Adoptonomics: Financial Decision-Making in Adoption
Poster #9 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Chloe Cordell, Nikki Wendt, L'Rae Bell, Sierra Mullins, Aleysha Ildefonso Mendez, & Stella Steinman
Research Mentor(s): Nicole Martin

Adding a child to a family via adoption involves significant planning for the associated expenses. While previous research has examined the psychological factors associated with adoption, studies have yet to examine the monetary elements within the adoption process or the decisions made regarding these costs. This research focused on how families funded their adoptions, the expenditures involved in the process, the various sources of outside contributions families sought (e.g., grants, fundraising, tax credits), and the attitudes surrounding each financial choice made. Preliminary data on the expenses involved in participants' adoptions was collected through an online survey from an international audience of parents who had adopted at least one child. We predicted that each method of adoption, including foster-to-adopt, domestic, and international, necessitated unique financial requirements and contributions from the adopting individual(s). We also hypothesized that those who utilized outside funding support would hold more positive attitudes towards using these avenues to fund their adoptions than those who did not. The data

is currently trending toward support of our hypotheses and will be completed at the time of presentation.

Applying Computer-Aided Textual Analysis to Understand Employee Recruitment in Start-Up
Poster #40 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am – 11:45am
Undergraduate Student(s): Jimena Lopez Flores & Robert A. Cooke
Research Mentor(s): Dianhan Zheng

New ventures may be at a disadvantaged position regarding talent attraction due to reasons such as a less established reputation and job seekers' perceived uncertainty regarding their career trajectory. Employment webpages and job postings are common places where start-up organizations can convey an attractive organizational image in a textual format to job seekers. However, little is known about whether such textual information reflects the actual experience of employees or the effectiveness of such textual information in attracting talent. In this study, we collected texts related to organizational culture, employee benefits, and diversity statements from the websites of 142 new ventures featured in the Forbes 2022 and 2023 lists of AI50 and Fintech 50. We first used computer-aided text analysis (CATA) in R to analyze the organizational culture/value text on their recruitment web page and scored the startups regarding entrepreneurial orientation. We used a web scraper to download employee ratings of each company from Glassdoor.com, where employees rated their employer regarding positive business outlook and specific aspects such as career opportunities. Multiple regression results indicated that entrepreneurial orientation, senior management, and career opportunity scores were positively related to positive business outlook ratings from Glassdoor. We also conducted exploratory text analysis using R to create a visual representation of our data. To test the effectiveness of using texts to increase organizational attraction, we will conduct an online experiment with real job seekers recruited from Prolific. Specifically, we will manipulate textual elements in a recruitment webpage (e.g., types of employee benefits, deep vs surface-level diversity statements, and types of culture/value statements) and test whether the inclusion of certain texts can enhance job seekers' attraction to the organization and intention to apply for the job. Our findings will have important practical implications for job seekers and talent recruitment strategies in the start-up scene.

Assessing the Evaluation of Clinical Significance in Mental Health Intervention Studies: A Systematic Review.
Poster #24 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm

Undergraduate Student(s): Kianan Carr
Research Mentor(s): Alexander Crenshaw

A key step in the development and refinement of new mental health interventions is to formally evaluate their effects in clinical trials and other intervention studies. When reporting findings in intervention studies for mental health, it is important to evaluate the clinical significance of the intervention to gauge if the changes participants experience are enough to meaningfully improve their lives. Additionally, consistency in the way that clinical significance is reported would allow comparison between related and unrelated studies alike. This study aimed to find how many intervention studies for mental health formally evaluate the clinical significance of the intervention in a quantifiable way, as well as the consistency of the methods used. To do so, we conducted a review of 3 prominent journals that published results of intervention studies across the years 2020-2023, recording whether each study evaluated clinical significance, and which method was used. We expect to find that studies are inconsistent in reporting clinical significance and when measured, use varying methods. Preliminary results from 39 published clinical trials in psychology show that just 8 of the 39 studies formally tested the clinical significance of the intervention. Additionally, there were 8 distinct ways clinical significance was tested, including 4 distinct ways the same formula was operationalized. This research suggests that intervention studies for mental health should increase efforts to report clinical significance and adopt more consistent practices for measuring and reporting findings. Doing so would allow different studies to be compared directly and enable consumers of research to have adequate information about the clinical significance of interventions in the study. The goal is to establish recommendations for future clinical trials, standardizing methods for reporting evaluation of clinical significance and reliable change.

College Students' Engagement with GroupMe: An Examination of Usage Patterns
Poster #6 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Anastasia Getz & Katherine Walker
Research Mentor(s): Jennifer Willard

GroupMe is a mobile instant messaging platform that allows students to communicate with each other outside the classroom in a way that is familiar and comfortable (Lauricella & Kay, 2013). Although prior research has examined how the inclusion of instant messaging can support student learning (e.g., Tang & Foon Hew, 2022), little is known about students' organic use of the platform. This study examines students' use of GroupMe in higher education. Specifically, we sought to identify general frequency, as well as situational factors and individual differences (i.e., big five, loneliness, need for drama, and connectedness) that might influence usage. Participants are undergraduate students from Kennesaw State University. They completed a

questionnaire consisting of a survey on GroupMe usage, media and technology usage and attitudes, personality (i.e., Big Five, loneliness, need for drama) and campus connectedness subscale. Data are currently being analyzed. In addition to exploring general trends in the data, we expect that extraversion, need for drama, and social media usage will be positively related to student GroupMe usage. Understanding students' GroupMe usage may help professors identify areas of change needed to support student success.

College Students' Reader Identity: Differences by Gender
Poster #1 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Adam Serani
Research Mentor(s): Ordene Edwards

Reader identity or how one perceives oneself as a reader is a key determinant of reading success. However, little is known about how college students' reader identity varies by gender and impacts reading outcomes by gender. This is especially critical to consider as women have historically been stereotyped as more adept at reading than men. Drawing from the reader identity theory, this conception assumes that women have more positive reader identities than men and gender moderates the effect of reader identity on achievement. The current study sought to test this phenomenon. Thus, the study examines how reader identity varies by gender, investigates differences in comprehension by gender, and explores how reader identity predicts comprehension by gender. 259 students (68.1% Female; 31.9% Male) enrolled in introductory psychology courses participated in the online study. Participants responded to a reader identity questionnaire and read a text about remote countries. Comprehension was measured with a 10-item multiple choice test (5 items = shallow comprehension; 5 items = deep comprehension). There was no statistically significant difference in reader identity by gender. However, males ($M = 60.7$, $SD = 20.6$) outperformed females ($M = 54.5$, $SD = 21.0$) in overall comprehension, $p < .05$. Males ($M = 67.8$, $SD = 29.8$) outperformed females ($M = 58.5$, $S = 32.5$) in lower-order comprehension, $p < .05$. Males performed better ($M = 46.0$, $S = 27.8$) than females ($M = 37.2$, $SD = 27.6$) in deep comprehension, $p < .05$. Gender did not moderate the effect of reader identity on shallow or deep comprehension, $ps > .05$. Our results suggest no differences in reader identity by gender. Gender differences in comprehension exist. However, differences are not accounted for by reader identity. The study expands the reader identity literature and gives insight into reader identity dynamics by gender.

Comparing Acoustic Startle Responses to Arthropod vs. Scenic Images with Insect Audio Probes
Poster #20 (Convocation Center, East & West Activity Wings)
Thursday, April 18th

3:00pm - 3:45pm
Undergraduate Student(s): Jasmine Cooper
Research Mentor(s): Ebony Glover

Nature can be recognized for the natural beauty and energy that it can bestow throughout society and landscapes. However, some humans may think of nature and become overwhelmed with adverse emotions due to the ominous ecosystem of crawling and flying arthropods that reside there. Moreover, the sight of an arthropod or the mere sound of wings fluttering is enough to make most people startle and orient themselves to gather information about the organism and its location. The goal of this study is to explore the use of a novel, ethologically-based, insect buzzing sound probe to induce acoustic startle responses in the presence of scenic vs. arthropod images presented on a computer screen. Participants will rate each image for its appeal on a 2-point scale. It is hypothesized that participants will have heightened startle in response to the arthropod images compared to the scenic images. The research here is vital to the advancement of experimental and emotion testing as it can possibly provide a new use for smaller organism noises, like wing flutter, to effectively induce or heighten participant startles in future studies.

Comparing and Contrasting Methods of Engaging Students in Psychological Research: A Qualitative Analysis of Course Reflections
Poster #2 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Abigail Dingess & Mahdi Ghasemi
Graduate Student(s): Chazzidy Harper
Research Mentor(s): Amy Buddie & Kimberly Cortes

Kennesaw State University (KSU) prepares psychology majors for careers in research through coursework and opportunities for extracurricular engagement. One way coursework can be utilized to engage students in the research process is through Course-based Undergraduate Research Experiences (CUREs). CUREs provide an opportunity for students to take part in original research as a part of a course. Courses utilizing CUREs differ from Apprentice Model experiences, where one or a few students are taken under a professor's wing and taught outside of the classroom. Psychology is often overlooked in CUREs as most attention is given to traditional sciences and technology disciplines, such as chemistry and engineering. Additional research is needed to examine the uses and benefits of CUREs in psychology, particularly in comparison to the Apprentice Model. This study aims to explore the benefits CUREs and research apprenticeships offer to psychology majors and what activities students perceive to do as a part of the course. A sample of 50 reflections completed by students enrolled in either a CURE or Apprentice Model course in psychology at KSU will be analyzed using NVivo. Qualitative coding will be used to examine the previous coursework students report to be useful while

participating in research, the skills students felt they gained, and the value placed on the experience compared to past courses. Activities students reported taking part in for their research will be recorded and summarized. In each area described above, a comparison will be drawn between students who took part in a CURE and those who completed an Apprentice Model experience. Data is expected to reflect positively on the impact of research as an experience and course. Results will reflect both contrasting and affirming elements of CUREs and Apprentice Model experiences. Future implications of the research for KSU will also be reported.

Course-based Undergraduate Research Experiences (CUREs): Views from Undergraduates in STEM Disciplines
Poster (Microsoft Teams)
Friday, April 19th
12:45pm – 1:00pm
Undergraduate Student(s): Joshua Jones, Porscha Harrison, Abiniam Gulti, & Sirawdink Wakalto
Research Mentor(s): Amy Buddie

A significant method for integrating research into undergraduate education is through Course-based Undergraduate Research Experiences, or CUREs. CUREs have become increasingly recognized as valuable opportunities for students to engage in active, hands-on learning that fosters a deeper understanding of fundamental science concepts. There is currently insufficient research comparing the perceptions of students, instructors, and administrators about CUREs. Therefore, the purpose of this study is to investigate how these groups feel about CUREs in educational settings. A survey was administered to students, instructors, and administrators in STEM disciplines at KSU, and for this presentation, we have analyzed the open-ended questions (e.g., perceived definitions of CURE, willingness to present/publish results, perceptions regarding how team-based CUREs can be improved). The survey was open to anyone in STEM disciplines, regardless of their familiarity with CUREs. A total of 158 individuals (123 undergraduates, 28 faculty, and 7 administrators) had completed at least some of the open-ended questions at the time of analysis. The results will help provide insight into the effectiveness and accessibility of CUREs, which has significant implications for improving undergraduate research experiences at KSU. The ultimate goal of this study is to advance knowledge about how CUREs support learning outcomes, student engagement, and general academic achievement in higher education settings.

Current Source Density and Non-Current Source Density Transformed Spectral Measure Comparability: A Methodological Study
Poster #1 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am

Undergraduate Student(s): Aidan McColligan, Alexis Newman, Lamar LaTella, MK Kerlin & Graham Owenby
Research Mentor(s): Tim Martin

Current source density (CSD) transformation is a process by which researchers can increase the spatial frequency of electroencephalographic (EEG) measures by imposing a high-pass spatial filter on the data to attenuate the lateral spread of electrical signals across the skull and scalp. The present study examines the relationship between spectral power measures taken from CSD transformed and non-CSD transformed data to assess whether the CSD transformation limits researchers' ability to compare spectral measures from studies that do and do not use CSD transformation. Data from multiple electrodes across multiple cognitive states (eyes open/closed and before/after a cognitive task) were compared to the CSD transformed versions of the same data using bivariate analysis. Further, correlations between CSD/non-CSD transformed measures for frontal alpha asymmetry (FAA), theta/beta ratio (TBR), and frontal beta asymmetry (FBA), were assessed using bivariate correlation. The relationship between CSD and non-CSD transformed data in the present study varied such that few correlations between CSD/non-CSD transformed data for the same spectral measure were relatively high, while the majority of bivariate analyses yielded correlations too low to support comparing CSD and non-CSD transformed spectral data. Overall, our study suggests that the CSD transformation changes the original measures to such a degree that data which have been filtered using CSD should not be compared to data that have not been transformed.

Depression Among College Students: Differences by Race, Generation Status, and Their Intersection
Poster (Microsoft Teams)
Friday, April 19th
1:00pm - 1:15pm
Undergraduate Student(s): Kenzie Thomas
Research Mentor(s): Ordene Edwards

Previous research has shown that depression can negatively impact college students. Yet, there is a major gap in the literature regarding differences in depression among college students by race, generation status, and their intersection. One study demonstrated that first-generation college students (FGCS; neither parent obtained a college degree) experience higher levels of depressive symptoms compared to continuing-generation college students (CGCS; at least one parent obtained a college degree). Similarly, another study found that African American college students endure more experiences of hopelessness and depression than their counterparts. Still, this evidence is scant, and there remains little research on depression as a function of race and generation status. Moreover, in my exhaustive search of the literature, no study examined differences in depression by the intersection of race and generation status. The study examines

differences in depression among college students by race, generation status, and their intersections. Using a cross-sectional design, I am collecting responses on the well-established 21-item Depression, Anxiety, and Stress scale from students in introductory psychology courses. Students' demographic information, including generation status and race, is also collected. I hypothesize that 1) there will be differences in depression across races, 2) depression will vary by generation status, and 3) differences in depression by the intersectionality between race and generation status will be evident. However, given the limited empirical prior evidence, results could go in either direction. The findings of this study may influence universities to adopt intervention techniques such as assigning mentors to students and promoting counseling/therapy for students more at risk for depression. This study can also help faculty understand the struggles of some of their students and their impact. Consequently, they might adopt more wellbeing-informed teaching practices in their classes.

Does Perspective-Taking Impact Negative Stereotypes and Negative Meta-Stereotypes White Americans Hold?
Poster #10 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Chloe Duckworth & Abigail Dingess
Research Mentor(s): Danica Kulibert

Meta-stereotypes refer to the stereotypes people believe others have about their group (e.g., White Americans believe Black/African Americans view them as prejudice). The current study aimed to assess how empathy impacts meta-stereotypes. White participants were asked to report the meta-stereotypes they held regarding Black/African Americans. They were also asked about their tendency to empathize with others. We then examined how both meta-perceptions and empathy related to White participants' own prejudice towards Black/African Americans. We found that both meta-stereotypes and empathy relate to one's own stereotypes. Specifically, higher trait empathy was related to less stereotyping but more meta-stereotyping. We also found that intergroup anxiety was not related to meta-stereotypes or stereotypes but was related to empathy. Overall, this research suggests that empathy and perspective-taking may impact intergroup relationships by reducing anxiety and reducing the stereotypes people have about outgroup members.

Dog Problem Behavior's Relationship with Owner Expectations and Attachment
Poster #31 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Mia Hardy
Research Mentor(s): Allison Martin & Suma Mallavarapu

Problem behaviors exhibited by dogs are associated with negative outcomes in the human-dog relationship, and if left unaddressed, may result in the relinquishment of dogs to shelters. This study's purpose was to determine if participants who indicated problem behaviors and aggression in their adopted dogs would have significantly different levels of adoption satisfaction, perceived difficulty of ownership, and owner-dog attachment than those who did not. Sixty-eight survey responses measuring a variety of post-adoption outcomes from a largely White (86.8%) and female (83.8%) sample were included in Mann-Whitney U tests to evaluate each relationship. All but one adopter indicated that they were highly satisfied with their dogs, preventing statistical analysis of satisfaction, so that variable was substituted with expectations of ownership difficulty. While there were no significant differences between the aggression and non-aggression groups in either attachment ($p = .129$) or difficulty expectations ($p = .059$), the problem behavior group perceived their dogs to be more difficult to own than the non-problem behavior group ($p = .008$). These findings shed light on the relationship between problem behavior and post-adoption experiences of dog owners and can be applied in dog training, dog shelters, and individual human-dog relationships.

Elderly Populations with Mild Cognitive Impairments Found to Have Higher Theta/Beta Ratio Than Control

Poster #4 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Alexis Newman, Naomi Mwangi, Lamar LaTella, MK Kerlin, & Graham Owenby
Research Mentor(s): Tim Martin & Erica Holliday

The purpose of this study was to examine the differences in Theta/Beta Ratio between elderly participants (ages 67-91) with mild cognitive impairments (MCI) and those without any cognitive impairments (Control). MCI is considered an early phase of Alzheimer's Disease. A sample of 70 participants was used, 26 belonging to the MCI group, and 44 belonging to the Control group. The participants' brain activity was measured using an electroencephalograph (EEG) immediately before and after completing an interactive task. The ratio of theta band activity (4-7 Hz) to beta band activity (13-35 Hz, fast waves), known as theta/beta ratio (TBR), was computed from a frontal electrode location (Fz). This measure has been associated with cognitive deficits, particularly attention. There was a significant difference in Theta/Beta Ratio between MCI participants and Control participants, with MCI participants having significantly higher TBR than controls. This finding replicates previously published work from our lab in a new sample, and further establishes TBR as a correlate of MCI.

Examining Burnout Levels of Collegiate Student-Athletes

Poster #21 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Julia Weiss
Research Mentor(s): Jennifer Willard & Meghan Bankhead

Many collegiate athletes experience feelings of burnout, possibly because of the rigorous mental and physical requirements. The purpose of this study was to examine the extent to which previously identified predictors of burnout replicate with a sample of current athletes at a large southeast university and to examine which factors most strongly, and uniquely relate to burnout. Student-athletes at Kennesaw State University were asked to complete an online survey where they answered questions that assessed motivation, perceived sense of belonging, perceived social support, and burnout. Additional demographic and school-related questions were asked to examine the relationship between type of sport, scholarship status, and gender. Data are currently being analyzed. We expect that intrinsic motivation, perceived sense of belonging, and perceived social support will be negatively related to burnout, whereas extrinsic motivation will be positively related to burnout. This research could help athletes who are struggling by identifying what factors seem to be more strongly contributing to their burnout. Coaches and staff at Kennesaw State University can use the findings of this study to better understand the mental health of their athletes and how to provide a better experience for them.

Examining Takeover Responses Using Non-Dominant Hand in Automated Vehicles
Oral Presentation (Microsoft Teams)
Friday, April 19th
3:30pm - 3:45pm
Undergraduate Student(s): Amaya Howard, Pooja Patel, Jona Ritter, Aieyan Saeed, Jason Simons & Celine Thomas
Research Mentor(s): Kyung Hun Jung

This study examined how hand dominance influences a participant's evasive steering direction to an automated vehicle's (AV) silent failure at a T-intersection. Participants were instructed to manually take control of the AV using their non-dominant hand. Researchers analyzed in which direction the participants steered the vehicle. We hypothesized that participants using their non-dominant hand would steer to the right to avoid a collision at a T-intersection, mainly due to Western cultural factors in everyday tasks that ultimately influence one's hand movements and directional preferences. To test this hypothesis, we administered a virtual reality driving simulator study where participants monitored an AV, and the researchers observed the direction they steered, using their non-dominant hand, during a take-over response, as a result from a silent failure. We are currently collecting the data.

Examining the Five-Factor Personality Model: A Latent Profile Analysis in Individuals with Above Threshold PTSD Symptomology
Poster #1 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Alexa Brown
Research Mentor(s): Tyler Collette

Latent Profile Analysis (LPA) has been extensively used in psychological research to uncover distinct subgroups within heterogeneous populations. Historically, these subgroups have been pivotal for understanding the nuanced differences in symptom presentations, especially in conditions like PTSD. In this context, individuals with PTSD can vary in their expressed personality traits, which can impact treatment outcomes. This study aimed to understand these variations within a population exhibiting above-threshold PTSD symptomology. Similar to previous literature, LPA revealed three distinct profiles: 'Adaptive', 'Highly Adaptive', and 'Maladaptive'. These profiles were derived from the five-factor personality dimensions: openness, conscientiousness, extraversion, agreeableness, and emotional instability. Follow-up ANOVA outcomes showed significant differences across these profiles in multiple variables, including PTSD severity, resilience, and quality of life measures. Notably, the 'Maladaptive' group showed heightened PTSD symptomology and reduced quality of life, highlighting the importance of personalized therapeutic strategies. Building on previous literature, these findings underscore the necessity of tailoring treatments based on personality profiles, which may lead to improved therapeutic outcomes for individuals who struggle with PTSD.

Examining the Relationship Between Test Anxiety, Cortisol, and Fear-Extinction in Students
Poster #8 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Corene Fuller
Research Mentor(s): Sharon Pearcey, Doreen Wagner, & Ebony Glover

Test Anxiety is one of the most common occurrences in an education setting, affecting an estimated 40-60% of students (Harris & Coy, 2003). Test Anxiety is a type of performance anxiety which has emotional, cognitive, behavioral, and physiological components (Conneely & Hughes, 2010). Cortisol is a hormone produced by the adrenal glands released in response to stressors. The relationship between test anxiety and cortisol is unclear. A meta-analysis found a small, but significant relationship between test anxiety and cortisol levels (Roos, 2021). However, others have found no relationship between test anxiety and cortisol (Conneely & Hughes, 2010). Cortisol also has an uncertain relationship with fear-extinction.

Endogenouscortisol has been shown to increase startle response during fear extinction (Tabbert, 2010). However, administering cortisol to participants provides different results. One study found that when cortisol was administered it produced a diminished startle response during extinction compared to the placebo group (Merz et al., 2018). Similarly, another study saw that administration of cortisol decreased skin conductance response (SCR) duringextinction (Brueckner, 2019). The relationship between fear-extinction and test anxiety has not been examined. The aim of the current study is to use the fear-potentiated startle (FPS) paradigm to examine the relationship among students' self-reported test anxiety, cortisol, and fear extinction.Extinction in a psychological study involves a reduction in fear responding after repeated exposure to the threat cue (CS+) without the US (reinforced) pairing. The FPS paradigm is well established as a noninvasive tool to measure amygdala activity and characterize biological correlates of fear learning. In the current study, participants were divided by test anxiety (High, Low) and cortisol level (High, Low). Participants underwent four trials of fear-extinction. Test anxiety was measured using the Westside Test Anxiety Scale (Driscoll, 2004) and saliva samples were taken at baseline before testing. Saliva samples were analyzed using enzyme-linked immunosorbent assays. The data will be analyzed to determine the relationship among test anxiety, cortisol, and fear-extinction. The results are predicted to clarify the relationship among fear learning and physiological measures related to test anxiety.

Examining the Relationship Between Trait Anxiety, Cortisol, and Fear Extinction
Poster #31 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Sahil Bardai
Research Mentor(s): Sharon Pearcey, Doreen Wagner & Ebony Glover

Anxiety disorders are the most common of mental disorders in the United States affecting 6.51% of people including men and women (Institute of Health Metrics and Evaluation, 2019). State anxiety refers to the psychological and physiological reactions based on situations at a specific time. In contrast, trait anxiety refers to a type of anxiety that an individual possesses as a personality trait (Leal et al., 2017). Cortisol dysregulation is strongly associated with fear and anxiety, and individuals who have experienced stress and trauma often show dysregulation of the HPA-axis including cortisol abnormalities (Merz et al., 2018). A way that anxiety disorders are studied is using a Fear-potentiated Startle (FPS) Paradigm. The FPS paradigm is well established as a noninvasive tool to measure amygdala activity and characterize biological correlates of fear learning. The FPS Paradigm includes two phases: Fear Acquisition and Fear Extinction. FPS measures startle amplitude (μV) in the presence of a reinforced conditioned stimulus (CS+), as well as during exposure to a non-reinforced conditioned stimulus (CS-). A psychological process known as Fear Extinction involves a reduction in fear responding after repeated exposure to the threat cue (CS+) without the US (reinforced) pairing. (Myers et al.,

2006). The aims of the current study include 1) examining the relationship among participants' status of trait-anxiety and their performance on Fear Extinction using the FPS Paradigm, and 2) exploring how the participants' extinction performance and anxiety status relate to their cortisol levels. In this study, participants will be divided into high and low groups based on their self-reported trait anxiety status. The participants will complete a self-reported trait anxiety scale (Spielberger, 1983). This relationship will be analyzed with salivary cortisol levels and their performance on fear extinction. Salivary cortisol levels will be analyzed using enzyme-linked immunosorbent assay (Shimada et al., 1995). We hypothesize that there will be a significant correlation between participants' trait anxiety status and their performance on fear extinction. We also hypothesize that their cortisol levels will be in trend with their performance.

Exploring Stigma and Social Isolation Among College Students and Opportunity Youth
Poster #40 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Will Hodges
Graduate Student: Briana Rivera
Research Mentor(s): Chanler Hilley

While the majority of U.S. young adults pursue further education post-high school (62% as of 2021; NCES, 2023), approximately 16.4% of U.S. youth are opportunity youth (OY) – youth 16 to 24 years old who are not in employment, education, or training (OECD, 2023). Prior studies have established both college students and OY as populations at higher risk for mental health and substance use problems (Kovess-Masfety et al., 2016). However, research suggests certain marginalized groups have higher OY representation (Lewis, 2020), with socioeconomic status playing a significant role (Belfield et al., 2012). Limited research exists on the developmental mechanisms behind these disparities. The objective of this qualitative study is to explore experiences of stigma, discrimination, social isolation, and loneliness among a sample of young adults who undertook normative (college) versus non-normative (OY) transitions to adulthood. OY aged 18-24 were recruited via social media advertising targeting the Atlanta metro area, and college students were recruited using digital advertisements at Kennesaw State University. Prospective participants completed a screening survey, and eligible participants were invited for a virtual interview using a structured interview guide ($30 remuneration). This study is ongoing, with coding commencing in tandem with continued interviews. Thematic analysis will be employed to identify and analyze emergent themes from the collected data. Based on initial interviews (n = 10), several themes regarding stigma and social isolation have emerged, including: familial support (or lack thereof), self-perception, and agency. In this presentation, we will share preliminary findings regarding experiences of stigma and social isolation as described by college students versus OY. Better understanding mechanisms (like stigma and social isolation) of young adult mental health disparities may improve practices and policies to prevent

and intervene upon young adult mental health problems, considering the unique experiences of this developmental time.

Expressive Arts Therapy as a Coping Strategy in Caregivers
Oral Presentation (Microsoft Teams)
Friday, April 19th
2:15pm - 2:30pm
Undergraduate Student(s): Emily Barton
Research Mentor(s): Anisah Bagasra

Expressive Arts Therapy has been defined as a multimodal approach to therapy similar to its cousins drama therapy and music therapy. Expressive arts therapy may incorporate writing, drama, dance, movement, painting, and/or music. This study aims to determine if caregivers perceive Expressive Arts Therapy as beneficial to cope with and reduce their feelings of anticipatory grief and their willingness to use it. Grief has been known to typically follow a pathway involving Elizabeth Kübler-Ross's stages of grief. However, there are challenges that are particular to the process surrounding ambiguous grief. Caregiver's in particular know this feeling very well. However, little to no research has been done in looking at how these caregivers are able to cope with their ambiguous and anticipatory grief. It has been stated that Expressive Arts Therapy is an effective method for bereaved children and others who are struggling with the grieving process, but there has been little research that studies if this form of therapy can be beneficial to caregivers, in particular. This study includes a questionnaire for caregivers and will be advertised through a flier that will be distributed on social media as well as to hospice offices. Participants will receive a link or QR code to the survey. The survey takes about 10-15 minutes to complete. Upon completion the data will be analyzed. Findings will include current coping strategies of these caregivers as well as if they would consider use of Expressive Arts Therapy to aid in their coping. Raw data will be downloaded from Qualtrics and coded in Excel. Data will then be transferred into SPSS for descriptive data and correlational data to be derived. We can expect that the results of this study will include caregivers considering use of Expressive Arts Therapy in their coping.

Frontal Alpha Asymmetry in Addiction Recovery: Differential Patterns with Control Groups
Poster #17 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Graham Owenby, Alexis Newman, MK Kerlin, & Lamar Latella
Research Mentor(s): Tim Martin & Erica Holliday

Differences in brain dynamics between people with and without substance use disorders may provide insight into the etiology of addiction, but such differences are not fully known or understood. Cognitive-emotional processes are associated with neuronal oscillations in frequency bands like Alpha, Beta, and Theta. Frontal Alpha Asymmetry (FAA), the difference between left and right frontal lobe alpha values, is related to approach and inhibition-relate motivation. FAA has been associated with mood disorders but might also distinguish those with and without substance use disorders. This study investigated the discrepancies between college students in addiction recovery and a control group using electroencephalography (EEG). EEG was measured before and after a cognitive task, and FAA was calculated. Using SPSS and Excel, a mixed ANOVA was used to examine potential interactions between participant groups, time-point (pre vs. post), and eye status. The results revealed a significant interaction between eye status and group. Prior to the task, controls had a negative FAA (indicating higher alpha on the left and a higher avoidance motivation), while those in recovery had a positive FAA. After the task, alpha shifted leftward for those in recovery and rightward for those in the control group, indicating that engaging in a cognitive task shifted FAA in opposite directions for these two groups.

How Does the Type of Job Impact How People View Sexual Harassment?
Poster (Microsoft Teams)
Friday, April 19th
1:45pm - 2:00pm
Undergraduate Student(s): Destiny McCray
Research Mentor(s): Danica Kulibert

Past research on prototypes of sexual harassment has focused on the prototypes people have of victims. Specifically, people tend to think a sexual harassment victim is a young, feminine, White woman. There has been very little research examining how the type of job/career the victim has impacts perceptions of sexual harassment. Given that sexual harassment is prevalent across job types, we were interested in examining how the job itself may impact perceptions of sexual harassment. We had participants read about different types of sexual harassment (e.g., unwanted groping, unsolicited sexual photos, unwanted romantic attention) and manipulated if the job the victim has was either a feminine job (e.g., housekeeping, teacher, nurse) or a masculine job (e.g., plumber, school police officer, emergency response technician [EMT]). By better understanding how a setting can impact people's perceptions of sexual harassment, we can help create interventions and informational guides to remove these additional barriers some sexual harassment victims may face.

Human Turning Behavior and Hand Dominance in Hands-Free Driving
Oral Presentation (Microsoft Teams)
Friday, April 19th
2:30pm - 2:45pm

Undergraduate Student(s): Beverly Cua, Christopher Campbell, Dana Lovett, Roberto Ramirez & Sara Cohen
Research Mentor(s): Kyung Hun Jung

We conducted a virtual reality driving simulator study to explore whether individuals monitoring the self-driving maneuvers of an autonomous vehicle (AV) are more likely to steer towards the left or the right when faced with a potential crash at a T-shaped intersection. T-intersection crash scenarios introduce a degree of directional ambiguity and freedom of choice that is often lacking in AV crash avoidance studies. As another condition of this experiment drivers were not allowed to touch the steering wheel unless they believed the AV was about to crash. Prior studies examining potential correlates of human turning behavior suggest that hand dominance and driving side are both strongly related to turning behavior and sometimes work against each other. In accordance with such studies, we hypothesized that right-handed drivers would reliably steer in the direction of their dominant hand but that left-handed drivers would not show a strong preference for either direction. We are currently collecting the data.

In-Group and Out-Group Meta-Perceptions of Political Deviants
Poster #29 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Mason Lawson & Devyn Woodard
Graduate Student: Kadija Diaby
Research Mentor(s): Danica Kulibert

According to the Subjective Group Dynamics model, political extremists constitute pro-norm deviants and political moderates constitute anti-norm deviants. Past research has determined that people tend to think political moderates are viewed more negatively than extreme members. We wanted to expand on this by understanding how much these perceptions differ between ingroup and outgroup members. In this study, we examined people's meta-perceptions (i.e., beliefs about how Republican/Democrat party members perceive another Republican/Democrat) of political extremists and political moderates within both the Republican and Democrat parties. Democrats and Republicans were randomly assigned to read about their political ingroup or their political outgroup. Next, they were given information about a political candidate and were told the candidate was either more extreme than the party, more moderate than the party, or similar to the average member of the party. Overall, we determined that people believe political members dislike moderate members more than extreme members, and this difference is similar for both ingroup members and outgroup member.

Is the Association Between Parental Financial Socialization and College Students' Financial Self-Efficacy Moderated by Hope?

Poster #16 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Giselle Vaquez & Kayla Little
Research Mentor(s): Chanler Hilley

The transition to adulthood is a critical developmental period, both shaped by youths' prior development and contexts and shaping future development (Elder, 1998). Some scholars have used the term "emerging adulthood" to argue that this is a new, distinct developmental stage (bounded generally by the third decade of life), of which identity exploration, setting and working toward long-term or future oriented goals, and gaining independence are key attributes (Arnett, 2000). One aspect of future oriented goal direction is hope, which Snyder (2002) conceptualized hope in two constructs: the ability to form pathways that lead to a goal being met and using agency thinking to activate those pathways. In a review of hope and young adult college students' mental health, Griggs (2017) found that hope is related to college students' improved coping and well-being, moderates the relation between negative life events and depression, and may protect against suicide and unhealthy behavior. Further, self-efficacy (believing one can handle situations effectively) is a key component to young adults gaining independence (particularly financial independence; Lim et al., 2014). However, the extent to which young adults' parental relationships interacts with developmental assets like hope to predict financial self-efficacy is poorly understood and is the focus of this study. Kennesaw State University PSYC 1101 students (n = 651) participated in an online survey. We examined the multidimensional role of parental financial socialization on financial self-efficacy, and whether this association is moderated by hope.

The Link Between Testosterone Levels and High-Risk Behavior Including Alcohol
Poster #24 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Laura Wilkinson, Emily Clarke, & James Kitchens
Research Mentor(s): Sharon Pearcey & Doreen Wagner

Alcohol use in college is widespread and popular. In a national survey, roughly 50% of college students aged 18-22 reported drinking alcohol with approximately 28% of those students reporting they have engaged in binge drinking (National Survey on Drug Use and Health, 2021). Moreover, as many as 1500 students die each year from alcohol-related injuries (Hingson et al., 2017). Studies show that functional connectivity is decreased after drinking. Functional connectivity measures how different parts of the brain interact with one another, concluding that if alcohol were to interfere with functional connectivity, then fewer rational decisions are made (Peters et al., 2015). Hormones such as testosterone may have a role in the relationship between

drinking and decision-making. The participants of this study are college students enrolled at Kennesaw State University a part of a previous study on emotional dysregulation. Male and female participants took a battery of questionnaires including the AUDIT. Salvia samples were collected, and testosterone levels were measured using enzyme-linked immunosorbent assays (ELISA). We hypothesize that participants high in testosterone will engage in higher risk-taking behaviors including the consumption of alcohol. In future research, the direct relationship between testosterone and risk-taking behaviors from alcohol should be examined.

Loneliness and Parental Relationships Among College Students
Poster #2 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Alanna James & Charlie Barna
Research Mentor(s): Chanler Hilley

The transition to adulthood is a unique developmental period that involves rapid changes in youths' individual development and social contexts, which can involve leaving behind familiar support networks (Eeske et al,. 2015). Common experiences during the transition to adulthood, like leaving home, pursuing college, and entering the workforce can leave individuals feeling marginalized and cutoff (Mathews et al,. 2022). Loneliness is a subjective feeling experienced by individuals in all age demographics (Matthews et al,. 2022). Despite a wide array of research on social connectedness interventions for older adults and people with physical disabilities (Zagic et al,. 2021), there is little research on loneliness in young adulthood. Forming meaningful social connections during these years is crucial to successfully navigating this period (Moeller, 2019). However, adolescence and young adulthood mark the period when individuals start to acquire independence and autonomy, which can cause a strain on parent-child relationships (Laursen et al., 2009). The current study assessed the relationship between college students' loneliness, living situations, and parental relationship quality. Kennesaw State University undergraduate students responded to surveys that included items regarding loneliness, parent relational satisfaction, living situations, demographic characteristics, and other psychosocial constructs. Preliminary results showed a moderate, negative correlation between parental relationship satisfaction and loneliness for participants who lived with their parents and alone or with roommates (rWith Parents = -.315; rAlone or Roommates = -.37). This study demonstrates that there is a connection between young adults' parental relationships and their overall loneliness. However, in practice, there is currently limited opportunities to intervene on young adults' parental relationships or loneliness except at the individual level (i.e., therapy), as shown in previous meta-analyses of loneliness interventions. Future research should consider the uniqueness of young adulthood experiences when exploring ways to improve parental relationships and loneliness.

Man's Best Friend: The Relationship Between Training and the Human-Canine Bond
Poster #35 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Rae Scott
Research Mentor(s): Allison Martin & Suma Mallavarapu

The strength of the human-canine bond can factor into the decision to relinquish a dog to a shelter. For this reason, it is important to determine strategies that may enhance owner-dog attachment. The purpose of this study was to evaluate whether participation in training was related to owner self-report of attachment to their adopted dog. A post-adoption survey distributed to individuals (N = 66, 86% white, 83% female) by Mostly Mutts Animal Rescue was utilized to evaluate the relationship between training and attachment. I hypothesized that adopters who were actively involved in training would have a higher attachment score than those who did not indicate engagement in training their dog. No significant difference was found between those who did (57.58%) and did not (42.42%) participate in training (Mann-Whitney U(66) = 505.50, p = 0.71). These findings contrast with previous research indicating a relationship between canine attachment and training. This suggests more study is necessary to understand the impact of training on human-canine attachment.

Measuring Sympathetic Nervous System Activation During Hot and Cold Cognitive States
Poster #20 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Lilian Kostka
Research Mentor(s): Ebony Glover

Stress is natural and it is helpful to understand how it impacts decision making in the workplace. Overall, stress activates the orbitofrontal cortex and therefore has the potential to impair decisions. In a professional setting, if an employee or supervisor can recognize high stress level stimuli then they may regulate or avoid high stress situations to make more effective decisions. One strategy for the recognition of high stress stimuli is to identify when your brain is in a hot cognitive state. Hot and cold cognition are concepts derived from cognitive theory referring to how people process emotion regulation. Cognitive behavioral therapists commonly use these concepts to detect hot cognition because of its major involvement in social and emotional behavior compared to cold cognition. Hot cognition develops within the brain as a result of stress, causing difficulties in making decisions. The goal of the current study is to experimentally induce hot and cold cognitive states via presentations of images that induce stress and images that induce non-emotional cognition to measure sympathetic nervous system

activation via the fear potentiated-startle response. It's hypothesized that participants will have a heightened startle response during presentation of hot cognitive vs. cold cognitive conditions. It is important to understand the theory of hot and cold cognition within the work environment because of the effect of stress on decision making. Testing the effect of stress on startle response will build on previous research to provide more evidence on the importance of understanding and establishing cognitive regulation to support an effective workplace dynamic.

Mechanical Preference and Handedness of Drivers
Oral Presentation (Microsoft Teams)
Friday, April 19th
4:15pm - 4:30pm
Undergraduate Student(s): Jasmine Senter, Kathya Morales, Rylan Kelly, & London Moore
Research Mentor(s): Kyung Hun Jung

With autonomous vehicles (AV), we can travel efficiently without the risk of human error. Autonomous vehicle, also known as a self-driving car, employs a combination of sensors, cameras, and artificial intelligence to navigate and operate safely in the environment with little or no human intervention. However, this modern technology does come with potential problems. A notable issue with AVs is 'silent failures,' where the vehicle does not respond appropriately in a specific circumstance without providing a warning to the driver (Mole et al., 2020). When silent failures appear, the AV may prompt a driver to take over the vehicle by using their hands to steer the wheel and avoid a potential collision (Petermeijer et al., 2017). Therefore, it is important to consider how an individual's hand dominance may influence a driver's decision in turning left or right when avoiding a collision. As a result, we analyzed how hand dominance, which refers to an individual's biomechanical preference while doing specific tasks, contributes to the driver's takeover performance when faced with a silent failure. Historically, there has been a right-hand preference for performing precision tasks which could further be affected by the forces of gravity (citation). Previous studies found that individuals exert less force to pull down the steering wheel with their dominant hand since the motion of pulling down is assisted by gravitational forces (Sakajiri et al., 2013). Therefore, we hypothesized that participants would turn in the direction that corresponds to their dominant hand. We instructed participants to take over with both hands and analyzed their performance when faced with a silent failure at a T-intersection. We chose the T-intersection as it requires the participants to take-over by either turning left or right to avoid a collision. To test this hypothesis, we used virtual reality (VR) technology and a driving simulator.

Mind Games: Meditation's Impact on Cognitive Abilities & Athletic Performance
Poster #17 (Convocation Center, East & West Activity Wings)
Thursday, April 18th

2:00pm - 2:45pm
Undergraduate Student(s): Justin Summe
Research Mentor(s): Sidni Justus

This study assesses the impact of a four-week mindfulness and meditation program, leveraging a YouTube guided meditation, on cognitive flexibility, attention, and overall well-being in KSU student-athletes. Amidst the pressures of athletic commitments, academic responsibilities, and personal life management, student-athletes face unique challenges that may affect their mental health and cognitive functioning. This research fills a notable gap by exploring the potential benefits of a short, accessible, self-guided meditation regimen. Participants will undergo baseline evaluations using cognitive tasks such as the Stroop and Sustained Attention to Response Task, along with comprehensive questionnaires to assess aspects of mental health and well-being, including mental toughness, life satisfaction, metacognition, stress, mindfulness, and sleep quality. The experimental group will engage three times a week in guided meditation sessions via YouTube, with adherence monitored through survey usage data. Comparative analyses will be performed on pre- and post-intervention measures against a control group to evaluate the program's effectiveness. Anticipated findings aim to demonstrate the short-term mindfulness intervention's efficacy in enhancing cognitive and emotional well-being among student-athletes. This research contributes to the understanding of non-pharmacological interventions in sports psychology, offering evidence for integrating mindfulness and meditation into athletic training programs to support student-athlete mental health and cognitive performance.

Moderating Role of Meaningful Work Among First Responders
Poster #10 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Edwin Trejo-Rivera
Research Mentor(s): Israel Sánchez-Cardona

Job demands can either negatively impact and hinder an individual's attainment of goals at work, or positively impact an employee by presenting challenges that foster personal growth. Ultimately, both types of demands are linked to burnout and emotional exhaustion as they both require the consumption of energy that causes stress, although challenging demands can lessen the effects of burnout. Similarly, preliminary research on nurses suggests that higher levels of meaningful work can either lead to higher levels of emotional exhaustion or lower levels of exhaustion. Using the Job Demands-Resources Model, we argue that meaningful work may moderate the relationship between the different types of job demands and burnout, primarily by reducing the impact of demands and promoting engagement. Using survey data from firefighters and police officers, this study aims to investigate how variations in meaningful work influence the relationship between job demands and burnout among a sample that is prone to experiencing

meaningful work at a higher level given the nature of their job. We expect individuals with a greater sense of meaning to be more susceptible to well-being issues, particularly among those who appraise hindrance demands at a higher rate. There is a need to investigate the role of meaningful work in stressful environments and to understand the conditions that impact first responders' well-being.

Patterns of Violence Exposure Before and After COVID: Connections with Externalizing Behaviors
Poster #23 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Maya Maqousi & Avery Kirby
Research Mentor(s): Chanler Hilley

Adolescent exposure to violence (ETV) has been shown to be related to a host of negative youth outcomes, including poorer mental and physical health, desensitization to violence, increased externalizing, and lower educational attainment. The COVID-19 pandemic had a substantial impact on adolescents' lives, including family, school, and social contexts (Loades et al., 2020). Concerns were also raised regarding the potential for increases in ETV during COVID restrictions (Ragavan et al., 2020). Research on pre/post COVID differences in ETV remains limited even nearly 4 years after the World Health Organization declared a "global health emergency." This study uses data from the Arizona Youth Survey (AYS) to compare patterns of ETV pre-COVID (2018) and post-COVID (2020), as well as whether these patterns of ETV are differentially related to youths' externalizing behavior. AYS is a school-based biennial survey conducted with 8th, 10th, and 12th grade students across the state of Arizona. Students reported their demographics, behavior, and family, school, and community risk and protective factors based on the Communities that Care student survey. This study used latent class analysis to identify patterns of ETV and their relations with externalizing. We found 6 classes of youth ETV, differentiated by the extent and type of violence exposure. Patterns of ETV were similar pre- and post-COVID, as were their relations with externalizing behavior. One class with higher ETV had moderate externalizing. There were no clear differences in rates of externalizing when comparing pre- and post-COVID classes. ETV during critical developmental periods can have a lasting impact on wellbeing and development (Mueller & Tronick, 2019). Our analyses did not find substantial differences in patterns of ETV before and after the COVID pandemic. Current prevention and intervention efforts may benefit from understanding the unique psychosocial risk and protective factors of youth who exhibit low externalizing despite high ETV.

Pregnancy Behind Bars: Exploring the Impact of Incarceration on Prenatal and Postnatal Care for Female Inmates
Oral Presentation (Prillaman Hall - Indoor Plaza)

Wednesday, April 17th
4:00pm - 4:50pm
Undergraduate Student(s): Caitlin Callahan
Research Mentor(s): Anisah Bagasrah & Meghan Bankhead

Incarcerated women have a constitutionally protected right to obtain appropriate medical care. Past research has found that "38 states had inadequate or no prenatal care in their prisons" (NWsLC, 2010). A report from The US Department of Justice states that "46% of pregnant imprisoned women reported they received no pregnancy care" (Maruschak, 2008). There is a gap in the literature of analyzing primary accounts of pregnant inmates. The current study is investigating the interaction of incarceration and the available care and quality of care given to female inmates in American correctional institutions. This study is comprised of a qualitative video analysis using a convenience sample. We selected 10 videos of incarcerated women and 10 of non incarcerated women speaking about their pregnancy experience in America. Inclusion criteria includes the videos being made within the past five years, being at least ten minutes long, and showing their face. The software system "ATLAS.ti" will be used to analyze the transcripts and visual notes of the video testimonies. The analysis will focus on the spoken experiences and the visual social cues that are present. Considering these variables, we will be able to account for the similarity and differences of provided care to inmates. The visual cues will provide information about how the subject feels recounting their experience, which can give another element to the analysis as some mental health conditions, such as PTSD, has visual cues. As a control, video testimonies from non-incarcerated women sharing their pregnancy experience will also be analyzed. We hypothesize that prenatal and postnatal care being given to inmates will vary greatly since there is very little legislation protecting pregnant inmates' access to honorable prenatal and postnatal care. We also hypothesize that women that were incarcerated while pregnant will show more visual signals of mental distress.

Public Knowledge and Understandings of Advance Care Planning
Oral Presentation (Microsoft Teams)
Friday, April 19th
2:15pm - 2:30pm
Undergraduate Student(s): Rory Bailey & Gretchen Agans
Research Mentor(s): Anisah Bagasra

The goal of this study is to add on to a developing knowledge base surrounding understandings and perceptions of advance care planning. To do so, a Qualtrics survey of 171 participants, was used to assess understanding of advanced care planning among the lay population, both conceptually and as a process with many features. Though a conceptual understanding of advanced care planning has been assessed in many studies, minimal research has been undertaken to locate and identify misunderstandings in depth. The expected findings of this

study would reflect low to moderate knowledge of advanced care planning as a concept, consistent with previous literature, and a notable lack of accuracy in perceived time and financial costs.

The Relationship Among and Hormones and Affective Mood Disorders in Men and Women

Poster #35 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Wesley Dieudonne
Research Mentor(s): Sharon Pearcey & Doreen Wagner

The hypothalamic-pituitary-adrenal (HPA) axis is responsible for the stress response and the release of cortisol. The hypothalamic-pituitary-gonadal (HPG) axis is responsible for the release of sex-linked hormones including testosterone and estrogen. The HPA and the HPG axes have a reciprocal relationship with each causing changes in the other. Both the HPA and HPG axes have been linked to affective disorders such as depression and anxiety (Domonkos et al., 2018; Kische et al., 2023). This study will look at the relationship among testosterone, cortisol, and mood disorders in men and women. College students enrolled at a large southeastern university participated. Upon arrival to the testing room, each participant gave a saliva sample and completed a set of questionnaires including a demographics form, the depression, anxiety, and stress scale (DASS-21; Lovibond & Lovibond, 1995) and the Spielberger Trait and State anxiety scale (STAI; Spielberger, 1989). Saliva samples will be assayed for hormones using enzyme linked immunosorbent assays (ELISAs). Preliminary results reveal a marginally significant interaction between sex of participant and cortisol level (hi, lo) regarding trait anxiety showing that men with low cortisol levels have much lower trait anxiety than the other groups, $F(1, 157) = 3.13$, $p = .08$. Additional results will investigate the hormonal influences that contribute to affective mood disorders in the normal population.

The Relationship Between Perceived Dog Adoption Profile Accuracy and Perceived Difficulty and Expectations of Dog Ownership

Poster #17 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Hailey Fussell
Research Mentor(s): Allison Martin & Suma Mallavarapu

Relinquishment is a common issue in dog shelters, with 27% of dogs taken in by U.S. shelters being relinquished by owners in 2022 (Shelter Animals Count, 2022). Common reasons for relinquishment include behavioral issues and owner expectations. These expectations may be set

by the shelter on a dog adoption profile. Adoption profiles are descriptions provided by shelters to educate potential owners on a dog's past, personality, and behavior. There is a gap in adoption research on how the adoption profile sets expectations for owners and impacts their perception of expectations being met. This study evaluated the relationship between the perceived accuracy of the adoption profile, behavioral expectations, and perceived difficulty of ownership using a two-week post-adoption survey. The sample included 32 adopters from Mostly Mutts Animal Rescue. The findings indicated that adopters who rated the adoption profiles as highly accurate were also more likely to agree that the dog met their behavioral expectations (Mann-Whitney U = 129, p = .025). There was no significant relationship between perceived adoption profile accuracy and perceived difficulty of ownership (U = 112, p = .23). These findings highlight the importance of expectations and the adoption profile as factors in successful adoptions.

The Relationship Between Testosterone and Anxiety
Poster #20 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): James Kitchens, Laura Wilkinson, & Emily Clarke
Research Mentor(s): Sharon Pearcey & Doreen Wagner

It is well-documented that hormone levels play an essential role in the regulation and expression of emotional responses. The role testosterone plays in anxiety is multifaceted and may cause both anxiety-producing and anxiolytic feelings (Domonkos et al., 2018). This study will look at the relationship between endogenous testosterone levels and anxiety in men and women. The participants are college students enrolled at a large southeastern university. Upon arrival to the testing room, each participant gave a saliva sample and completed a set of questionnaires including a demographics form and the Spielberger Trait and State (STAI) anxiety scale (Spielberger, 1989). Saliva samples will be assayed for testosterone levels using enzyme-linked immunosorbent assays (ELISAs). Because of the integrated relationship between testosterone concentration, part of the hypothalamic-pituitary-gonadal (HPG) axis, and the hypothalamic-pituitary-adrenal (HPA) axis, we hypothesize that testosterone will be related to both state and trait anxiety.

The Relationship Between Testosterone Levels and Depression Morbidity
Poster #12 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Emily Clarke, James Kitchens, & Laura Wilkinson
Research Mentor(s): Sharon Pearcey & Doreen Wagner

Following the mental health epidemic of the Covid-19 quarantine period, depression has become a mainstream health topic which affects roughly 4.7% of the adult population at some point throughout their lives (CDC, 2023). Depression can affect every part of a person's ability to function and enjoy daily life, so understanding the biological context for depression could help to increase the rate of early diagnoses and efficient treatment methods. A large number of depressive symptoms can be related to sex hormone levels like estrogen, progesterone, and testosterone. The goal of this research centers around understanding the relationship between the expression of depressive symptoms and a person's testosterone levels. The participant samples were evaluated through a secondary analysis from an overarching study. Participants completed a demographics questionnaire and the DASS-21 (Depression and Anxiety Stress Scale; Lovibond & Lovibond, 1995). The DASS is a 21-item questionnaire that assesses depression and anxiety in the normal population. Saliva samples were collected from participants and evaluated using an enzyme-linked immunoassay (ELISA). We hypothesize that testosterone will not affect the rate of depression overall but the individual expression of symptoms (i.e. suicidality, eating habits, and sleeping habits) may be related to testosterone. Data is undergoing analysis, currently.

The Role of Sense of Purpose in Health Navigation Among Marginalized Older Adults
Poster #4 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Ameesha Narine
Research Mentor(s): Shubam Sharma

A sense of purpose is a central, self-organizing life aim that guides choices and behaviors (Lewis, 2020; Mcknight & Kashdan 2009). In older adulthood, having a sense of purpose is linked with positive health (Musich et al., 2018; Lewis & Hill, 2021). Understanding how older adults who identify as socially marginalized (e.g., racially/ ethnically diverse, LGBTQ+) leverage purpose to navigate their health, for example, when setting health values, making health decisions, or adapting to health challenges may support the development of tailored resources to combat social disparities embedded in healthcare systems. This study used qualitative thematic analysis (Braun & Clarke, 2012). to explore the role of purpose in marginalized older adults' current health navigation and include how purpose and health navigation change across adulthood. Nineteen older men and women who identified as socially marginalized (Mage = 66.5) participated in semi-structured interviews Analyses revealed that older adults draw on purpose to guide health by maintaining personally meaningful, health-related (e.g., health education, caregiving) vocations into late life and by modeling positive health behaviors for others. Further, the role of purpose in health navigation changed across their adulthoods: participants described shifts from adversity-driven purpose to wellness-focused purpose, translating early adversity into current health motivation, and finding space for their authentic purpose when health was considered to stabilize. Findings demonstrate that, for marginalized older adults, their relationship with their

health may improve across the lifespan as they overcome adversity and health becomes enmeshed in purpose. Findings support refining health interventions to account for the role of purpose for older adults who have faced undue social hardship.

Total Worker Health for First Responders Needs Assessment
Poster #2 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Adrian Alicea
Research Mentor(s): Kristin Horan

What are the effects of integrating Total Worker Health initiatives into the first responder workplace? Previous research indicates general success in the integration of Total Worker Health initiatives in the general population's workforce. Research shows that there is a positive relationship between proper integration of Total Worker Health and the reduction of health and safety hazards in the workplace. There is an overall gap in the literature in reference to how to apply Total Worker Health to First Responders, this research aims to bridge that gap. This study aims to conduct a needs assessment for both the awareness and integration of Total Worker Health interventions in First Responder leadership. We submitted an application to the KSU IRB and received approval to send out a survey. The survey consisted of a collection of questions which measured general awareness of Total Worker Health initiatives. We then distributed the survey through the national training academy for public safety officers, which was distributed nationally to different First Responder Safety leaders. The scales that were used measured safety leaders' awareness of interventions, as well as how relevant safety leaders felt current interventions were. We expect that descriptive statistics will reveal low existing knowledge levels of Total Worker Health and moderate to high levels of interest in learning more about Total Worker Health.

Turning the Wheel: A Study of Collision Avoidance with Automated Vehicles in Relation to Handedness
Oral Presentation (Microsoft Teams)
Friday, April 19th
2:45pm - 3:00pm
Undergraduate Student(s): Emily Wells, Ashley L. Fernandez, William Payne Robinson, Alena G. Shull, and Dana Rodriguez
Research Mentor(s): Kyung Hun Jung

Our study aims to investigate the relationship between handedness and driving preferences in automated vehicle malfunctions. From previous research, we have discovered a trend in which people will prefer turning right in relation to favoring their dominant hand. Due to this

literature, our team hypothesizes that participants will favor steering to the right at a T-intersection to avoid a collision when they use their dominant hand, providing that the participant is right-handed. To test our hypothesis, we collected data using a virtual reality driving simulator. In our study, the participants were faced with a situation where the self-driving function of an automated vehicle malfunctioned as it approached a T-intersection. Participants were instructed to take over the vehicle using only their dominant hand. We are currently collecting the data.

Using Cognitive Psychology to Probe AI Social Bias
Poster #28 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Nancy Manasreh
Research Mentor(s): Yian Xu

Human rationality and decision making is heavily susceptible to social and cognitive biases. This irrationality in human nature poses an intriguing question: Does artificial intelligence display the same heuristics as humans? The current study seeks to examine social essentialism, the belief social groups possess natural or biological underpinnings, in GPT-4. This research builds upon recent studies that have tested prominent cognitive biases (e.g., anchoring and representative heuristics) using word vignettes by building on social essentialist bias. Our goal is to understand the differences between social essentialist thinking in large language models compared to humans. Specifically, we will examine two dimensions within social essentialism - Naturalness, or the belief in immutable and naturally occurring boundaries within social groups, and cohesiveness, or the belief in uniform characteristics within social groups. We utilized the social essentialism scale, a 9-point rating system, to observe whether GPT-4 would exhibit the similar heuristic patterns as previously studied on human participants in the terms of race, gender, nationality, religion, and social class domains. We compared the 150 generated responses from GPT-4 with 161 previous human participant data in the United States. Key findings showcased GPT-4 scoring lower than humans in terms of social economic class, race, and nationality. However, GPT-4 scored much higher on the social essentialism scale in terms of the religious domain in both naturalness and cohesiveness models. Overall, understanding the psychological perspective of GPT-4 in its API parameters and interface allows us to gain a deeper command of artificial intelligences' susceptibility to bias and its understanding of social groupings.

Sociology & Criminal Justice

Sharing Medical Experiences Through Their Stories with Autoimmune Disease: EOE
Poster #37 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Abigail Lloyd
Research Mentor(s): Daniel Farr

Eosinophilic Esophagitis (EOE) is a rare autoimmune disease described as "an inflammation of the esophagus (the tube connecting the mouth to the stomach), caused by a specific white blood cell – the eosinophil." This disease impacts a variety of gender and age groups. Given the rarity of this disease, many of those affected may feel isolated—the availability of a "peer group" as found on social media serves as an important source of knowledge, community, and hope. The purpose of this study is to examine the medical discourse and narratives of people with EOE as shared on YouTube. This qualitative research examines a sample of YouTube videos with systematic sampling. The final sample of videos includes varied gender and age groups. Using grounded methods, these narratives were coded to analyze thematic commonalities. Several key themes that emerge from the data include: a sense of "community," emotions during "diagnosis period," post "diagnosis period" and transitions, interactions with medical staff and environments, treatment options, emotional labor, and issues of social and familial support. These results suggest that regardless of age and gender, there appear to be many common themes and experiences shared by those affected by EOE.

How Long Is the Essay Supposed to Be, Professor? A Literature Review of Feasible Writing Expectations for University Students and In-Class Exams
Poster #23 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Kris Duah
Research Mentor(s): Kenneth White

What is a reasonable amount of writing, in terms of number of paragraphs, that a professor can expect from university students during an hour-long, in-class essay exam? This study is a literature review that attempts to answer this question of how much or how fast a student can be expected to write during an in-class, timed exam. The goal is to summarize previous scholarship on this question using education databases available through Kennesaw State University's library system—particularly, ERIC (Educational Resources Information Center). Search terms include: "written exams," "essay writing," "writing speed," "teacher expectations," "test expectations," and "student performance" among others. This study recapitulates existing

literature on writing speed and exam expectations to determine a reasonable standard for how much students can be expected to write during an in-class exam. This information could help both students and instructors manage their expectations of writing quantity during timed, in-class exams.

Understanding the Effect of Morality and Competing Values on the Decision to Offend
Poster #26 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Mahi Dalia
Research Mentor(s): Lisa Thompson

Criminologists are beginning to develop a framework for describing the nature and role of morality in the onset and continuation of deviant behavior and crime. This project adopts moral psychological perspectives to measure the impact of our moral systems and values on our willingness to engage in offending behaviors in a range of environments, including digital spaces. Recent studies have found evidence for a correlational link between moral values and the decision to engage in deviant behavior. Outcomes of this work contribute to (1) validating a new measure of morality and decision-making and (2) driving future work on building theories on the intersection of morality, crime, and decision-making.

Voices of Resilience: Women in Law Enforcement Navigating Bias and Barriers
Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
4:00pm - 4:50pm
Undergraduate Student(s): Emma Smalley
Research Mentor(s): Robin Mathis

In the male-dominated field of law enforcement, where women make up approximately 13% of law enforcement in the United States, underrepresentation poses significant challenges. While working in law enforcement requires resilience regardless of gender, research indicates that women, especially when underrepresented in the workplace, are prone to encounter additional challenges that demand resilience too. This study will explore prevalent issues that uniquely or disproportionately impact female officers and explore coping mechanisms employed by female officers to process the impact of these challenges. This study also aims to identify how departments can better accommodate the women in their workplace. To conduct this research, police departments were randomly selected and contacted via email. Police administration then distributed a comprehensive 32-question survey to sworn female officers, including open-ended questions addressing issues specific to women in law enforcement. A total of 75 responses were analyzed using affective coding techniques. Participants described how they encountered and

coped with issues such as gender discrimination, stereotyping, exclusion from informal networks, lack of mentorship, stigma associated with motherhood, barriers to assimilation, and limited opportunities for career advancement. Participants also recommended potential resources or policy improvements they believe would help them address these challenges effectively. By uncovering and addressing barriers hindering the advancement and overall well-being of female officers, this research holds significant potential to inform initiatives aimed at improving the retention of women in law enforcement. Additionally, recognizing the coping strategies used by female officers can shed light on aspects of organizational culture that may hinder effective coping. Furthermore, by identifying potential resources, programs, or policy that would be most beneficial to participants, this study holds the potential to offer recommendations for policy improvements and resource allocation.

Technical Communication and Interactive Design

Accessible World: Examining Accessibility through Social, Legal, and Technological Perspectives
Poster #8 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Anneli Numi
Research Mentor(s): Laura Palmer

Persons with disabilities rely heavily on technology to conduct their day-to-day lives. While disability is often seen as "dependent", using technology does not mean people with disabilities cannot be independent (Watson et al., 2020). Current accessibility features on mobile phones, advanced gaming technologies, hearing aids, and more types of assistive technologies and accessibility features provide countless people with an improved lived experience. However, the current state of accessibility with respect to assistive and web technologies as explored from a social, legal and technical perspective remains unexamined. The social lens examines interactions between humans and society. The legal lens inspects the legal pressure on companies to incorporate accessibility as well as the government's duty to protect the rights of people with disabilities. Finally, the technological lens explores the available assistive technologies and state of accessibility with consideration of how inclusive design can improve product design overall. This research looks to fill a gap in our understanding about the importance of accessibility in all types of digital products from these three perspectives.

College of Science and Mathematics

Chemistry and Biochemistry

Deposition of Metal-Organic Framework on Cotton Fabric for Effective Adsorption and Fixation of Radioactive Iodine
Poster #30 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm – 1:45pm
Undergraduate Student(s): Rohan Bhatia
Research Mentor(s): Bharat Baruah

The purpose of this project was to create highly adsorbent porous composite materials. Commercially available cotton fabric (CF) with a hierarchical structure contains micro and macro pores. We hypothesized that incorporating a metal-organic framework (MOF) can create highly adsorbent porous material, MOF@CF. Subsequent addition of silver nanoparticles (AgNPs) created AgNP@MOF@CF composite material. In addition, we created AgNP@CF. Such composite material adsorbed and fixed radioactive iodine (based on the following reaction, 2Ag + I2 à 2AgI2). We compared the adsorption and fixation capacity of AgNP@MOF@CF and AgNP@CF. SEM, EDX, FTIR, and XRD techniques were used to characterize the composite materials. The iodine adsorption experiment was monitored by UV-visible spectroscopy. Our iodine adsorption experiment's results indicated the iodine sample containing AgNP@MOF@CF and AgNP@CF had a faster iodine concentration decrease over time compared to the iodine sample containing just CF.

Adding a New Member to the CadR Regulatory Network in Pseudomonas aeruginosa Using REPSA and Bioinformatics
Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
10:00am - 10:50am
Undergraduate Student(s): Mya Stubbs
Research Mentor(s): Michael Van Dyke

Pseudomonas aeruginosa is a common bacterium that can infect human hosts. Currently, P. aeruginosa *is classified as a "critical priority pathogen" by the World Health Organization due to its resistance to multiple antibiotics and being one of the leading causes of nosocomial infections - infections that come about during health care that were not present to begin with. One way researchers study the basic biology of pathogenic bacteria is by understanding how the bacteria control gene expression. Deciphering how genes are turned on or off in response to environmental stimuli can often lead to the development of improved treatment strategies.*

Transcription factors are proteins that bind to a specific DNA sequence to regulate gene expression. They recognize and react to factors in their environment to know when to and when not to bind DNA. The CadR – cadmium regulator – transcription factor is found in P. aeruginosa genome and activates the transcription of CadA, a cadmium exporter. CadR has been found to be responsive to both cadmium, which is not essential for cells, and zinc, which is essential for cells. Since zinc often plays a fundamental role in bacterial pathogenicity, we sought to understand the complete regulatory network for the CadR transcription factor. Using an iterative selection technique, Restriction Endonuclease Protection Selection and Amplification (REPSA), the DNA binding sequence for CadR was discovered. Mapping this sequence to the P. aeruginos*a genome, we identified a genomic region that had not been cited as being regulated by CadR.Through bioinformatic approaches, we were able to determinethat this binding sequence was in the promoter region of apreviously uncharacterized, Zinc Ribbon Domain-containingprotein product. Through in vivo experimentation, we validatedthat this novel gene product is in the regulatory network ofCadR.*

Noninvasive Detection of Cholesterol from Human Sebum
Poster #26 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm – 3:45pm
Undergraduate Student(s): Davis Kammerdiener
Research Mentor(s): Christopher R. Dockery

A lot can be told about the human body simply from the natural oil on one's fingerprint. The aim of this study is to look for cholesterol in that oil specifically. Through using Gas-Chromatography (GC) and Mass-Spectroscopy (MS) we hope to gain enough information to isolate the peak for cholesterol. To test for this, it was necessary to extract the fingerprint oil from a microscope slide using dichloromethane (DCM) and then mixed with ethyl acetate and trimethylsilyl chloride (TMS), the derivatizing agent, to turn it into a form easily seen in GC-MS. After doing so, we were able to identify a strong peak at approximately 30 minutes, which, after comparing against the NIST mass-spec library, we were able to identify our target molecule. Finding and identifying the link between cholesterol and the oil on the skin would be one of the first steps in creating a minimally invasive cholesterol test.

Antimicrobial Peptides Inhibitors for Main Protease of SARS-CoV-2
Poster #24 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Julia Franz
Research Mentor(s): Mohammad A. Halim

Severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) still poses a significant risk to people's health with 774 million infections and 7 million deaths as of March 2024. SARS-CoV-2 is a positive-sense single stranded RNA virus consisting of 29 proteins. The main protease (Mpro) of SARS-CoV-2 has been identified to play a crucial role in viral replication and transcription. Ideally, inhibition of the Mpro would prevent replication and allow us to effectively prevent and treat SARS-CoV-2. Peptides therapeutics have been utilized in the inhibition of the Mpro due to their targeted binding ability to the catalytic dyad His41 and Cys145. In this study, we synthesized three antimicrobial peptides including DRAMP01613, DRAMP02397, and DRAMP03064 to inhibit the Mpro. These peptides are non-cytotoxic with strong antimicrobial properties and were chosen because of their higher binding affinity as evident from our previous bioinformatics studies. The DRAMP peptides were synthesized using a CEM Liberty Blue peptide synthesizer with automated Fmoc solid phase synthesis protocols and cleaved using a 95% trifluoracetic acid mixture. The peptides were then precipitated with diethyl ether and subsequently lyophilized. All peptides theoretical masses were confirmed through mass spectrometry and then stored in 4° C. To measure the 50% inhibitory concentration (IC50) value of these peptides, a selected ion monitoring (SIM) based LCMS (liquid chromatography coupled with mass spectrometry) assay was conducted. DRAMP03064 demonstrated the highest inhibition efficiency with an IC50 value of 378 nanomolar (nM) whereas the DRAMP02397 showed the moderate inhibition efficiency (IC50 5.72 micromolar).

Comparative Bottom-Up and Middle-Down Proteomics for Escherichia-Coli
Poster #20 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Imran Dabdoub
Research Mentor(s): Mohammad A. Halim

Proteomics is the large-scale analysis of proteins found in a particular cell or tissue, giving insight into the function of the cell from which the proteome originated. Proteomics involves cell lysis, in which the plasma membrane of the cell is damaged, resulting in release of all proteins from the cell. In bottom-up proteomics, cell extracted proteins are digested with trypsin generating peptides which were separated and identified by LCMS method. While bottom-up proteomics is considered the gold standard, it does introduce challenges such as peptides that are too small and some proteins are resistance to enzymatic degradation. In top-down approach, proteins are not digested, however, this makes separation and fragmentation of large proteins difficult. A new technique known as middle-down where proteins are digested to generate larger peptides by GluC enzyme or non-enzymatic chemicals. The aim of this study is to perform a comparative bottom-up and middle-down proteomics study on E. Coli using enzymatic and non-enzymatic digestions. In the bottom-up approach, trypsin/Lys C was employed which cleaves at the C-terminal of Arg/Lys whereas in middle-down approach formic acid was used which cleaves

at Glu/Asp. In bottom-up approach, we have identified 3597 proteins, with the peptide mass range of 0.6-6.7 kDa. Among these proteins, 150 are related to kinase activity, 408 proteins are associated with transporter activity, 626 are shown to have nucleic acid activity, and 2182 are other proteins with unknown functions. In the middle-down approach, we have identified 1397 proteins, with the peptide mass range of 0.7- 5.65 kDa. Among these proteins, 72 proteins are associated with kinase activity, 128 have transporter activity, 242 have nucleic acid activity, and 1011 are other proteins. The top 40 proteins which are identified by both methods are not similar, which demonstrated that enzymatic and non-enzymatic digestions can help to identify diverse proteomes.

Comprehensive Proteomic Analysis of Tenualosa Ilisha Employing Bottom-Up Proteomics Approach

Poster #2 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Graduate Student(s): Airin Akhter
Research Mentor(s): Mohammad A. Halim

Proteomics study is an essential approach for molecular characterization, enabling the identification and quantification of proteins in different organisms, including fish. Fish known for being a high-quality protein source, is crucial for ensuring global food safety. Despite proteomics studies being widely used in human diseases, fish proteomics gets less attention. In this study, we utilized a bottom-up proteomics approach to identify the essential proteins in Tenualosa ilisha, a species belonging to the Clupeidae family and popularly known as ilishi, hilsa, hilsa herring, or hilsa shad, which is mostly caught in rivers and coastal areas in south Asian countries. In this context, we collected the tissues from different parts of the hilsha fish including the egg, brain, and tail. Afterward, we extracted the protein from these parts using lysis buffer followed by treating them with trypsin/Lys-C protease mix after reduction, alkylation, and digestion. Peptides were subsequently separated using reverse-phase liquid chromatography (RP-LC) using a Vanquish Flex HPLC system with a 90-minute gradient. Peptide identification was conducted with an Orbitrap Exploris 240 Mass Spectrometer utilizing a data-dependent analytical approach. The Proteome Discoverer software (V2.5) was used to analyze LC-MS/MS data against all proteins of Tenualosa ilisha (732 proteins) in the NCBI database with the SEQUEST algorithm. Our Initial findings showed the detection of 77 proteins in the ilisha tail tissue sample, 71 in the egg sample, and 66 in the brain sample with high confidence. Whereas, 120 proteins were identified in the tissue sample with medium confidence, along with 115 in the egg sample and 113 in the brain sample. Adenylate Kinase was the most prevalent protein found in Tenulosa ilisha, with a sequence coverage of 100%. Adenylate kinase (AK) acts as a signaling protein that is essential for controlling the balance of energy within cells.

Deep Eutectic Solvents Based Charge Reducing Agents for Native Mass Spectrometry
Poster #1 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Graduate Student(s): Abdul Hannan
Research Mentor(s): Mohammad A. Halim

Electrospray ionization coupled with mass spectrometry (ESI-MS) has become a very powerful tool for protein analysis. However, formation of multiple charges sometimes leads to complex mass spectra due to overlapping of peaks and data interpretation becomes challenging, especially for large protein systems. A relatively new approach known as native mass spectrometry which also utilized electrospray ionization techniques obtaining the mass spectrum of large protein employing non-denaturing solvents. However, non-denaturing solvents only slightly reduce the charge states. To simplify the mass spectrum of a large protein system, various charge reducing agents such as triethylamine, trimethylamine oxide, imidazole, and alkali metal salts are used. In this study, we have investigated the charge reduction properties of amino acid based deep eutectic solvents (DESs). DESs solvents are greener, biodegradable, nonhazardous, cost effective and can be a better alternative to traditional charge reducing agents. DES is prepared by mixing two or more components in a certain ratio, one component acts as a hydrogen bond acceptor (HBA) and the other is a hydrogen bond donor (HBD). Several amino acids (Histidine, Lysine, Arginine, Proline and Serine) based on DESs were synthesized with glycerol. The DES formation was confirmed by the attenuated total reflection (ATR) coupled to IR spectroscopy and principal component analysis (PCA). Various concentrations of the DESs were mixed with a model protein, Lysozyme. When lysozyme was prepared in water, various charge states from 7+ to 11+ were noticed with the most dominant peak at 9+. For histidine-glycerol DES, the most dominant peak was spotted at 7+ with several change states ranging from 5+ to 8+. A significant charge reduction was observed for arginine-glycerol DES where the most abundant peak was detected at 5+ charge state. Similar trend is noticed for proline-glycerol DES. However, serine-glycerol DES failed to reduce the charge states.

Design and Synthpesis of Peptides-Based Broad-Spectrum Sunscreen
Poster #26 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Lexie Thrasher
Research Mentor(s): Mohammad A Halim

Sun emits harmful ultraviolet (UV) rays which can damage our skins. There are three types of UV rays such as UV-C (200-280 nm), UV-B (280-320 nm) and UV-A (320-400 nm). The ozone

layer and oxygen filter out the UV-C and act as the earth's sun's cream. However, UV-B and UV-A cannot be filtered out by Ozone layer, that's why we need sunscreen. There are two types of sunscreens: One is organic compound based which absorb the UV-A and UV-B light and another one is nanoparticle based which reflect or scatter the UV lights. However, organic, and nanoparticle-based sunscreens are generally toxic and not environmentally friendly. Our lab recently designed and developed peptide-based sunscreen. Peptides made of amino acids are non-toxic and environmentally friendly. However, there is no peptide-based sunscreen developed yet. This study aims to create a peptide-based sunscreen that is non-toxic, biodegradable, and protects against the UVA (320-400 nm) and UVB (280-320 nm) spectrum. Previously non-aromatic amino acids were prioritized because of their lack of steric hindrance. This allowed UV rays to be blocked from 190-320 nm. To cover the remaining UV-A (320-400 nm) different dimer peptides were created, D-1, D-2, and D-3. D-1 was synthesized using the previous Sunscreen E sequence using Glycine as the base of the dimer. D-2 was synthesized using different non-bulky amino acids. D-3 was synthesized focusing on creating a fluorescence peptide base. Previous research has shown a fluorescence peptide can cover UV rays to 450 nm. Future research will result in testing the UV coverage capacity of these combinations from 190-400 nm, and how to produce them on a large scale.

Determination of Mitogen-Activated Protein Kinase-Activated Protein Kinase-2 (MK2) Function Through a Human cDNA Library Screen of Possible Binding Proteins
Poster #2 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Alaina Westee & Ridham Raval
Research Mentor(s): Rajnish Singh

Protein interactions are essential to the regulation of living systems, constituting pathways that elicit specific responses. Activation of the p38 MAPK pathway by environmental stressors plays a significant role in cancer development and inflammation. The inhibition of Mitogen-Activated Protein Kinase-Activated Protein Kinase-2 (MK2), a downstream substrate, has been shown to decrease the progression of tumors in vivo, making it a desirable drug target. Therefore, we intend to explore the functions of MK2-isoform 2 by screening for interacting proteins from a human cDNA library. This will be conducted via the Yeast Two-Hybrid System, which involves fusing the binding (BD) and activation domains (AD) of the Gal4 protein to various ''bait'' and ''prey'' proteins, respectively, within plasmids. The bait will then ''fish'' through prey proteins, and if a successful interaction occurs, the Gal4 domains will be brought into contact and reconstitute at the promoters for the His3, Ade2, Aur1-c, or Mel1 genes. Binding is visualized through Mel1 expression of α-galactosidase, an enzyme responsible for cleaving X-α-Gal into a blue product. After Maxiprep purification of MK2-BD, BD and AD control plasmids were separately transformed into the yeast strains Y190 and Y187 to evaluate system performance.

Cells containing positive control plasmids that express p53 and T-antigen proteins were mated and then streaked onto X-α-Gal supplemented plates, accurately resulting in blue colonies. Moreover, white colonies were observed when T-antigen and Lamin negative control plasmids were mated. This was also done with MK2-BD by itself and with an empty pGAD vector, resulting in no blue colonies and indicating no autoactivation. With the time and resources available to our Course-Based Undergraduate Research Experience group (CHEM 3512L), we aim to next mate yeast containing the MK2-BD plasmid with those carrying a library of AD-prey proteins to detect potential interactors and further characterize this important, yet less studied kinase.

Developing Cationic Peptide Analogues for Alzheimer's Treatment
Poster #34 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Rosa Leap
Research Mentor(s): Mohammad A. Halim

Peptide therapeutics have gained traction over the past few years because they are a highly selective medication due to their targeted binding ability. They are better tolerated in the body because of their amino acid backbone. This is unlike small molecule drugs, which the body can develop a resistance to due to consistent use. The current understanding of Alzheimer's is that it is caused by an overproduction of amyloid beta in the brain. Senile plaques begin to develop throughout, which leads to neurotoxicity. This increases the accumulation of amyloid beta, which then causes neurons to die off. With the current understanding of Alzheimer's and its cause, the development of certain peptides has begun that will inhibit the production and presence of amyloid beta in the brain. In this project, we have developed two cationic peptide analogues incorporating basic amino acids in the N and C-terminal of the KLVFF motif. Previous studies showed that KLVFF can inhibit the amyloid beta fibril formation. In this study, two cationic peptide analogues including RGKLVFFGR (CP1) and RGKLVFFGK (CP2) are designed. We synthesized them by using the Liberty Blue peptide synthesizer with an automated Fmoc solid phase synthesis. It was cleaved using a 95% trifluoracetic acid mixture. The experimental mass of the synthesized peptides was measured by Orbitrap Exploris 240 mass spectrometry and confirmed with the theoretical mass. The binding affinity of the cationic peptides were measured against the amyloid beta using selected ion monitorial (SIM) based LCMS assay developed in our lab. The cationic peptide CP1 demonstrated a strong binding with a Kd value of 33 nM. Testing is still in progress for CP2 peptide. The preliminary result revealed that cationic peptides have potential to develop as effective therapeutics for Alzheimer's diseases.

Developing Clinically Proven Peptide Analogues for Alzheimer's Treatment
Poster #19 (Convocation Center, East & West Activity Wings)

Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Iona Alatar
Research Mentor(s): Mohammad A. Halim

It has been theorized that the accumulation of beta-amyloid protein may be the cause of the progressive neurological disease known as Alzheimer's. The most commonly diagnosed form of dementia is Alzheimer's disease, affecting around six million Americans of all ages. Various theories surround the causes of this neurological disorder, resulting in different potential treatments. The beta-amyloid hypothesis suggests that the accumulation of beta-amyloid (Aβ) peptides leads to plaques forming in the brain, resulting in the death of neurons and other neural cells. This study has synthesized and tested several peptides for their binding ability to bind to the beta-amyloid peptide. The aim of this study is to develop potent analogues by modifying peptides that failed in clinical trials. The most qualified candidates have been selected for further synthesis and testing. A CEM Liberty Blue peptide synthesizer was used to perform solid-phase peptide synthesis protocols following standard Fmoc procedures and cleaved with 95% trifluoracetic acid. The peptide was precipitated using cold diethyl ether before being lyophilized. Peptide characterization was then performed using mass spectrometry. One of the peptides named "NAP" showed a strong peck at m/z *423.72, corresponding to its [M+2H]2+ charge state. The modified analogue named "NAPM" has a mass of* m/z *1458.75 and showed a strong peak at* m/z *729.92, corresponding to its [M+2H]2+ charge state. Both synthesized peptides were tested for their ability to bind with amyloid beta. The selected ion monitoring (SIM) based mass spectrometry assay result indicated strong binding (Kd =124 nM) between the amyloid beta and peptide inhibitor. Further research will be conducted to design more modified analogues and test their interaction with the amyloid beta employing hydrogen deuterium exchange mass spectrometry.*

Developing Cyclic Peptide Therapeutics to Inhibit the Amyloid Beta in Alzheimer's Disease
Poster #21 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Jhonatan Stincer
Research Mentor(s): Mohammad A. Halim

Alzheimer's disease is a neurodegenerative disorder that affects nearly 6 million Americans primarily 65 and older and is the leading cause of dementia in the aging population. This disease is characterized by the progressive loss of cognitive function and ultimately leads to total loss of any memory and death within 10 years of diagnosis. The leading theory associated with the cause of Alzheimer's is related to the accumulation of Amyloid Beta (AB) plaque. Peptide therapeutics

has appeared to be a very promising field in terms of delaying and even eradicating the buildup of the Amyloid Beta in recent years. In this study, we synthesized linear (LP1) and cyclic peptide (CP1) using Fmoc based Solid-Phase peptide synthesis protocol. For cyclic peptide, two cysteine amino acids were installed into position 3 and 13. The cyclic peptide was synthesized by mixing the linear peptide with 10% DMSO and stirred for 48 hours at room temperature. The mass change of the cyclic peptide was monitored by mass spectrometry which demonstrated peaks at 332.6 and 415.5 corresponding to +5 and +4 charges, respectfully. The binding affinity of these peptides were measured against by the amyloid beta (AB) employing selected ion monitoring (SIM) based mass spectrometry assay. In this case, peptide concentration was fixed while AB concentration was varied from 1 to 100 micromolar. The binding affinity between peptides and AB was determined by the dissociation constant (Kd) which disclosed that cyclic peptide demonstrated a Kd value of 24 nanomolar (nM) while the linear peptide showed the Kd value of 268 nanomolar (nM). This study showed that cyclic peptides show promise to be an excellent therapeutic in inhibiting the amyloid beta.

Do Carbonyl Index and Contact Angle Relate to Each Other?
Poster #9 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Graduate Student(s): Dhimani Still
Research Mentor(s): Marina Koether

Carbonyl index is the measure of oxidation and is determined by ATR-FTIR. Contact angle is the measure of hydrophilicity and is determined by a goniometer. In the environment, plastics undergo oxidation which increases hydrophilicity. This study compares three different plastics, polyethylene, polypropylene, and polystyrene, for oxidation and hydrophilicity. These plastics have undergone weathering via UV radiation over time. Results will show the relationship between carbonyl index and contact angle. As carbonyl index increases, contact angle decreases. While there is a general trend between the two, the actual values for each plastic are different. This knowledge will help future forensic scientist determine the age of plastics discovered at crime scenes.

Effect of Nitro Group Location on the Optical Properties of Pyrrolidinone-Fuse-1,2-Azaborine Chromophores
Poster #33 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Ra'Nya Malone, Ophelia Adjei-sah, Lilianna Kocai, Jacob Erasmus, & Miriam Raggs
Research Mentor(s): Carl Saint-Louis

Polycyclic aromatic compounds substituted with the -NO2 moiety are commonly used in n-type organic conjugates due to the strong electron accepting capabilities of the -NO2 group. However, adding a -NO2 group to chromophore's scaffold quenches their fluorescence, particularly in polycyclic aromatic compounds containing three coordinated boron, such as pyrrolidinone-fuse-1,2-azaborines (PFAs). Due to strong intermolecular π-π stacking interactions, these NO2-substituted PFAs tend to aggregate at high concentrations, causing emission quenching, also known as aggregation-caused quenching (ACQ). In this study, we synthesized four PFAs substituted with a -NO2 group at positions (1-, 2-, 3-, and 4-) to investigate the influence of the location of the -NO2 group on the optical properties. Unexpectedly, the location of the -NO2 group to the left hemisphere of the PFA core results in distinct optical properties. Substitution of the -NO2 group at different position also resulted in aggregation-induced emission (AIE), aggregation-caused quenching (ACQ) or both in a single PFA scaffold. We further noticed solvatochromic and thermochromic properties based on the substitution of –NO2 group to the left hemisphere of the PFA.

Exploring the Effects of Course-Based Undergraduate Research Experiences (CUREs) on STEM Students with an Emphasis on Chemistry Majors: A Qualitative Analysis of Critical Reflections

Poster #22 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Mahdi Ghasemi & Abigail Dingess
Graduate Student(s): Chazzidy Harper
Research Mentor(s): Amy Buddie & Kimberly Cortes

This study investigates the effectiveness of Course-based Undergraduate Research Experiences (CUREs) in comparison to traditional mentorship and apprentice model research approaches, focusing on their impact on student perceptions and learning outcomes within the STEM disciplines. The central research question guiding this inquiry is to determine if CUREs provide comparable or superior educational value and connectedness insights compared to traditional undergraduate research models. Building upon existing literature on undergraduate research and educational methodologies, this study aims to contribute unique insights into the effectiveness of CUREs as a tool for enhancing student engagement and learning in STEM fields. By analyzing 57 chemistry student reflections obtained through the Quality Enhancement Plan (QEP) initiative, this research project seeks to provide empirical evidence supporting the benefits of CUREs in fostering deeper connections to course content, promoting integrated problem-solving skills, and facilitating values growth among students. The research methodology employed involved consolidating and cleaning data from multiple Excel sheets containing student reflections, which were then imported into NVivo for systematic coding based on four

key principles derived from an overall rubric: Educational Value, Connectedness Insights, Integrated Problem Solving, and Values Growth. This coding process enabled the identification of recurring themes and patterns in student reflections, allowing for a comprehensive analysis of their perceptions and experiences with CUREs. While the data analysis is ongoing and preliminary, expected results include insights into the perceived educational value of CUREs compared to traditional research approaches, the extent to which students feel connected to their coursework and research activities, and the development of problem-solving skills and values growth attributed to CURE participation. These conclusions will be discussed within the context of existing research literature and implications for future educational practices and policies in STEM disciplines.

Expression of Novel Biomolecule for Targeting and Eradicating Intracellular Pathogens
Poster #30 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Matthew Frias
Research Mentor(s): Thomas Leeper & Jonathan McMurry

This project aims to establish a foundation for a new therapy using cell-penetrating peptides (CPPs) to deliver novel antibacterials against intracellular pathogens. This is easier said than done due to the endosomal escape problem, where molecules, in this case CPP-cargos enter the cell but remain trapped in endosomes and are either degraded or cycled back to the cell surface. We seek to address and nullify this problem by expressing our biomolecule. Rather than having the CPP directly attached to the cargo, we will use a novel non-covalent coupling strategy, a calmodulin-binding sequence (CBS) interaction with calmodulin, a calcium-dependent binder of CBS sequences. When the CPP is fused to calmodulin and the cargo, the complex of these two molecules would allow penetration into the cell and the cargo could separate from the CPP when transitioning to a low Ca2+ environment, i.e. when it enters the cell. We will be screening a multitude of cargos, with the intent that the cargo will target the pathogen of interest e.g. Staphylococcus aureus, Chlamydia trachomatis, Mycobacterium tuberculosis. We must first express the protein (with the regulatory sequence) in sufficient quantity for structural biology, enzymology, confocal microscopy, and biophysical characterization; progress toward that goal will be presented. If successful, this project may provide the groundwork for developing a new method of treating difficult intracellular bacterial pathogens.

Geometry Optimization and Energetics Analysis of Cyclo[10]Carbon Structures via Ab Initio Methods
Poster #5 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm

Undergraduate Student(s): Ben Gibbas, Jose Gutierrez-Cardenas, & Kyle Whitaker
Research Mentor(s): Martina Kaledin

The first successful synthesis of cyclo[10]carbon structures was recently discovered to be possible via the tip-induced dehalogenation of octachloronaphthalene, $C_{10}Cl_8$ deposited on the interface of a sodium chloride and gold (III) crystal. Previous research revealed characterizations of the C_{10} molecular structure using the atomic force microscope (AFM) and simulated AFM images. Cyclo[10]carbon is proposed to transition between cumulene-like circular (D_{10h}) and pentagonal (D_{5h}) structures. However, a discrepancy exists surrounding the difference in energy between the two structures, which has been a debate in literature. The second order Møller–Plesset perturbation theory, MP2 asserts that the circular ring exists in lower relative energy; whereas the pentagonal structure in coupled-cluster, CCSD(T), and density functional theory (DFT) methods resulted in lower energy. These structures exhibit double aromaticity, with orthogonal (in- and out-of-plane) π systems. In this work, DFT calculations have been carried out using the Gaussian16 quantum chemistry package and coupled-cluster, CCSD(T) methods with the Molpro quantum chemistry package. Multiple methods including Becke 3-Parameter Lee-Yang-Parr (B3LYP), exchange-correlation density functionals (tau-HCTH), and Truhlar's density functionals (M06L) were used in conjunction with aug-cc-pVDZ, cc-pVTZ, aug-cc-pVTZ, and cc-pVQZ [zeta-functionalized] basis sets. Data for intrinsic reaction coordinates (IRC), frontier orbitals (FOs) have been visualized in GaussView06, while Mulliken population analysis and atomization energies were completed with Gaussian16. We compared the barrier heights of D_{5h} – D_{10h} isomerization with data in the literature to validate the accuracy of new theoretical methods for fitting the potential energy surfaces. Cyclo [10]carbon calculations imply that the pentagonal D_{5h} isomer is lower in energy with barrier heights ~ 0.3 kcal/mol. The IRC calculations confirm that the D_{10h} ring is the transition state between two different inversions of the pentagonal cyclo[10]carbon. Furthermore, triplet state calculations elucidate a lower energy with a marquise-shaped structure. FO calculations suggest that this stretching allows the π-system to achieve a state of aromatic conjugation, lowering the overall energy.

How Much Lead Do These Fabrics Absorb?
Poster #29 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Robert Bollin
Graduate Student: Aleksandra Hilliard
Research Mentor(s): Marina Koether

This investigation sought to describe the behavior of the absorption of lead onto microplastics, created from weathered fabrics. These microplastics may behave as vectors of lead transport in the environment. Three different fabrics were oxidized for 0 or 10 hours. These fabrics were then

exposed to lead solutions for 0, 1, 2, or 3 weeks. The amount of lead absorbed onto the fabric was determined by difference analysis using ICP-OES. Subsequently, these fabrics were analyzed via XRF. Cotton and a blend fabric absorbed lead while polyester absorbed one-tenth of the amount based on XRF data. In general, the amount of lead absorbed by the fabric increased with time of exposure to the lead solution, with and without oxidation. The carbonyl index, determined by FTIR, was measured for the polyester samples. Trends are observed between the measurements of ICP-OES and XRF.

Identifying the Mineral Source of Phosphorus-Containing Molecules in Space
Poster #8 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Kayla Roper
Research Mentor(s): Heather Abbott-Lyon

Phosphorous is the only one of the six most abundant elements in life that does not exist in a stable yet volatile form (i.e., as a gas or the vapor of a liquid). Therefore, it must have migrated from a solid mineral into prebiotic molecules. Only a few volatile P-containing species have been observed in space, mainly in the comas of comets or the interstellar medium. Astronomers want to know "What is the reactive P-bearing mineral in these extraterrestrial environments?" We hypothesize that this mineral may be schreibersite or Fe2NiP, a phosphorus-bearing mineral commonly found in iron and stony-iron meteorites, which is known to corrode upon exposure to water under ambient conditions releasing reactive P-bearing compounds. To test this hypothesis, we created a synthetic schreibersite sample and placed it into an ultrahigh vacuum (UHV) experimental chamber with a base pressure of 1.3 x 10-9 torr. A cryohead is used to cool the sample to temperature below 100 K. We dose water (H2O) and methanol (CH3OH, CD3OD) through a variable leak valve and irradiate the surface with a tunable electron gun. To detect structural changes on the surface, we use Reflection-Absorption Infrared Spectroscopy (RAIRS). A quadrupole mass spectrometer (QMS) is used to characterize small molecules and ions desorbing off the surface during the electron irradiation and as the sample is warmed to room temperature. Irradiating with 1000 eV electrons leads to the formation of a new peak in the infrared spectra at 2345 cm-1. This is red-shifted (i.e., shifted to lower frequency and energy) compared to the P-H stretch of phosphite, which is computationally predicted to occur at 2423 cm-1. Therefore, the feature we observe in the RAIRS spectra is more likely CO2, which is expected to have a peak at 2340 cm-1, rather than phosphite on the schreibersite surface.

Impact of Solvents on the Protein Charge States Detected by Mass Spectrometry
Poster #10 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm

Undergraduate Student(s): Ayaan Rana
Research Mentor(s): Mohammad A. Halim

Electrospray ionization (ESI) combining with mass spectrometry is a powerful soft ionization technique to identify, quantify and elucidate the structure of the small and large protein complexes. In this technique, the protein samples are required to dissolve with organic solvents which significantly influence the charge state distribution of the protein in the gas phase that occurs during the ESI process. In this study, we explore the charge state distribution of Ubiquitin in various organic solvents including hexane, methanol, DMF and DMSO by ESI-MS. The control experiment was performed by dissolving Ubiquitin in water. All mass spectrometry experiments were conducted on an Electrospray Ionization (ESI) coupled a with LTQ mass spectrometer. Mass spectra was acquired using a mass range of 200–2000 m/z. In the presence of 10% solvents, the most intense peak was observed at 6+ charge state with DMSO. The other dominant peaks are noticed for 5+ charge state when Ubiquitin was mixed with Methanol, DMSO and DMF. The large percentage of organic solvents has significantly influenced the charge state distribution of Ubiquitin. In the presence of 50% methanol, Ubiquitin showed a wide range of charge state distribution from 5+ to 11+ with the most dominant peak being noticed at 7+ charge states. This shows that alcohol causes more unfolding of Ubiquitin than hexane, DMF and DMSO. The highest ion current was also noticed for methanol compared to other solvents. The relative abundance of Ubiquitin was significantly suppressed when high percentage of DMSO, DMF, and Hexane were utilized. This study shows that methanol induced more unfolding of Ubiquitin while other solvents helped the protein to retain its folded conformation.

Inhibition Efficiency of Linear and Cyclic Temporin L Analogues Against the Main Protease of SARS-CoV-2
Poster #31 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Graduate Student(s): Md Taimuzzaman Sharif
Research Mentor(s): Mohammad A. Halim

Main protease (Mpro) of SARS-CoV-2 plays key roles in replicating the virus when it enters into the host-system. Mpro is not found in the host-system and hence it will be very selective and safe to inhibit this protease. An effective inhibitor would block the two amino acids (Cys145 and His41) present in the catalytic dyad of the Mpro. Although two oral antiviral drugs are available in the market, small molecule drugs induce side effect and resistance. Peptides can play a vital role in inhibiting the catalytic sites of Mpro as they are more effective, selective and induce less side effects and resistance. However, peptides are not stable in the stomach as they degrade quickly due to the presence of various proteolytic enzymes. Previous studies from our group

showed that Temporin L can effectively inhibit the main protease, however, this peptide showed a short half-life. The overall goal of this project is to develop cyclic analogues of Temporin L investigating their inhibition efficiency and improving the serum half-life. Initially, a linear Temporin L analogue containing two cysteine amino acids was synthesized by solid phase peptide synthesis. The cyclic analogue was prepared by dissolving it with 10% DMSO and stirring it for 48 hours. Both peptides' masses were confirmed by LTQ mass spectrometer. Selected ion monitoring (SIM) based liquid chromatography-mass spectroscopy (LC-MS) assay was used to evaluate and compare the in-vitro biological activity of linear and cyclic analogues. The inhibition efficiency of the linear peptide demonstrated a IC50 value of 16.6 μM in SIM assay. Remarkably, the cyclic analogues showed a slightly strong inhibition efficiency with a IC50 value of 13.2 μM in SIM assays, respectively. Future studies will be directed to synthesize more cyclic analogues and test their serum stability.

Introducing Peptide Synthesis Based Research to Freshman Students
Poster #31 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Graduate Student(s): Md Ackas Ali
Research Mentor(s): Mohammad A Halim

KSU has a unique program to introduce freshman students to undergraduate research. In the last two years, our group has recruited 14 students for a two-semester long research project on peptide synthesis. The key challenges to engage freshman students with peptide synthesis projects are that they do not have sufficient background in organic chemistry, basic biochemistry, and analytical instrumentation. In this research project, we developed several modules to teach key concepts in organic chemistry, biochemistry, and mass spectrometry so that students can build a strong understanding and foundation on peptide synthesis and characterization. For organic chemistry module, functional groups, structural presentation are introduced. Students are required to memorize two compounds' name and their Lewis structures from aliphatic group and ten compound names from aromatic group. For Biochemistry module, all amino acids names were introduced alphabetically (A for Alanine, C for Cysteine). Moreover, classification of amino acids, Lewis's structure and peptide bond formation was reviewed. Several worksheets and quizzes were made to monitor students' learning. For peptide synthesis, four key concepts including resin swelling, deprotection, coupling and cleavage were explained. Students are trained on a peptide synthesizer and allowed them to synthesize therapeutic peptides for Infectious, Alzheimer and Cancer diseases. Before joining our team, 64% of students did not know the name and properties of amino acids and 28% of students only knew a few names and their properties. 72% strongly agreed and 28% agreed that alphabetic way is an effective way to memorize all amino acids. Out of 14 students, 10 students were extremely confident, 3 students were somewhat confident, and 1 student was neutral on peptide synthesis. Over 90% of students

strongly agreed that this program helped them to improve their research skills, communication skills, team-oriented work, and significantly boosted their confidence for organic chemistry, biochemistry, and instrumentation.

Investigating the Gas Phase Ubiquitin Oligomers Formation by High Resolution Orbitrap Exploris 240 Mass Spectrometer
Poster #36 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Saania Zehms
Research Mentor(s): Mohammad A. Halim

Ubiquitin is a 76 amino-acid residue protein which covalently binds to substrates and modifies them using a class of posttranslational modification called Ubiquitination. Ubiquitination is regulated by three types of enzymes, namely, ubiquitin-activating enzymes (E1), ubiquitin conjugating enzymes (E2), and ubiquitin ligases (E3). E1 activates ubiquitin so it can be transferred to its active site, cysteine, by E2 which can bond with both E1 and ubiquitin. Then, E3 recognizes and binds the target substrate using an isopeptide bond between the last amino acid, glycine 76 of the ubiquitin molecule to a lysine on the substrate protein. This enzymatic cascade is repeated until a small chain of several ubiquitin molecules marks the target protein for degradation in the proteasome. To understand how ubiquitin functions in the removal of unwanted or damaged proteins, it is critical to know its quaternary organization and conformational changes. In this research, we investigate the gas phase oligomeric structure of Ubiquitin in neutral and basic environments using high resolution mass spectrometry. In neutral conditions, the measured charged states ranged from 2+ to 11+ for the monomer, with the highest peak of 8+ at 1057.20 m/z. For the dimer, the charges ranged from 5+ to 9+, with 7+ being the most intense peak located at 2415.30 m/z, and for the trimer, 7+ to 11+ states were observed, with the highest peak at 10+ at 2535.96 m/z. Moreover, we observed a single tetramer charged state of 13+ at 2605.78 m/z. In basic condition, similar pattern is observed for monomer, dimer, and trimer, however, no tetramer is noticed. Overall, the peaks observed in neutral conditions were more intense than the peaks observed in basic conditions. This study provides experimental evidence Ubiquitin can form more oligomers in neutral condition compared to the basic (native like) environment.

Investigation of the Gas Phase Cluster Formation of Amino Acids by High-Resolution Mass Spectrometry
Poster #22 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Jaina Kothari

Research Mentor(s): Mohammad A. Halim

Mass spectrometry emerges as an essential technique to investigate the non-covalent cluster formation among various small molecules such as amino acids and nucleosides. Amino acids receive specific attention as they represent the building blocks of protein and protein complexes and also the early step in the origin of life. The interactions among amino acids, including hydrogen bonding, electrostatic and hydrophobic, play a crucial role in shaping the structures and functions of biological molecules. This study focuses on investigating the clustering behavior of arginine, histidine, and serine employing electrospray ionization (ESI) coupled with high resolution Orbitrap Exploris 240 mass spectrometer. For arginine, our mass spectrometry experiment detected several homo clusters from dimer to 11-mer. The most stable cluster observed was noticed for tetramer at m/z 697.5. The 11-mer cluster was detected at m/z 1917.23. For histidine, several homo clusters of histidine from dimer to 17-mer are noticed. The most stable cluster observed was noticed for tetramer at m/z 1086.49 m/z. The 17-mer cluster was detected at m/z 2638.18. Lastly for serine, our mass spectrometry experiment obtained several homo clusters of serine from mono dimer to 13-mer. The most stable cluster observed was noticed for tetramer at m/z 1039.18. The 13-mer was detected at m/z 1221.15. Overall, the non-covalent gas phase cluster creation by basic and polar of amino acids reveals a very diverse pattern.

Investigations into the Biological Activity of Two New NHC-Coinage Metal Complexes

Poster #16 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Douglas Brooks Dickson, Alexander Van Dyke, Aidan Gerdis, & Shanza Choudhary
Research Mentor(s): Daniela Tapu & Carol Chrestensen

Over the past few decades, N-heterocyclic carbenes (NHCs) have become a benchmark of organometallic chemistry. Due to their strong σ-donating and π-acceptor ability, NHC are not only great ligands in catalysis, but they are also exceptionally well suited to stabilize transition metal complexes in biological environments. Many NHC-transition metal complexes have been found to display biological activity such as anticancer, antimicrobial, antiseptic, antioxidants, and anti-inflammatory agents. This study targeted two NHC-coinage metal complexes which were screened for glutaredoxin (GRx) inhibition. Glutaredoxins (GRx) are part of a family of thioltransferases that uniquely reduce mixed disulfides with glutathione, using a critical cysteine thiolate residue in the active site. This thiolate is susceptible to alkylation causing inhibition of the enzyme. Preliminary studies show that the new coinage metal complexes are capable of irreversibly inhibiting GRx, demonstrated using a coupled assay system.

Molecular Design and Application of a Pro-fluorescent Thiophene-Based o-Nitrobenzyl Photolabile Protecting Groups for the Synthesis of Hydroxamic Acids
Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
10:00am - 10:50am
Graduate Student(s): Albert Campbell, Ophelia Adjei-sah, & Kaia Ellis
Research Mentor(s): Carl Saint-Louis

Hydroxamic acids (HAs) have a wide range of applications, including use as dyes in dye-sensitized solar cells, precursors in the production of chemotherapy medicines for various cancers, and metal chelators in the removal of hazardous metals from seawater. Nonetheless, they are notoriously difficult to synthesize and purify, resulting in a wide range of polysubstituted by-products and low HA yield during their synthesis. Chemists have learned to solve this difficulty by using protecting groups (PGs) to temporarily inhibit the reactivity of functional groups such as HAs. Despite this advantage, PGs must be removed with harsh conditions which may destroy the protected HA product. Selective PG removal is especially problematic when many PGs that are unstable under comparable conditions are used on the same compound. Photolabile protecting groups (PPGs) such as ortho-nitrobenzyl (o-NB) based PPGs have become a popular tool to solve the challenges of selective PG removal because they can be selectively removed using only light, which is a less harsh condition. In this study, we describe the molecular design and synthesis of a new class of o-NB PPGs as a solution to the limitations of HA synthesis and purification. This new class of PPGs can be selectively cleaved with light and produce a diagnostic fluorescent by-product that can be seen with the naked eye and used to quantify the amount of the released HA product. The stability of the new PPGS will be assessed by determining their shelf-life stability. Herein, we are reporting the first and only example of thiophene-based PPGs used to synthesize HAs that produce a diagnostic fluorescent by-product used to quantify the amount of the released HA product.

Molecular Design and Synthesis of Thiophene-Based O-Nitrobenzyl Group: A Visible Light-Absorbing Pro-Fluorescent Photoremovable Protecting Group for Hydroxamic Acid Synthesis.
Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
10:00am - 10:50am
Graduate Student(s): Ophelia Adjei-sah, Albert D. Campbell, & Kaia Ellis
Research Mentor(s): Carl Saint-Louis

Hydroxamic acids (HAs) are a class of organic compounds widely known for their use as precursors of anticancer drugs such as Trichostatin A, a powerful tumor cell inhibitor. Despite their widespread use, HAs are difficult to synthesize and purify due to their high reactivity and

the formation of numerous polysubstituted by-products. To address the drawbacks associated with HA synthesis and purification, scientists explored the chemistry of protecting groups (PGs), which are are compounds used to mask the reactivity of highly reactive functional groups. Nonetheless, as the number of similar PGs within a molecule increases, the selective deprotection of individual PGs with harsh acidic and basic conditions becomes difficult. As a result, photolabile protecting groups (PPGs) especially ortho-nitrobenzyl (o-NB) PPGs, a less harsh approach is employed because only light is required to cleave the PPGs. However, most o-NB PPGs absorb in the ultraviolet region (UV) of the electromagnetic spectrum, making them unsuitable for biological applications. In this study, we have solved the problem of HA traditional synthesis and purification by designing and synthesizing a series of visible light-absorbing o-NB PPGs. In our method, we reduced the formation of undesired by-products and only produce one diagnostic fluorescent by-product, which is used to quantify the amount of HAs produced by measuring the absorption and emission intensity and wavelength. This is a preferable synthetic route because deprotecting these PPGs with visible light, a less harsh method, is required to release HAs in very high yields. The stability of the o-NB PPGs is also confirmed by monitoring their shelf life using 1H NMR spectroscopy and selectively deprotecting standard PGs from our PPGs using harsh conditions that do not cleave the HA moiety. Most notably, our visible-light absorption PPGs have potential applications in biological systems, specifically drug delivery and cancer treatment.

Native Mass Spectrometry Investigation of Organophosphate Pesticide Interaction with Cytochrome C

Poster #27 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Layth Alsibai
Research Mentor(s): Mohammad A. Halim

Pesticides are a major component of global agriculture. They are used to protect crops from pests and to ensure consumers have produce to purchase in grocery stores, local or international. However, pesticides can heavily destroy environments that are applied with it such as trophic poisoning and destruction of micro-food chains and if not properly applied and cleaned, even consumers can be affected by long term low concentration exposure. This brings a major importance to study pesticides as they are developed to ensure the environment isn't extensively harmed and that individuals don't suffer consequences from prolonged low concentration exposure. In this study, we employed native mass spectrometry approach to investigate the interaction of organophosphate herbicides with a heme-containing model protein, Cytochrome C, a mitochondrial protein that is essential in cellular respiration. Various buffer and charge reducing agents such as ammonium bicarbonate, ammonium acetate, ammonium hydroxide, and imidazole were used for obtaining the native mass spectrometry spectra of Cytochrome C with

glyphosate. In presence of ammonium hydroxide, ammonium acetate and imidazole, various charge states of Cytochrome C from +5 to +10 were noticed where 8+ was the most intense peak, however, in the presence of imidazole, 6+ was the most intense charge state. Nonetheless, only few glyphosates were abducted with the protein, where at most would adduct two or three glyphosates at their most intense charge state. In presence of 10% methanol, mass spectrum of cytochrome C shows the charge state distribution from 6+ to 11+ where 8+ is the most intense peak and displayed the highest quantity of glyphosate adduction of three from charge states 8+ and 7+. A series of glyphosate from one to three were adducted with protein despite having the partially folded or unfolded gas phase structures of cytochrome C.

Peptide-based Drug Development to Stop the Viral Replication of SARS-CoV-2
Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
10:00am - 10:50am
Undergraduate Student(s): Blaise Williams
Research Mentor(s): Mohammad A. Halim

Almost all the antiviral medications we use today are small molecule drug. Several small molecules drugs have showed promising results for covid-19 treatment and a Pfizer (PF-07321332) drug is approved for emergency use. However, small molecule drugs often induce harmful off-target effects and lead to therapy resistance on prolonged use. Peptides are comprised of amino acids; however, they have few amino acids (2-50) compared to proteins. Peptide can be used as a drug (such as Insulin, a peptide hormone, is used to treat diabetics) for various diseases but not yet developed for Covid treatment. Peptide-based therapeutics are very attractive over small-molecule medications, as they are highly selective, well-tolerated, and have less adverse effects. In this research, we have developed peptide-based drug targeting the main protease of SARS-CoV-2 which performs a very critical function in viral replication. The initial lead peptide (Temporin L, TL) was identified based on computational screening. The FRET and selected ion monitoring (SIM) based assays showed an estimated IC50 of TL at 38.80 and 23.8 μM, respectively against the 3CLpro of SARS-CoV-2. Numerous staple and dimer peptides analogues were designed, synthesized, and tested their biological efficiency. The in-vitro investigation revealed that several analogues showed improved inhibition efficiency and the best α-methylated staple (TLP3M3) peptide demonstrated an estimated IC50 at 284 nanomolar (nM) and outstanding (~8h) serum stability. This study showed that the best peptide candidate will further be improved through structural-based rational design for Covid treatment.

The Phosphite Puzzle: Concentrations of Metal Phosphites and Their Reactions Between Phosphonoacetic Acid
Poster #12 (Convocation Center, East & West Activity Wings)
Thursday, April 18th

2:00pm - 2:45pm
Undergraduate Student(s): Ellie Boyle & Thomas Leyden
Research Mentor(s): Heather Abbott-Lyon

The phosphorylation of organic molecules on the early Earth for prebiotic chemistry is an open research question. Phosphate minerals have low solubility in aqueous solutions, suggesting they were likely not a major source of phosphorous in the environments where life emerged (i.e., Darwin's "warm little pond"). Phosphites or HPO32- have much higher solubility and several formation routes are plausible under early Earth conditions. Therefore, our investigation focuses on the reactivity of phosphites paired with the most abundant metal cations on the early Earth (Ca, Mg, Fe (II) and Fe (III)). While these metal phosphites are not commercially available, they can be synthesized using a straightforward procedure in the laboratory. Our hypothesis is that these metal phosphites could be the phosphorus source of orgoanophosphates via an indirect, two-step process of phosphonylation followed by oxidation. To test this hypothesis, we have synthesized and characterized calcium phosphite, magnesium phosphite, iron (II) and iron (III) phosphite, using a variety of analytical techniques (e.g., P-NMR, FTIR, TGA, XRD) to determine key values (e.g., frequency and J-coupling constants of the P-H bond and the robustness of the metal phosphites to oxidation). Before performing quantitative reactivity experiments, we established the saturated concentration of each metal phosphite and our organophosphorus calibration standard, phosphonacetic acid, using ICP-OES. These concentrations will be correlated with P-NMR peak intensities under acidic, neutral and basic pH conditions. This will allow percent yields for the phosphonylation of small organic molecules (i.e., glycerol, 1-propanol, 2-propanol) and subsequently oxidation to organophosphates to be calculated. This research will contribute to understanding the potential role of metal phosphites in the prebiotic formation of biologically relevant organophosphate molecules, providing insight into the emergence of life on Earth.

Plant-Derived Antimicrobial Peptide Inhibitor against the Main Protease of SARS-CoV-2
Poster #13 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Blaise Williams & Donovan Landers
Research Mentor(s): Mohammed A. Halim & Rajnish Singh

The SARS-CoV-2 virus represented a significant threat to the health of people across the globe, with 7.03 million deaths and 774.6 million infections caused by the virus. This is a positive sense single-stranded RNA (+ssRNA) virus which translates 29 proteins in the host cell. Among these proteins, scientists have identified crucial proteins such as the 3-chymotrypsin-like protease, main protease (Mpro), which performs a very critical function in viral replication and

transcription. Various reliable and effective methods were developed to screen small molecules and peptide inhibitors targeting the catalytic dyad, C145 and H41, of the main protease. The focused peptide of this experiment is Ib-AMP-3, which is derived from the seeds of Impatiens balsamina, and has shown activity as an anti-gram+ and antifungal peptide. The determination for this peptide's binding affinity was identified using HDock software targeting the catalytic dyad and surrounding residues of Mpro resulting in a binding affinity of -234.57. The peptide was synthesized utilizing a Liberty Blue 2.0 Microwave Peptide Synthesis, and its synthesis was confirmed by running the sample through a LTQ XL Linear Ion Trap Mass Spectrometer which identified the peptide with a mass to charge ration (m/z) of 512.83 [M+H]+5 Da, 640.50 [M+H]+4 Da, and 853.33 [M+H]+3 Da. The 50% inhibitory concentration (IC50) value will be determined using a selected ion monitoring (SIM) coupled with liquid chromatography-mass spectroscopy (LC-MS) assay. This project was conducted as a CURE research project that meets once a week in lab for a three-hour period.

Quaternary Ammonium Salt as Promising Charge Reducing Agents for Gas Phase Proteins in Native Mass Spectrometry

Poster #17 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Farah Mashal
Research Mentor(s): Mohammad A. Halim

Electrospray Ionization (ESI) is a process which utilizes high voltage in order to transfer the protein from solution into a gaseous phase producing multiple charge states. This ionization process results in the unfolding of the protein by disrupting the noncovalent interactions among subunits and secondary structures. Native mass spectrometry requires to preserve the noncovalent interactions in the gas phase protein while highly charged ions are generated from the electrospray ionization process. In this experiment, promising charge reducing agents of quaternary ammonium salts such as choline chloride (ChCl), tetra-n-butylammonium hydrate (TNBH), and betaine (BET) were investigated during the ESI process to determine their effectiveness as a charge reducing agent against the model protein lysozyme. All mass spectrometry experiments were conducted using high resolution Orbitrap Exploris 240 mass spectrometer. Initially, the control sample of Lysozyme was prepared in water, ammonium bicarbonate, ammonium acetate and acquired their mass spectrum. Various charge states from 5+ to 15+ were noticed for water soluble lysozyme sample where the most intense peak was noticed at 10+. The traditional charge reducing agents (ammonium bicarbonate, ammonium acetate) showed similar patterns although the strong peak is noticed at 8+. When chlorine chloride (ChCl) was added to the lysozyme sample, numerous high m/z peaks appeared in the spectrum including 3+ and 4+ charge states which were absent in the water and ammonium buffer samples. Similar trend is also noticed when betaine was added where 3+ and 4+ charge states also noticed.

Nonetheless, various adducts were detected while high concentration of betaine was added. Moreover, tetra-n-butylammonium hydrate did not show any charge reduction. This study showed that chlorine chloride (ChCl) and betaine (BET) can be used as promising charge reducing agents although future experiments need to be directed for other proteins.

Screening of MK2 Interacting Proteins in Human cDNA Libraries Using a Yeast Two-Hybrid Assay

Poster #6 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Bracey Dallas & Christina Ambat
Research Mentor(s): Rajnish Singh

Mitogen-activated-protein-kinase-activated-protein-kinase 2 (MK2) is a kinase that phosphorylates substrates. The short isoform is of interest to our Course-Based Undergraduate Research Experience (CURE) CHEM 3512L class. This project seeks to better understand MK2's function by finding its interacting/binding partners. To facilitate this, the Matchmaker Gold Yeast Two-Hybrid Assay was used. This method is based on the reconstitution of a transcriptional activator through the "bait" and "prey" proteins. The "bait" protein, MK2, is cloned into a binding vector to express a protein tagged with the binding domain. This protein is then screened against a library of "prey" proteins tagged with an activation domain. If the bait and prey proteins interact, then the binding and activation domains will come together and activate the Gal4 transcription factor resulting in the transcription of four reporter genes, AURI-C, HIS3, ADE1, and MEL1. Autoactivation of MK2-binding domain fusion protein was tested by screening for the expression of Gal4 reporter genes, namely aureobascidin resistance and alpha-galactosidase activity. No autoactivation of reporter genes in yeast Y190 transformed only with the binding domain-MK2 plasmid was observed, as evident by no growth on aureobasidin-containing plates and no blue colonies on X-alpha gal-containing plates. A positive control experiment was implemented by testing known interactors, namely p53 with the binding domain and T-antigen with the activation domain. Since these proteins interact in yeast, blue colonies were obtained, and colonies grew on -leu-trp/X-alpha-GAL/AbA plates. Negative controls were performed with laminin with the binding domain and T-antigen with the activation domain. No colonies grew on the aureobasicin plates, and no blue colonies were detected on the double dropout plates. Next steps involve transforming Y190 yeast cells with MK2-binding domain plasmid and mating them with Y187 yeast cells containing a cDNA library of human proteins to screen for potential binding partners through the yeast two-hybrid assay.

Screening of MK2-Interacting Proteins in a Human cDNA Library Using a Yeast Two-Hybrid System

Poster #19 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Kelechi Okere, & Imran Dabdoub
Research Mentor(s): Rajnish Singh

MK2 is the less understood, short isoform of a eukaryotic kinase important in the regulation of cellular processes. Its function is studied by finding the proteins it interacts with. Investigation of the protein-protein interactions of MK2 was performed in a CURE-based biochemistry lab course utilizing the Yeast Two-Hybrid methodology. This methodology uses GAL-4, which is a positive regulator of gene expression of galactose-induced genes and is comprised of a DNA binding domain (BD) and activation domain (AD) that can be separately expressed. The binding domain is fused to MK2 (bait), and the activation domain is fused to a "prey" protein that originates from a cDNA library. Yeast strain Y190 is transformed with bait plasmid, which a maxi-prep was performed to create more of, and Y187 with prey and then mated to create a diploid cell containing both proteins. If the "bait" and "prey" interact, GAL-4 will be reconstituted, bind to its promoter, and reporter genes are activated resulting in aureobasidin resistance and yeast colonies turning blue through galactosidase activity. No blue colonies were formed when binding domain-MK2 fusion protein was tested for possible autoactivation of GAL reporter genes. A positive control was made to test the system using well-known interactors p53 and T-antigen. Y190 strain expressing p53-binding domain fusion protein was mated with Y187 strain expressing activation domain-tagged T-antigen. A negative control was made to test the system using well-known non-interactors LAM and T-antigen. Y190 strain expressing LAM-binding domain fusion protein was mated with Y187 strain expressing activation domain-tagged T-antigen. These produced blue colonies and no blue colonies respectively as a result. The Y190 containing MK2-BD and Y187 containing the human cDNA library will be mated to see if reporter genes are activated. If activated, the interacting proteins will be fished out and the interactions will be further tested.

STEM Identity: Where Do I Stand?
Poster #25 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Reagan Shumpert
Research Mentor(s): Michelle Head

One objective that universities and colleges focus on with STEM students is preparing students for future careers and developing professional identities. This current research project seeks to identify an effective model to develop individuals STEM professional identity in their first semester through a CURE course. Using a case approach that utilizes qualitative and

quantitative data emerging themes will be identified to understand the relationship between the CURE experience and an individual's STEM professional identity. The Professional Identity Status Questionnaire (PISQ-5D) is an instrument used to classify a student's professional identity status as they enter the world of STEM. The PISQ-5D uses the scores for identity formation practice that include affirmation, in-depth exploration, commitment, practices, and reconsideration of commitment to classify a student's professional STEM identity status. The research was structured using a pre-survey and post-survey to understand how a student's STEM professional identity and related attributes such as self-efficacy and sense of belonging related to shifts in one's identity. An individual's identity will be used to create cases of individuals with similar identities. Student reflections that were embedded in the course were used to further inform the survey data and analyzed to identify emerging themes that may have contributed to an individual's identity shift. There were noticeable changes in identity status of the individuals from the beginning of the fall semester to the end. Results indicate that some factors such as sense of belonging and self-efficacy played a role in a student's identity status. Also, students reflect on how the CURE experience informed their understanding of their major/profession which contributed to shifts in their identity status. A student identity status can change no matter how sure a student is about their future. The findings from this study aid to inform classroom instruction and understanding elements that may contribute to the development of an individual's STEM professional identity.

Structural Behavior of the Magnetocaloric Candidate CrNiP1-xSbx
Poster #33 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Miriam Raggs & Samantha Deniz Gonzalez
Research Mentor(s): Madalynn Marshall

The magnetocaloric effect is an important phenomenon because it can be used to create more efficient cooling technology than conventional gas compression cooling. Additionally, it is more environmentally friendly since it doesn't use ozone depleting gases. The MM'X alloy CrNiP is a promising magnetocaloric material based on recent theoretical studies. The magnetocaloric effect stems from a magnetostructural coupling in this family, which creates a large entropy change over a wide temperature range, optimal for magnetic cooling technology. In this presentation we will discuss the structural analysis of the CrNiP1-xSbx solid solutions using powder X-ray diffraction. With only a small percentage of Sb dopant into CrNiP1-xSbx we see the material transition from the orthorhombic CrNiP structure to the hexagonal Ni2In-type structure. As a result, the structural variation in CrNiP1-xSbx can be used to tune the potential magnetocaloric effect which will be analyzed in our future studies.

Synthesis and Characterization, and Label-Free Quantification of Cell Penetrating Peptide in Yeast Cell

Poster #7 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Aniyah Harris
Research Mentor(s): Mohammad A. Halim

Cell-penetrating peptides (CPPs) are short sequences of amino acids (5-30) possessing a positive charge, enabling their entry into cells by passing through the cell membrane and being high in amino acids like arginine and lysine. Those factors present a huge potential for biomedical applications including transportation of cargo into cells via endocytosis. CPPs have been employed as carriers for delivering proteins or genes into various cells and tissues. They are good at penetrating their membrane walls, but it can be complex to do this without damaging or destroying the cell. In this course-based research project, three short peptide sequences of CPPs were chosen to be synthesized, characterized by mass spectrometry, and performed label free liquid chromatography and mass spectrometry assay to quantify how many cell-perpetrating peptides enter inside the Yeast cell. These peptides were synthesized using a CEM Liberty Blue peptide synthesizer, peptide-resin drying and cleavage using 95% trifluoracetic acids, and the peptides being filtered and precipitated with cold diethyl ether. Peptide characterization was then conducted with mass spectrometry. Electrospray ionization-mass spectrometry (ESI-MS) is an analytical method that is used to determine the molecular weight of these peptides. The mass spectrometry results can confirm the successful synthesis of each of the peptides as the expected charge states were seen using mass spectrometer. CPP1 that was synthesized showed one strong peak at m/z 864 which corresponds to the [M+H]+ charge state. CPP2 demonstrated a dominant peak at m/z 670 which corresponds to the [M+H]+ charge state. Likewise, a strong peak at m/z 763 was noticed for CPP3 which agreed with the theoretical masses. Currently, label free LCMS assay is under investigation to quantify the CPP entrance to the Yeast cell.

Synthesis and Characterization of Antimicrobial Peptides Targeting the DNA Gyrase of Mycobacterium Tuberculosis

Poster #30 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Matthew Mineo
Research Mentor(s): Mohammad A. Halim

Mycobacterium tuberculosis is a microorganism that causes the disease tuberculosis. The mycobacterium tuberculosis vaccine was developed over a century ago and is widely available. Despite this, tuberculosis is the cause of around two million deaths each year, with most of these

deaths occurring in undeveloped and developing countries. New production of fast-acting, cost-effective treatments to tuberculosis are crucial in allaying global suffering. Antimicrobial peptides have shown promise in treating bacterial infections due to their high specificity, relatively low cost, and use against a wide range of microorganisms. DNA Gyrase is a topoisomerase necessary for replication in bacteria and is the target of many antibiotics. Antimicrobial peptides have been shown to instead induce cell death in bacteria via electrostatic interactions between the negatively charged bacterial cell wall and the positively charged peptide. Three antimicrobial peptides (Temporin L, Temporin A, and SMAP-29) were modelled using Alpha fold and tested their binding affinity to DNA Gyrase through docking via HDOCK. Temporin L was found to have the most negative docking score, followed by SMAP-29 and Temporin A respectively. These peptides were synthesized using a Liberty Blue Microwave Peptide Synthesizer. Each peptide product was dried, cleaved, and isolated for further studies. Observed mass spectrometry data for each peptide was found to closely resemble theoretical data in terms of m/z. Visible peaks were found at the [M+H]+ and [M+2H]2+ ions for Temporin L, the [M+H]+, [M+2H]2+, and [M+3H]3+ ions for Temporin A, and the [M+H]3+ through [M+7H]7+ ions for SMAP-29. Further testing will be performed to assess the inhibitory effects of these three antimicrobial peptides against the Mycobacterium tuberculosis.

Synthesis, Characterization, and In-Vitro Binding Affinity of Short Peptide Analogues Targeting the Amyloid Beta in Alzheimer Diseases

Poster #9 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Ashley Zamora
Research Mentor(s): Mohammad A. Halim

Alzheimer's disease is the most common form of dementia that causes problems neurologically, basic memory functions eventually are damaged with Alzheimer's disease. Alzheimer's disease includes the symptoms of memory loss that intervenes with basic everyday tasks, the inability to form new memories, and repeating questions. It is estimated that over 50 million people suffer from this neurological condition and that number is soon to double in the next few years. Many factors can play into developing Alzheimer's, such as the environment the individual is surrounded in, family genetics, and prior health issues. As many hypotheses are developing, Amyloid beta aggregation has been investigated and tested as a main therapeutic strategy for neurodegenerative disorders. The Aβ protein and its accumulation has led to the belief that it is the molecular driver of the disease of Alzheimer's. In this research, three short peptide analogues including KVLFF, KLVFFA, and KLVFFAE were synthesized and characterized by mass spectrometry and tested the binding affinity against the amyloid-beta. Short peptides are easy to synthesis, characterize and cost-effective compared to large peptide inhibitors. These peptides were synthesized by the CEM Liberty Blue peptide synthesizer on a Rink-amide resin. The

peptide-resin complex was dried with dichloromethane and subsequently cleavage was performed using 95% of trifluoroacetic acid, 2.5% of H2O, and 2.5% of Triisopropyl silane. The cleaved peptide was precipitated and lyophilized before characterizing them by mass spectrometry. KVLFF peptide showed two intense peaks at m/z 652.7 which correspond to [M+H]+ charge states. For two other analogues including KVLFFA and KLVFFAE demonstrated strong peaks at m/z 723.7 and 852.6 for [M+H]+ and at m/z 36.7 and 427.17 for [M+2H]2+ , respectively which agreed with the theoretical masses. The binding affinity of these peptides against the amyloid beta is under investigation, employing the selected ion monitoring based mass spectrometry assay.

Synthesis, Characterization and In-Vitro Assay of Staple and Dimer Cationic Peptides Targeting the Main Protease of SARS-CoV-2

Poster #18 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Inaara Dinani
Research Mentor(s): Mohammad A. Halim

The main protease (Mpro) of SARS-CoV-2 is a critical factor in the virus's ability to replicate, making it a prime target for therapeutic intervention. Research efforts have explored various peptide-based inhibitors aimed at disrupting the activity of Mpro. Our previous published study showed that cationic peptide Indolicidin and its analogues can moderately inhibit (IC50 = 59 micromolar) the main protease of SARS-CoV-2. The aim of this study is to design some non-covalent staple and dimer analogues improving the inhibition efficiency of Indolicidin. We hypothesize that staple and dimeric peptides can show promising results regarding their efficacy in inhibiting Mpro function, thereby hindering viral replication. In the α-methylated Indolicidin variant, methyl groups were introduced to the alpha carbon of two phenylalanine residues which can form pi-pi staple. Dimeric peptides are distinct from pi-pi stapled peptides and are characterized by the interconnection of two peptide chains. Dimer peptides exhibit heightened complexity and interactions owing to the coupling of these peptide chains, contrasting with the stapled peptide, which consist of singular peptide chains. Dimeric structure was achieved through the C-terminal linkage method employing Fmoc-Lys(Fmoc)-OH. Solid-phase peptide synthesis (SPPS) was employed to synthesize the peptides and following the synthesis, the peptide underwent mass spectroscopy characterization to validate its structural integrity and confirm its identity. To determine the 50% inhibitory concentration (IC50) of the peptides, a selected ion monitoring (SIM) based LCMS assay (liquid chromatography-mass spectrometry) was conducted. This approach exhibited the inhibition levels and effectiveness of the synthesized peptides, offering valuable insights into their potential as therapeutic agents against SARS-CoV-2. Results indicated that the dimer exhibited the most potent inhibition, with an IC50 value of 1.90 micromolar (μM), while the α-methylated Indolicidin displayed moderate inhibition

efficiency, with an IC50 of 10.75 μM. Overall, exploring dimeric and staple represents a promising avenue for developing novel antiviral therapies with enhanced efficacy and potency.

Synthesis of Silver Nanoparticles in the Presence of Egg White
Poster #14 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Gracie Smith & Mia Santillan
Research Mentor(s): Bharat Baruah

The escalating demand for large-scale manufacturing of nonwoven fibers, often incorporating synthetic materials and additives, has led to concerns regarding the potential presence of toxins and pollutants. This research uses Surface-Enhanced Raman Spectroscopy (SERS) for the detection of contaminants at sub-micromolar and sub-nanomolar concentrations with the fabrication of gold and silver nanoparticles of varying sizes. Furthermore, we aim to (i) test DPPH radical scavenging activity and (ii) catalytic activity. We characterize samples with FTIR, Raman, UV-vis DRS, XRD and SEM.

Synthesis of Unnatural α,α-Methylated Tyrosine and Phenylalanine Amino Acids for Peptide Therapeutics
Poster #29 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Lilianna Kocai & Jacob Erasmus
Research Mentor(s): Carl Saint-Louis

Peptide-based therapeutics have attracted a lot of attention in recent years due to their great selectivity and lower side effects compared to small-molecule medicines. To avoid destruction due to the severe acidic conditions in the stomach and the presence of proteases in the small intestine, peptide medications must be injected into patients. Unnatural-amino acids such as α,α-disubstituted amino acids have two carbon substituents on the α-carbon, which bears the amino and carboxylic acid groups. They have been applied in a range of applications, such as physiologically active peptide conformational modifiers and pharmaceutical chemistry as building blocks to produce biologically active molecules. Herein, we have successfully synthesized precursors for α,α-methylated tyrosine and phenylalanine, which can be used in peptide treatments. The α,α-methyl groups on the amino acid scaffold cause steric hindrance to the peptide backbone, promoting strong intermolecular π-π stacking interactions between the two aromatic phenyl rings on the same side of the peptide. This results in a noncovalently stapled helical peptide. This non-covalent interaction generates unnatural-amino acids that proteases are unable to recognize, resulting in unusually stable peptides in serum.

Towards the Synthesis and Characterization of New Zwitterionic NHC-Coinage Metal Complexes
Poster #4 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Aidan Gerdis, Shanza Choudhary, Alexander Van Dyke, & Douglas Brooke Dickson
Research Mentor(s): Daniela Tapu

Since Arduengo's discovery of the first stable nucleophilic carbene over three decades ago, carbene chemistry has emerged as one of the most explored and promising fields of study in modern chemistry. Due to their synthetic and functional diversity, N-heterocyclic carbenes (NHCs) have shown significant potential not only as ligands in catalysis, but also as coveted entities in medicinal, luminescent, and functional materials. While the chemistry of neutral NHCs has been well-explored in recent years, limited progress has been made in the development of their anionic counterparts. This project targeted the synthesis of a new anionic carbene. Capitalizing on its unique electronic properties, we used this carbene as building blocks for the development of two new coinage metal complexes. Due to their unique electronic makeup, these zwitterionic NHC-metal species are expected to exhibit valuable advantages such as enhanced catalytic activity and solubility relative to the classical cationic metal complexes of the neutral NHCs.

Unveiling the Molecular Dance: Exploring MK2 Binding and Protein-Protein Interactions
Poster #33 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Suzane Nguyen & Emma Murphy
Research Mentor(s): Rajnish Singh

Mitogen-Activated Protein Kinase-Activated Protein Kinase 2 (MK2) is a protein kinase that modulates expression at the translation level by regulating RNA-binding proteins. Activated via the p38 MAPK and can promote chronic inflammatory diseases. There are two isoforms of MK2 – a short and long one. However, little information is available about the function of the short variation. The research was conducted once a week for three hours in an advanced biochemistry laboratory functioning as a Course-based Undergraduate Research Experience (CURE) to identify a possible binding partner and function of MK2. The control plasmid was pGBT9, and the binding domain (BD) plasmid was pGBTK7. BD plasmids pGBKT7-53 (p-53), pGBKT7-LAM, and pGBKT-MK2 were transformed into the yeast strain Y190. The activation domain

(AD) plasmids, pGADT7-T (T-antigen), was transformed into the yeast strain Y187. A yeast two-hybrid assay was performed by mating the plasmid containing strains Y190 and Y187. If the transformed proteins interact, the binding domain and activation domains of the GAL4 transcription factors come together and can activate reporter genes, one of which results in expression of a-galactosidase that is secreted and reacts with the substrate X-a-gal resulting in a blue product. p-53 interacts with the T-antigen are known interactors and was used as a positive control, and when plated on α-xGal plate, gave bright blue colonies. Laminin, however, does not interact with the T-antigen and was used as the negative control and did not give blue colonies as expected. Our protein of interest MK2 fused to the gal4 binding domain was tested for autoactivation and we found that it does not activate reporter genes as expected. These findings conclude that the yeast 2 hybrid assay is working and that we can now proceed with screening a cDNA library of activation domain fusion proteins to test for potential MK2 binding proteins.

Using a Yeast Two-Hybrid to Study the Protein Interactions of Mitogen-Activated Protein Kinase-Activated Protein Kinase-2(MK2)

Poster #37 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Trinity Bell-Atkinson & Nathaniel Davis
Research Mentor(s): Rajnish Singh

These experiments were conducted as part of a CURE biochemistry lab, with 3-hour meetings once a week. Our protein of interest is the short isoform MK2, which is understudied compared to its long form. MK2 is significant because it plays a role in DNA transcription and regulation; learning about its functions could lead to clinical applications. By discovering what proteins MK2 interacts with, we can determine its function. We used yeast 2-hybrid screening to accomplish this. This method uses transcription factor GAL4 that binds to the GAL promoter and activates 4 reporter genes. This factor's binding and activation domains can be separated and fused with bait protein and prey protein. When these fusion proteins are expressed in yeast, if the bait and prey protein interact, they reconstitute GAL 4 and activate the reporter genes. MK2 is our binding domain-bait fusion protein, and it will screen a library of prey human proteins. Before that, we performed an autoactivation assay on the binding domain. We used plasmids pGBKT7-53 and pGADT7-T-anitgen as positive controls because p53 interacts with T-antigen. We used plasmids pGBKT7-LAMININ and pGADT7-T-antigen as negative controls since Laminin and T-antigen are non-interactors. When our positive controls interact, they should secrete a-galactosidase enzyme, resulting in blue yeast colonies in the presence of substrate X-alpha-GAL. Our negative controls should not create colonies. When these were grown on agar plates, both results were observed. The final step is a cDNA library screen of human- activation domain fused proteins. When the MK2-BD successfully binds to a library

protein, the resulting colonies will be blue because of interaction. By learning which proteins MK2 binds to, we can determine which cellular processes it is most likely to impact.

Utilizing a Gal4-Based Yeast Two-Hybrid Assay to Screen for Protein-protein Interactions Using the Short Isoform of MK2
Poster #17 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Karen Anisha & Grace Kurniawan
Research Mentor(s): Rajnish Singh

Complex protein-protein interactions, which are the foundation of functioning biological systems, can be comprehensively analyzed using the Yeast Two-Hybrid (Y2H) screening method. This assay utilizes Gal4, a yeast-specific transcription factor that possesses both a DNA-binding domain (DBD) and an activation domain (AD); when these two domains interact, Gal4 promotes the expression of four separate reporter genes. For this study, a Y2H assay was used to analyze the short isoform of mitogen-activated-protein-kinase-activated-protein-kinase-2 (MK2), an enzyme with little-known function. The DNA sequence that codes for MK2 was inserted into a Gal4-DBD plasmid vector, creating a protein fusion termed MK2-BD or the "bait". A cDNA library with human proteins fused to Gal4-AD – the "prey" proteins – will eventually be used to screen for potential MK2 interactors. If the "bait", MK2, interacts with a "prey protein", Gal4 should be reconstituted, leading to the activation of the reporter genes. A maxiprep was conducted to amplify the bait plasmid. The BD-containing plasmids pGBT9, pGBKT7-53, pGBKT7-Lam, and MK2-BD were transformed into a Y190 yeast strain, while pGADT7-T was transformed into a Y187 strain. Transformation into yeast with pGBT9 was used to calculate the transformation efficiency and indicated that the cells were successfully transformed. To test the efficacy of the Y2H system, pGBKT7-53 and pGADT7-T were mated as a positive control; pGBKT7-Lam and pGADT7-T were mated as a negative control. A blue-white screening was used to determine whether proteins were interactors or non-interactors. MK2-BD was also plated by itself to test for autoactivation of Gal4-regulated genes. Ultimately, the controls showed that the Y2H system functions well. This system will ultimately be used to screen for proteins that interact with MK2, and it may aid in the elucidation of its function. All experiments were done within a CURE course, where students met for about three hours once a week.

Yeast 2 Hybrid System to Find Map Kinase (MK-2) Interacting Binding Proteins
Poster #36 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Walter McReady & Kayla Maeger

Research Mentor(s): Rajnish Singh

The protein MAPKAPK2 (MK2) encodes for Ser/Thr in the protein kinase family, and along with p38 MAP kinase, play a crucial role in many cellular processes including inflammatory responses, nuclear export, gene expression regulation, and cell proliferation. The goal of this C.U.R.E.(course-based undergraduate research experiment) study is to find out more information about the MK2 protein, its function, and possible therapeutics in cancer and medicine research. To achieve this, a Yeast 2 Hybrid (Y2H) assay was utilized to screen for proteins interacting with MK2. The Yeast 2 Hybrid assay involved the insertion of a Gal4 Binding Domain (BD) fused with a bait protein and Gal4 Activation Domain (AD) fused with a prey protein. If the bait and prey proteins interact, GAL4 transcription factor is reconstituted and the reporter genes will be turned on, one of which, the alpha galactosidase, will turn the yeast colonies blue. The autoactivation of Gal4 by the "bait" protein, MK2, was assessed along with the positive and negative controls. The positive control was p53 with a BD and a T-antigen with a AD, these are known interactors and, in the Yeast 2 Hybrid system, did turn the yeast colonies blue. The negative control was Lamin with a BD (pGBKT7-LAM) and a T-antigen with an AD, these plasmids do not interact and no blue colonies were observed. The positive control of the reporter genes exhibited activation, while the negative control exhibited no activation. The experimental findings align with the predicted plates where interactions were expected to occur; similarly, the plates where no interactions were anticipated did align with the predictions. The Yeast 2 Hybrid System further supported the notion that the binding domain cannot activate the reporter genes by itself.

Ecology, Evolution, and Organismal Biology

Assessing Bat Biodiversity in Increasingly Urban Landscapes
Poster #17 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Elise Arias
Research Mentor(s): Nicholas Green

Urbanization poses significant challenges to native wildlife, often leading to the loss of spatial biodiversity. The replacement of natural habitats with urban structures creates opportunities for certain non-native species, termed "synanthropic species", to thrive in disturbed environments. Understanding the factors influencing species survival in urban areas is crucial to conservation efforts. Urban expansion threatens bat populations, impacting their ability to provide valuable ecosystem services such as pest control and pollination. While previous studies have examined the effects of urbanization on bat biodiversity, research in the Atlanta, Georgia area remains

*sparse. This study investigated bat biodiversity in and around Atlanta, GA, along an urban-to-rural gradient extending to 64.4 km to Bartow County, GA, considering factors such as land cover patterns and socioeconomic influences. Preliminary results indicate a diverse bat fauna across the gradient, with each location detecting a mean of 10.8 species (SD = 3.3). Simpson index of diversity ranged from 0.236 to 0.858, with mean = 0.638 (SD = 0.216). Big brown bat (*Eptesicus fuscus*) was the most frequently detected, followed by tricolored bat (*Perimyotis subflavus*) and evening bat (*Nycticeius humeralis*). By assessing bat populations in this urban context, this research contributes to our understanding of how urbanization affects wildlife, informing conservation efforts in rapidly urbanizing regions.*

A Checklist of Parasites in Catostomidae and Ictaluridae in the United States
Poster #16 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Kaleigh Jones
Research Mentor(s): Whitney Preisser

This parasitological survey presents an updated checklist of helminth species infecting the Catostomidae (suckers) and Ictaluridae (catfish), two families of primarily freshwater fish, and functions to consolidate data from parasitic infections present in these two families in the United States. I compiled a list of catostomid and ictalurid species and their common names from multiple published sources. I then used these names to search for published parasite surveys using Web of Science and the Natural History Museum's Host-Parasite Database. I narrowed the parasite infection search by limiting searches to nematodes, cestodes, trematodes, isopods, copepods, monogeneans, and acanthocephalans. I collected parasitological data from 65 published papers on 54 catostomids and 79 published papers on 49 ictalurids. I report 344 parasite species from these two families. I report parasite data from 24 of the 50 states. Parasitological checklists are most useful for research when they are updated and completed, and they can aid in parasite identification or be used in ecological and evolutionary studies. This checklist offers parasite data for both Catostomidae and Ictaluridae from across the United States between the years 1927 - 2023. This survey combines parasite data from a variety of sources to provide a convenient and easy way to access and use parasitic infection data for Catostomidae and Ictaluridae families in the United States.

Differences in Soil Communities at Longleaf Pine Restoration Sites
Poster #26 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Graduate Student(s): Isabella Vahle
Undergraduate Student(s): Olivia Walker, Rylee Shaw & Dylan Bennett

Research Mentor(s): Paula Jackson

*The longleaf pine (*Pinus palustris Mill.*) ecosystem is one of the most diverse and endangered temperate ecosystems in the world. Reasons for its decline include overlogging, agricultural land use, and fire suppression following European colonization. Restoration efforts in the longleaf pine ecosystem have since increased. Sites with preexisting longleaf can be managed primarily with prescribed fires, while other areas without established longleaf require planting and more aggressive management techniques. Bacteria and fungi in the soil surrounding plant roots are important for various plant functions, including fighting viruses, aiding in water and nutrient acquisition, and facilitating plant growth. Little is known about how differences in longleaf pine age impact associated soil microbes. Our study was conducted at two longleaf pine restoration sites: Sheffield Wildlife Management Area (WMA) and Paulding Forest WMA, both located in Paulding County, Georgia. The sites have similar herbaceous community structures and have been under restoration for about 25 years but differ in stand age due to differences in site history. Sheffield WMA consists of mature longleaf pine with second-generation growth present, whereas Paulding Forest WMA consists of only young, first-generation longleaf pine. Six randomized plots (2.4 m2) were set up at each site. Each block contained an undisturbed subplot (50 cm2) from which we collected soil samples. DNA was extracted from these soil samples using a commercially available soil DNA extraction kit. The DNA was quantified and then sent to LC Sciences for PCR amplification of bacterial and fungal genome sequences. Our preliminary results indicate a significant difference in the soil bacterial and fungal communities between restoration sites, pointing towards the influence of stand age on the soil microbiome. These results will help inform how stand age and restoration practices affect soil microbial communities, which can be indicators of plant and soil health.*

Direct Contact Assay Inhibition of Spoilage Pathogens Through the Use of Essential Oils

Poster #32 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Sidney Berrios
Research Mentor(s): Christopher Cornelison

Antimicrobial resistance by bacterial and fungal pathogens has become increasingly prevalent. Overprescribing and misuse of antibiotics are attributed to this increase in resistance. Recently, public preference has shifted towards more natural sources of antimicrobials, void of synthetic chemicals and additives. A potential alternative can be found using essential oils (EOs). While more research on their efficacy needs to be performed, preliminary evidence supports the idea that essential oils disrupt bacterial growth through the disruption of the cellular membrane. Our research focused on the effects of direct contact with essential oils on representative food spoilage

bacterial species. This research is an initial step in an evaluation of vapor phase EOs for extending the shelf life of the oyster mushroom, Pleurotus ostreatus. The constituent compounds that make up essential oils, such as phenols, monoterpenes, alcohols, and aldehydes exhibit antimicrobial properties that naturally defend against harmful microbes. These experiments were performed using broth microdilution techniques with six essential oils (Basil, Cinnamon Leaf, Cinnamon Bark, Clove Bud, Oregano and Thyme EOs) upon three bacterial species (Bacillus cereus, Enterobacter cloacae, and Staphylococcus aureus). This study determined the minimal inhibitory concentrations (MICs) of six essential oils when in direct contact with select bacterial species related to post harvest degradation of fresh mushrooms. Determining the lowest effective dose is a critical milestone in the development of this approach because, at higher levels, the organoleptic properties of EOs impart negative effects such as changes in texture, taste, or appearance. The results showed that with increasing concentration, the inhibition also increases, and that there was no significant difference between inhibition of essential oils between the gram positive and gram negative bacteria. In direct contact of each bacteria, Oregano, Cinnamon Bark, and Thyme yielded the strongest inhibition at the lowest concentrations, followed by Cinnamon Leaf, with lesser inhibition seen in Clove Bud and Basil.

Diving into Diversity: Parasites in Georgia's Waters
Poster #15 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Jessica Adu-Yeboah, Cassie Ellenberger, Torrey Flournoy, Jamie Hungerbuhler, Sanaa Merrell, & Eunice Okiyie
Research Mentor(s): Whitney Preisser

In the Preisser Lab, we are interested in describing the biodiversity of parasites in Georgia. To understand the spatial and temporal variations in parasitic communities among different fish species in the Etowah River, our project utilized the fluid preserved fish specimens contained in KSU's Mountains to Metro Biodiversity Collection. Contained within the collection are fishes that were collected from two differing regions of the Etowah River. We posit that due to possible regional differences, there will be differences in the prevalence, mean abundance, and the mean intensity of parasites found in the investigated regions. Parasites play a crucial role in ecosystems by cycling nutrients and regulating host populations. In aquatic systems, parasites often move from invertebrate hosts to fish hosts, forming an integral part of the ecosystem's balance. Consequently, the absence of parasites in fish populations may indicate an ecological imbalance or disruption in the natural processes of the ecosystem. Therefore, the presence of parasites in fish serves as an indicator of a healthy and functioning ecosystem, highlighting the interconnectedness of species within aquatic environments. To conduct our research, we follow a systematic set of lab procedures. Our research protocol follows a systematic approach: we document sampling location, standard length, and fish species before dissecting each specimen.

Dissection begins by removing the gills and eye from one side of the fish and making an incision at the cloaca on the ventral side of the individual. After this incision is made, the visceral organs are completely removed to check for parasites. Our findings suggest that location significantly influences host exposure to parasitic infections, with environmental conditions in different Georgia regions shaping parasite communities. Furthermore, our research aids in pinpointing prevalent parasites and their associated locations within these regions.

Exploring the Courtship Behaviors in the Three-Lined Salamander (Eurycea guttolineata)
Poster #4 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Bridgette Popov
Research Mentor(s): Todd Pierson

*Plethodontidae is the most diverse and largest family of salamanders. From the Southeastern United States to the West Coast and even parts of South America, plethodontid salamanders inhabit a wide range of habitats. Prior to internal fertilization through the external transfer of a spermatophore, all plethodontid salamanders engage in ritualized courtship behaviors. These behaviors are variable among species and play an important role in prezygotic isolation, but they remain undescribed in many species—including some that are widespread and common in Georgia. In this study, we describe the previously undocumented courtship behaviors of the Three-Lined Salamander (*Eurycea guttolineata*), also including the role of females. We collected a total of two female and four male of* E. guttolineata*, during the courtship season, which were maintained in the lab, and conducted courtship trials with all possible pairs of males and females. We conducted trials in a separate container, recorded each using a GoPro, and allowed for three hours to give ample time for the salamanders to commence and conclude the courtship rituals. After each trial, we cataloged the behaviors using an ethogram. Here, we present preliminary qualitative and quantitative results from these trials, which included behaviors such as pheromone delivery through snapping and rubbing, tail-straddle walk, and spermatophore deposition.*

Host Selection in Harper's Dodder, a Rare Parasitic Plant
Poster #38 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Will Freyberger
Research Mentor(s): Joel McNeal

Cuscuta harperi (Harper's Dodder) is a rare parasitic vine lacking roots and leaves that is endemic to hot, dry outcrop habitats. Cuscuta species find appropriate host plants by following gradients of specific volatile organic compounds in the air emitted by other plants and growing towards appropriate hosts or away from unsuitable species. Geographically separated populations of C. harperi exhibit drastically different host usage from each other, and we aim to determine whether these observed differences are due to differential responses to volatile chemicals, survivorship after host attachment, or other environmental factors such as timing of parasite germination. We will use greenhouse experiments to compare behavior in host choice between specialist and generalist populations and to investigate whether different populations have differential seedling attachment success across multiple potential hosts.

How Do We Build a Muscle? Let Me Count the Genes...
Poster #40 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Camille Santana
Research Mentor(s): Scott Nowak

Akirin is a nuclear cofactor involved in the gene regulation of the process of embryonic heart patterning in Drosophila melanogaster. During development, akirin facilitates gene expression by integrating transcription factor activity with chromatin remodeling machinery. Examples of the machinery that akirin interacts with include CHD4 and NuRD, which regulate the expression of cardiac developmental gene pathways. This mechanism is conserved from mammals to insects, allowing our studies to be later applied to humans. We have identified several candidate co-factors that may interact with akirin during the process of heart development. In my project, I will analyze a potential akirin genetic interaction with these candidate interactors. There have been other studies performed that have determined different cofactors that akirin interacts with; although, they may have not been wildly documented or extensively studied. The purpose of this research is to further understand the role of akirin in the process of heart formation and eventually prevent congenital heart defects in humans. For these studies, we have been performing out-crossing to exchange the balancer chromosomes in these candidate mutant lines with marked balancers that we can use in our assay. The first of these candidate genes we have examined is the Ppn gene. Once we obtain Ppn mutant stock flies, we will perform crosses with Ppn mutant lines and akirin mutant lines, collect the embryos that result, and analyze them for defects in heart development.

Investigating the Viability of eDNA Techniques for Eurycea Alternative Reproductive Tactics Research
Poster #25 (Convocation Center, East & West Activity Wings)
Thursday, April 18th

3:00pm - 3:45pm
Undergraduate Student(s): Matthew McLendon
Research Mentor(s): Todd Pierson

Male salamanders of the genus Eurycea demonstrate a phenomenon known as "alternative reproductive tactics" - within a single population, males exhibit two discrete reproductive strategies, which are manifested as suites of behavioral and morphological differences and are known to have a genetic basis. Thus far, the genetic component of research on this topic has been facilitated by tissue sample collection from living salamanders, but there is another possible source of DNA which might be used for this research: eDNA (environmental DNA). eDNA techniques involve the isolation of DNA from the environment (e.g., from water samples) rather than directly from an organism. Often, eDNA techniques take advantage of mitochondrial DNA, which is relatively common in the environment. The genetic basis of the alternative reproductive strategies of salamanders, however, is associated with nuclear DNA, which, for various reasons, appears in the environment in considerably smaller concentrations than mitochondrial DNA. The scarcity of nuclear DNA in environmental samples means that use of eDNA techniques may or may not be viable for research into Eurycea alternative reproductive tactics. This study tests whether environmental DNA techniques can viably be used to collect genetic data for this research by evaluating the efficacy of multiple DNA isolation and amplification protocols. While the tested eDNA techniques may not be able to sufficiently isolate and amplify Eurycea nuclear DNA, success could dictate the future of research in this area.

Metal Pollutants in Soil and Leaf Tissues from Atlanta Food Forests
Poster #22 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Maël Kes, Maima Greffin, & Nelson Ortiz
Research Mentor(s): Matthew Weand & Jason Rhoades

In food deserts residents lack access or have difficulty affording good-quality, fresh, healthy food and often suffer from other food insecurities. Food deserts can appear in rural or urban areas characterized by a lack of grocery stores. Neighborhoods in southwest Atlanta exemplify this phenomenon. Indeed, food deserts are most common in densely populated, urban, and impoverished areas with a high minority population. Food forests are perennial crop gardens that can effectively combat food insecurity. However, because food deserts frequently overlap in geography with other environmental justice concerns such as soil borne pollutants, food forests must be used cautiously. We aimed to determine the concentration of heavy metal pollutants within the soil and plants used in food forests within the Pittsburgh neighborhood of Atlanta. We expected a positive correlation between metal pollutants found in soil and pollutants found in plant leaf tissue. We also expected that soils polluted with one contaminant would also have

higher levels of other contaminants. We found that lead concentrations in soil and plant tissues were significantly lower than that of other metals including zinc and aluminum. Soil lead was most strongly correlated with soil zinc (r=0.95) and weakly correlated with metals like aluminum (r = 0.03). We found that crops varied widely with lead concentrations being highest in the Black-eyed Susan (Rudbeckia hirta), at 2.85 ppm, and lowest in fig plants (Ficus carica), at 0.79 ppm. We also found that the average lead concentration of Blueberry plants, a plant common at all sites, was 1.18 ppm. Lead in plants was only weakly correlated to soil lead concentrations (r=0.29). The food forests we visited are likely suitable environments for growing crops. However, further tests should be conducted to examine levels of metals in fruits and seeds.

Short-Term Effects of a Prescribed Burn on the Soil Bacterial Microbiome in an Area Under Restoration for the Longleaf Pine

Poster #18 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Graduate Student(s): Isabella Vahle
Undergraduate Student(s): Dylan Bennett
Research Mentor(s): Paula Jackson

*The longleaf pine (*Pinus palustris Mill.*) is a pyrophytic conifer that fronts one of the more endangered ecosystems within the Southeastern United States. This ecosystem is dominated by a matrix of herbaceous grasses and forbs in which pine trees are embedded, and which serve as propellants for fire, a necessary component and natural regulator for the ecosystem. While there is extensive knowledge on the importance of fire within the longleaf pine ecosystem, not much is known about the impacts of fire on the soil microbiome associated within this ecosystem. This study aims to investigate the immediate and short-term effects of a prescribed burn on the bacterial soil microbiome of a restoration area for the longleaf pine, located in the Piedmont region of Georgia. Soil samples from Paulding Forest Wildlife Management Area were collected from randomized plots before and after a prescribed burn (one day after, one week after, three weeks after, and two months after the burn) in spring of 2023. DNA was then extracted from samples using commercially available kits and concentrations of DNA extracted from soil were quantified using a Nanodrop spectrophotometer. DNA samples were sent to a commercial lab for the identification of bacteria. Pre-burn results indicate that Actinobacteria, Acidobacteria, and Proteobacteria dominate the soil microbiome. We predict there will be a noticeable difference in bacterial richness and a shift within the composition of the community of bacterial families within these phyla depending on the time since the burn. These analyses provide a connection between the soil bacterial microbiome of the longleaf pine and ecological succession after fire. This study is part of a longer-term study of the longleaf pine and its soil microbiome concentrating on the relationship between the different bacterial taxa, the above ground dominant herbaceous species, and environmental factors.*

Mathematics

The Classification of Internet Memes Through Supervised and Unsupervised Machine Learning Algorithms
Poster #36 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): William Little
Research Mentor(s): Pengcheng Xiao

Memes, those captivating internet phenomena, effortlessly deliver online entertainment. By leveraging time-series data from Google Trends, we can vividly illustrate and dissect the dynamic trends in meme popularity. Previous studies have discerned four distinct post-peak popularity patterns— "smoothly decaying," "spikey decaying," "leveling off," and "long-term growth"—and elegantly modeled these using ordinary differential equations. This research introduces a programmatic approach that harnesses both supervised and unsupervised machine learning algorithms. The dataset, now expanded to over 2000 elements, becomes the canvas for exploration. The K-means algorithm identifies clusters, which then serve as labels for the supervised SVC algorithm. The overarching goal is to achieve accurate classification of meme popularity patterns. Concurrently, each meme in the dataset will be categorized, such as catchphrase or viral video, facilitating an insightful analysis into the intriguing relationship between meme category and its distinctive popularity trajectory.

The Influence of Environmental Feedback on Ecological Competition
Poster #14 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Isabel A Ouko
Research Mentor(s): Glenn Young

Species occupying the same ecological niche must compete for resources and space. The competitive exclusion principle states that two species filling the same niche cannot coexist indefinitely; that is, one will always outcompete the other. Mathematical modeling offers an efficient method of studying the primary factors that determine which species survive this kind of competitive interaction. In this project, we examine the role of environmental feedback on ecological competition by analyzing a classic Lotka-Volterra ordinary differential equation (ODE) model that we extend to incorporate a simple model of the environment. We use a combination of analytical and numerical methods to study how the interaction between

competing species and their environment stabilizes or destabilizes the coexistence of the species. Our results offer insight into how real-life environmental states influence ecological competition.

Light Rays Passing Through Liquid Crystals
Poster #11 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Elizabeth Ehme
Research Mentor(s): Eric Stachura

As light passes through a liquid crystal, it splits into two different rays, the ordinary ray and the extraordinary ray. The effective refractive index is a functional composed of those two rays. An attempt is made to find an explicit equation for the path of light by finding the minimum distance to pass through a given field. Using the Euler-Lagrange equation in order to minimize the effective refractive index, the resulting function is a highly nonlinear second-order ordinary differential equation. If solved, this would give the equation of light passing through a given liquid crystal according to Fermat's principle of least time. The equation was examined for three different types of fields through which the light passes. A numerical solution was evaluated by computing a metric and subsequent Christoffel symbols, then applying the Euler-Lagrange equation to find a system of geodesics and graphing numerically to visualize the path of light. The Ricci curvature is computed to find how non-flat the associated geometry is, and the curvature of the path is computed to find when maximum ray bending occurs. Finally, the numerical process is repeated in three dimensions and the Gaussian curvature is computed for various fields.

Molecular and Cellular Biology

Histone Methyltransferases, SET-2 and MES-4, Contribute to Sterility in C. elegans That Inappropriately Inherit Histone Methylation
Poster #25 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Jazmin Dozier
Research Mentor(s): Brandon Carpenter

At fertilization, histone methylation must undergo maternal reprogramming to reset the epigenetic landscape in the new zygote. During maternal reprogramming of histone methylation in the nematode, C. elegans, H3K4me is removed by the H3K4 demethylase, SPR-5, and H3K9me is subsequently added by the histone methyltransferase, MET-2. Recently, it was

demonstrated that SPR-5; MET-2 maternal reprogramming antagonizes H3K36 methyltransferase, MES-4, which maintains a transcriptional memory of a subset of germline genes between generations, and H3K4me3 methyltransferase, SET-2, a member of the COMPASS complex. Maternal loss of SPR-5 and MET-2 results in ectopic expression of MES-4 germline genes and overexpression of H3K4 methylation. Together, this leads to developmental delay and sterility. We recently demonstrated that knocking down mes-4 and set-2 rescues the somatic developmental delay. However, whether knocking down mes-4 and set-2 rescues sterility in spr-5; met-2 double mutants has yet to be explored. To examine whether knocking down mes-4 and set-2 rescues sterility in spr-5; met-2 mutants, we knocked down mes-4 and set-2 using RNAi then performed DAPI staining and DIC imaging of the germlines. Excitingly, we found that knocking down mes-4 and set-2 significantly increases the number of oocytes in spr-5; met-2 mutants. These data demonstrate that ectopic H3K4me and H3K36me contribute to sterility in the absence of SPR-5; MET-2 maternal reprogramming. Our findings provide mechanistic insight into how evolutionary conserved histone methylation and maternal reprogramming ensure development of a germline.

Examination of How Inappropriate Inheritance of Histone Methylation Affects Muscle Function

Poster #7 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Bethany Daniels, Alexander Deen, Jazmin Dozier, & Torrey Flournoy
Research Mentor(s): Brandon Carpenter

Histone methylation is a post-transcriptional modification to the N-terminal tails of histone core proteins that regulates DNA accessibility, and consequently, gene expression. Like DNA, histone methylation can be inherited between generations, and is highly regulated during embryonic development. At fertilization, histone methylation must undergo maternal reprogramming to reset the epigenetic landscape in the new zygote. During maternal reprogramming of histone methylation in C. elegans, H3K4me (a modification associated with active transcription) is removed by the H3K4 demethylase, SPR-5, and H3K9me (a modification associated with transcriptional repression) is subsequently added by the histone methyltransferase, MET-2. Recently, we demonstrated that SPR- 5; MET-2 maternal reprogramming antagonizes the H3K36 methyltransferase, MES-4, which maintains a transcriptional memory of a subset of germline genes between generations. Maternal loss of SPR-5 and MET-2 results in ectopic expression of MES-4 germline genes in somatic tissues and a range of severe developmental phenotypes. One of these severe developmental phenotypes is defects in body wall muscle morphology. As part of a curriculum-based undergraduate research experience (CURE) implemented in Developmental Biology (BIOL_4390K), students performed

muscle motility assays to examine of inappropriately inherited H3K4me2 affect muscle function. Data from this CURE will be integrated into ongoing research in the Carpenter Lab aimed at understanding how inappropriate inheritance of chromatin states affect normal development. Our findings will provide insights into how aberrant soma-to-germline transition leads to complex developmental phenotypes that overlap with human patients harboring mutations in these same enzymes.

Examination of How Inappropriate Inheritance of Histone Methylation Affects Muscle Function

Poster #9 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Corene Fuller, Caroline Gore, Coralie Jean-Noel, & Juan Jimenez
Research Mentor(s): Brandon Carpenter

Histone methylation is a post-transcriptional modification to the N-terminal tails of histone core proteins that regulates DNA accessibility, and consequently, gene expression. Like DNA, histone methylation can be inherited between generations, and is highly regulated during embryonic development. At fertilization, histone methylation must undergo maternal reprogramming to reset the epigenetic landscape in the new zygote. During maternal reprogramming of histone methylation in C. elegans, H3K4me (a modification associated with active transcription) is removed by the H3K4 demethylase, SPR-5, and H3K9me (a modification associated with transcriptional repression) is subsequently added by the histone methyltransferase, MET-2. Recently, we demonstrated that SPR- 5; MET-2 maternal reprogramming antagonizes the H3K36 methyltransferase, MES-4, which maintains a transcriptional memory of a subset of germline genes between generations. Maternal loss of SPR-5 and MET-2 results in ectopic expression of MES-4 germline genes in somatic tissues and a range of severe developmental phenotypes. One of these severe developmental phenotypes is defects in body wall muscle morphology. As part of a curriculum-based undergraduate research experience (CURE) implemented in Developmental Biology (BIOL_4390K), students performed muscle motility assays to examine of inappropriately inherited H3K4me2 affect muscle function. Data from this CURE will be integrated into ongoing research in the Carpenter Lab aimed at understanding how inappropriate inheritance of chromatin states affect normal development. Our findings will provide insights into how aberrant soma-to-germline transition leads to complex developmental phenotypes that overlap with human patients harboring mutations in these same enzymes.

Examination of How Inappropriate Inheritance of Histone Methylation Affects Muscle Function

Poster #10 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Courtney Adair, Brianna Bailey, Tyler Barr, & Jenna Boone
Research Mentor(s): Brandon Carpenter

Histone methylation is a post-transcriptional modification to the N-terminal tails of histone core proteins that regulates DNA accessibility, and consequently, gene expression. Like DNA, histone methylation can be inherited between generations, and is highly regulated during embryonic development. At fertilization, histone methylation must undergo maternal reprogramming to reset the epigenetic landscape in the new zygote. During maternal reprogramming of histone methylation in C. elegans, H3K4me (a modification associated with active transcription) is removed by the H3K4 demethylase, SPR-5, and H3K9me (a modification associated with transcriptional repression) is subsequently added by the histone methyltransferase, MET-2. Recently, we demonstrated that SPR- 5; MET-2 maternal reprogramming antagonizes the H3K36 methyltransferase, MES-4, which maintains a transcriptional memory of a subset of germline genes between generations. Maternal loss of SPR-5 and MET-2 results in ectopic expression of MES-4 germline genes in somatic tissues and a range of severe developmental phenotypes. One of these severe developmental phenotypes is defects in body wall muscle morphology. As part of a curriculum-based undergraduate research experience (CURE) implemented in Developmental Biology (BIOL_4390K), students performed muscle motility assays to examine of inappropriately inherited H3K4me2 affect muscle function. Data from this CURE will be integrated into ongoing research in the Carpenter Lab aimed at understanding how inappropriate inheritance of chromatin states affect normal development. Our findings will provide insights into how aberrant soma-to-germline transition leads to complex developmental phenotypes that overlap with human patients harboring mutations in these same enzymes.

Examination of How Inappropriate Inheritance of Histone Methylation Affects Muscle Function
Poster #11 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): David Olaofe, Nayeli Ortiz, Diogo Saubel & Mylah Smith
Research Mentor(s): Brandon Carpenter

Histone methylation is a post-transcriptional modification to the N-terminal tails of histone core proteins that regulates DNA accessibility, and consequently, gene expression. Like DNA, histone methylation can be inherited between generations, and is highly regulated during embryonic development. At fertilization, histone methylation must undergo maternal

reprogramming to reset the epigenetic landscape in the new zygote. During maternal reprogramming of histone methylation in C. elegans, H3K4me (a modification associated with active transcription) is removed by the H3K4 demethylase, SPR-5, and H3K9me (a modification associated with transcriptional repression) is subsequently added by the histone methyltransferase, MET-2. Recently, we demonstrated that SPR- 5; MET-2 maternal reprogramming antagonizes the H3K36 methyltransferase, MES-4, which maintains a transcriptional memory of a subset of germline genes between generations. Maternal loss of SPR-5 and MET-2 results in ectopic expression of MES-4 germline genes in somatic tissues and a range of severe developmental phenotypes. One of these severe developmental phenotypes is defects in body wall muscle morphology. As part of a curriculum-based undergraduate research experience (CURE) implemented in Developmental Biology (BIOL_4390K), students performed muscle motility assays to examine of inappropriately inherited H3K4me2 affect muscle function. Data from this CURE will be integrated into ongoing research in the Carpenter Lab aimed at understanding how inappropriate inheritance of chromatin states affect normal development. Our findings will provide insights into how aberrant soma-to-germline transition leads to complex developmental phenotypes that overlap with human patients harboring mutations in these same enzymes.

Examination of How Inappropriate Inheritance of Histone Methylation Affects Muscle Function

Poster #15 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Devin Koonjbearry, Desiree' Langston, Miranda Forman & Jazmin Marno
Research Mentor(s): Brandon Carpenter

Histone methylation is a post-transcriptional modification to the N-terminal tails of histone core proteins that regulates DNA accessibility, and consequently, gene expression. Like DNA, histone methylation can be inherited between generations, and is highly regulated during embryonic development. At fertilization, histone methylation must undergo maternal reprogramming to reset the epigenetic landscape in the new zygote. During maternal reprogramming of histone methylation in C. elegans, H3K4me (a modification associated with active transcription) is removed by the H3K4 demethylase, SPR-5, and H3K9me (a modification associated with transcriptional repression) is subsequently added by the histone methyltransferase, MET-2. Recently, we demonstrated that SPR- 5; MET-2 maternal reprogramming antagonizes the H3K36 methyltransferase, MES-4, which maintains a transcriptional memory of a subset of germline genes between generations. Maternal loss of SPR-5 and MET-2 results in ectopic expression of MES-4 germline genes in somatic tissues and a range of severe developmental phenotypes. One of these severe developmental phenotypes is

defects in body wall muscle morphology. As part of a curriculum-based undergraduate research experience (CURE) implemented in Developmental Biology (BIOL_4390K), students performed muscle motility assays to examine of inappropriately inherited H3K4me2 affect muscle function. Data from this CURE will be integrated into ongoing research in the Carpenter Lab aimed at understanding how inappropriate inheritance of chromatin states affect normal development. Our findings will provide insights into how aberrant soma-to-germline transition leads to complex developmental phenotypes that overlap with human patients harboring mutations in these same enzymes.

Examination of How Inappropriate Inheritance of Histone Methylation Affects Muscle Function

Poster #22 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Jonathon Trummer, Rohit Veerapaneni, Illy Weinzetl, & Fawzia Yahya
Research Mentor(s): Brandon Carpenter

Histone methylation is a post-transcriptional modification to the N-terminal tails of histone core proteins that regulates DNA accessibility, and consequently, gene expression. Like DNA, histone methylation can be inherited between generations, and is highly regulated during embryonic development. At fertilization, histone methylation must undergo maternal reprogramming to reset the epigenetic landscape in the new zygote. During maternal reprogramming of histone methylation in C. elegans, H3K4me (a modification associated with active transcription) is removed by the H3K4 demethylase, SPR-5, and H3K9me (a modification associated with transcriptional repression) is subsequently added by the histone methyltransferase, MET-2. Recently, we demonstrated that SPR- 5; MET-2 maternal reprogramming antagonizes the H3K36 methyltransferase, MES-4, which maintains a transcriptional memory of a subset of germline genes between generations. Maternal loss of SPR-5 and MET-2 results in ectopic expression of MES-4 germline genes in somatic tissues and a range of severe developmental phenotypes. One of these severe developmental phenotypes is defects in body wall muscle morphology. As part of a curriculum-based undergraduate research experience (CURE) implemented in Developmental Biology (BIOL_4390K), students performed muscle motility assays to examine of inappropriately inherited H3K4me2 affect muscle function. Data from this CURE will be integrated into ongoing research in the Carpenter Lab aimed at understanding how inappropriate inheritance of chromatin states affect normal development. Our findings will provide insights into how aberrant soma-to-germline transition leads to complex developmental phenotypes that overlap with human patients harboring mutations in these same enzymes.

The Effects of Inappropriate Inheritance of Histone Methylation on Muscle Function
Poster #34 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Penelope Rodriguez & Mattie Villhauer
Graduate Student: Josh Labus
Research Mentor(s): Brandon Carpenter

Histone methylation, a post-transcriptional modification occurring on the N-terminal tails of histone core proteins, plays a crucial role in regulating DNA accessibility and, consequently, gene expression. Histone methylation, orchestrated by enzymes like SPR-5 and MET-2, is a critical regulator of gene expression and cellular function. In the nematode C. elegans, these enzymes play pivotal roles in maternal reprogramming and ensuring the proper epigenetic landscape during embryonic development. H3K4me (a modification associated with active transcription) is removed by the H3K4 demethylase, SPR-5, and H3K9me (a modification associated with transcriptional repression) is subsequently added by the histone methyltransferase, MET-2. It was demonstrated that SPR-5; MET-2 maternal reprogramming antagonizes the H3K36 methyltransferase MES-4, which maintains transcriptional memory for a subset of germline genes across generations. As the maternal loss of SPR-5 and MET-2 results in ectopic expression of MES-4 germline genes in somatic tissues this results in developmental delay and an impairment in muscle motility. It was recently found that spr-5; met-2 double mutants demonstrated defects in muscle motility. This finding led us to investigate whether spr-5 and met-2 single mutants also display a defect in muscle motility. Interestingly, the spr-5 mutants, but not met-2 demonstrated a defect in muscle motility but not to the extent of spr-5; met-2 mutants. This data suggests that met-2 may have a more specific role in muscle development and/or function. Using motility assays, we are also testing whether there is a decline in muscle motility from early, middle, to late generations in spr-5 and met-2 mutants that progressively inherit inappropriate histone methylation. We hypothesize that muscle function will decline from early to late generations. This data will provide insights into how mutations in the highly conserved maternal reprogramming enzymes affect the muscle and result in tissue-specific phenotypes throughout development.

Exploring Biofilm Inhibition of Candida auris against Lactic Acid
Poster #3 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Alexis P. Williams & Gissell Ramirez
Research Mentor(s): Christopher Cornelison

The emerging fungal pathogen Candida auris, which primarily affects immunocompromised patients, is known for its robust biofilm and resistance to most antifungals. However, biofilm production and antifungal resistance varies between strains within the species, thus there is no standard of treatment for C. auris infections. Seventy-five percent of women will experience a vulvovaginal infection at least once in their lifetime. This infection is commonly caused by Candida species. Lactobacillus spp., which produce lactic acid, have been shown to be effective at preventing vulvovaginal infections caused by Candida. The lactic acid inhibits Candida growth, sometimes resolving the infection without the aid of antifungal antibiotics. The principles of lactic acid treatment have not been applied to Candida auris infections, which typically begins with the colonization of a patient's nose, armpits, and groin. MIC assays with lactic acid and Candida auris were conducted in ninety-six well plates via a microdilution assay. Our findings indicate that lactic acid does inhibit Candida auris growth. This is important because the success of such a lactic acid treatment would mean that there is a widely available, cost-effective, and non-invasive treatment for Candida auris infections.

Analysis of Chromatin Modifications at Dmef-2 enhancer During Myogenesis
Poster #27 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Sarah Anglin & Sara Khadraoui
Research Mentor(s): Scott Nowak

The nuclear transcription cofactor Akirin plays a key role in the regulation of Dmef2 (Drosophila myocyte enhancer factor 2) during the early steps of embryonic myogenesis. Akirin is thought to help regulate Dmef2 expression levels by mediating an association between chromatin remodeling complexes and Twist transcription factor activity. Previous work by the Nowak laboratory has determined that Akirin genetically and physically interacts with either the Brahma (SWI/SNF) chromatin remodeling complex, or through genetic interactions with the Nucleosome Remodeling and Deacetylase Complex. These interactions are essential for proper cardiac and skeletal patterning and development during embryogenesis. While both complexes have seemingly contradictory activities, the exact nature of covalent histone modifications that occur at Dmef2 enhancers during myogenesis remains unknown. Using a variety of antibodies targeting various covalent histone modifications in chromatin immunoprecipitation we have begun an analysis of chromatin modifications that occur at the Dmef2 enhancers during early, mid, and late embryonic myogenesis in both wild-type and akirin mutant backgrounds. Our results indicate that the histone modification landscape at the Dmef2 enhancer is highly varied in akirin mutant backgrounds, which supports previous studies indicating that recruitment of chromatin remodeling complexes to these loci during myogenesis is key for their proper expression levels.

Applications of Essential Oils in the Vapor Phase to Prolong Culinary Mushroom Shelf Life
Poster #1 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Alexander Eisenbart
Graduate Student: James Flanagan
Research Mentor(s): Christopher Cornelison

Culinary mushrooms have seen a rise in popularity over the last decade. Despite this boom, mushrooms still suffer from higher levels of degradation, limiting distribution and resulting in high volumes of food waste. One of the more popular varieties is the oyster mushroom, P. ostreatus. Due to the lack of a thick cuticle present in fruits and vegetables, mushrooms, such as P. ostreatus, are especially prone to degradation after only a few days (3-5). Browning and other forms of deterioration are facilitated through internal and external factors usually driven by oxidation. These include bacterial growth on the surface of the mushroom and natural internal factors. Past research has shown that certain constituents of essential oils exhibit antibacterial and antioxidant properties, a promising prospect for prolonging shelf life. This comes at a time when consumers are trending toward more natural sources of preservation. One application, modified atmospheric packaging (MAP), employs volatilization of essential oils (EOs) a process shown to inhibit bacterial growth. Essential oils (EOs) are botanical plant extracts classified as volatile organic chemicals (VOCs). These compounds readily volatilize at room temperature allowing them to easily coat surfaces. Once volatilized in the headspace of packaging, EOs are hypothesized to degrade the cellular membrane of bacteria. They also function as antioxidants, sequestering reactive oxygen species (ROS) that increase post-harvest and accelerate degradation. This study evaluated the inhibitory ability of 5 essential oils (cinnamon bark, cinnamon leaf, clove bud, oregano, and thyme) upon bacterial cultures in the vapor phase. Using inverted Petri dish volatilization methods, previously described in the literature, zones of inhibition for three representative bacterial species (Staphylococcus aureus, Enterobacter cloacae, and Bacillus cereus) were measured for each EO, at multiple concentrations, to find the minimal inhibitory concentration (MIC).

Bacteriophage Against Foodborne Pathogen Shigella Dysenteriae
Poster #15 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Georgia McDuffie & Devin Koonjbearry
Research Mentor(s): Jean Lu

Shigella dysenteriae is an important foodborne bacterial pathogen. It causes epidemic dysentery or shigellosis which can be a severe illness with high mortality (up to 20%). Symptoms of shigellosis include diarrhea (often bloody and mucoid), stomach cramps, fever, and hemolytic-uremic syndrome which can be fatal. S. dysenteriae has a low infectious dose. It is easily transmitted through contaminated food and from one person to another. Despite numerous efforts for prevention and control, shigellosis continues to be an important cause of acute diarrhea and dysentery worldwide, particularly in Asia and Africa. The development of an effective control is urgently needed to decrease its global impact. Recently, bacteriophages (phages) have emerged as safe and promising biocontrol agents against bacterial pathogens. Phages are viruses that infect only bacteria. They do not replicate in foods unless their bacterial hosts are present. In addition, phages do not alter food properties and nutritional value. A novel Shigella phage (phage Shig-L) has been isolated. The phage is genus-specific. It is able to infect S. flexneri, S. dysenteriae, and S. sonnei. The objective of this study was to evaluate the effectiveness of the phage infection at 37°C against S. dysenteriae in cucumber juice as a model food system (representing vegetables) at 3 different multiplicity of infections (MOIs).The results from this study showed that regardless of the initial MOI (1, 10, or 100), the phage infection killed off the host cells within 2.5 hr, resulting in more than 5-log (99.999%) reduction in cell concentration, compared to the control. These results clearly demonstrated that the phage infection is highly effective to control S. dysenteriae in the model food system, suggesting that the phage has high potential to be used as a biocontrol agent against Shigella dysenteriae in foods.

Biochemical and Structural Analysis of Aromatic Aldehyde Dehydrogenase B from Pseudomonas Syringae DC300

Poster #31 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Taylor Clay, Ayyan Paracha, Aaron Walker, Ellie Arrecis, & Maddie O'Brien
Research Mentor(s): Soon Goo Lee

Bacterial pathogen Pseudomonas syringae strain DC3000 suppresses host defenses and promotes infection of target plants by producing indole-3-acetic acid (IAA). Using microbial genome sequences and computational analysis tools, we previously identified three aldehyde dehydrogenases (ALDs) from P. syringae DC3000. Recent work demonstrated that NAD-dependent aldehyde dehydrogenase A (AldA) mainly produces pathogenic IAA from indole-3-acetaldehyde (IAAld). Even though each ALD shares a common reaction mechanism, substrate specificity varies. As part of the 2024 Mentor Protégé Research Program, our team is investigating the three-dimensional structures and biochemical activities of AldA and aldehyde dehydrogenase B (AldB) to better understand the role of active site residues and substrate

specificity of each ALD. Using nickel-affinity chromatography, we expressed and purified His-tagged recombinant proteins to examine the effect of changes in the aldehyde substrate binding site. To further analyze the effects of mutations on activity and substrate specificity for IAAld and other aromatic aldehyde substrates, we will utilize steady-state kinetic analysis. The X-ray crystal structure of AldB and biochemical analysis provide insights into the evolution of enzyme and molecular architecture in the IAA biosynthetic pathway of the bacterial pathogen P. syringae.

Biochemical and Structural Characterization of UDP-glycosyltransferases (UGTs) in the Stevia Biosynthetic Pathway
Poster #32 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Oliver Buckley & Bailey Johnson
Research Mentor(s): Soon Goo Lee

The overconsumption of sugar has plunged our population into a worldwide health crisis, including issues such as obesity, diabetes, and heart disease. Identifying low or non-calorie sweeteners and researching their biosynthetic pathways are crucial for addressing numerous health issues. Our research on Stevia rebaudiana Bertoni-derived Stevia, a potent natural sweetener, aims to comprehensively elucidate its biosynthetic pathways. As a 2024 CSM Mentor-Protégé Fellow and an Honors Research Assistant (HON 3002), we are particularly interested in the UDP-glycosyltransferases (UGTs) that catalyze the production of steviol glycosides. Our objective is to decipher the molecular mechanisms of core UGT enzymes and determine their three-dimensional structures for innovative protein engineering approaches. The insights gained from these pathways are expected to enable the development of novel and flexible methods for engineering protein activities and enhancing their effectiveness. This work contributes not only to our scientific understanding of plant-based sweeteners but also offers practical strategies for tackling global health challenges such as diabetes.

Cell-Penetrating Peptide-Medicated Delivery of Insulin Degrading Enzyme as a Vehicle for Small Molecule Therapeutics
Poster #21 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Joy Davis
Research Mentor(s): Jonathan McMurry

Possible new therapeutic drugs often fail because they cannot cross cell membranes where the delivery is needed. A possible solution to this problem, and the source of this research project is

using cell-penetrating peptides to deliver small molecules across membranes. Cell-penetrating peptides (CPPs) have the ability to cross membranes onto molecules to which they are attached. In this study, a cell-penetrating peptide-adaptor protein was used to deliver Insulin Degrading Enzyme (IDE) to mammalian cells. IDE is a homodimer with a cavity capable of containing small molecules. The IDE in this study has been engineered to have a disulfide bond between subunits which acts as a 'clasp' similar to a coin purse. The disulfide 'clasp' can be reduced to 'open' the protein, a drug molecule would then be loaded into the cavity, and then the 'clasp' can be oxidized to close it again. Once the IDE is loaded with the drug molecule, it can then be attached to a CPP-adaptor and delivered to cells where it would be transported across the membrane, and then released in the reducing environment of the cytoplasm. To test this theory, we designed, expressed, and purified IDE as a fusion to maltose-binding protein (MBP). The binding kinetics of the purified protein showed fast on, fast off kinetics, and high affinity in the presence of calcium, and negative affinity in its absence. Multiple different CPP-adaptors were added to the IDE, including GFP-calmodulin (GFP-CaM), TAT-naked mole rat calmodulin (NMR-CaM), and TAT-LAH4-CaM. Cell-penetration experiments were run with baby hamster kidney (BHK) cells. IDE was successfully delivered to cell interiors with all adaptors. Experiments are underway to deliver a fluorescently labeled drug molecule using the CPP-adaptor/IDE scheme. The results show hope for future success in delivering IDE with small-molecule therapeutics.

Efficacy of Bacteriophages Infecting Opportunistic Bacterial Pathogen Pseudomonas aeruginosa

Poster #15 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Joanne Harrison & Jessica Tazanou
Research Mentor(s): Jean Lu

Pseudomonas aeruginosa *is the most prevalent opportunistic bacterial pathogen in hospital-acquired infections which may lead to diseases such as pneumonia. Previously,* P. aeruginosa *infections were treated with antibiotics; however, the development of antibiotic resistance in* P. aeruginosa *has caused treatment to be more difficult. Since the increase of difficulty in* P. aeruginosa *infection treatment, an increased interest in effective alternatives to antibiotics such as bacteriophages has developed. Bacteriophages (phages) are viruses that infect and kill their host (bacteria). Recent studies have shown that bacteriophages are promising alternatives to antibiotics to control bacteria. This study evaluates the effectiveness of two isolated phages (Φ1 and Φ2) against* P. aeruginosa. *The efficacy of each phage infection against* P. aeruginos*a at the multiplicity of infection (MOI) of 1, 10, or 100 was evaluated in cucumber juice and beef broth (as model food systems). The Φ1 infection (regardless of the MOI used) caused 6 to 7 log reduction in host concentration within 4 hr in cucumber juice or beef broth. In contrast, it took 6*

hr of Φ2 infection to achieve a similar level of reduction in host concentration in cucumber juice or beef broth. The thermal stability of Φ1 was evaluated at different temperatures (50, 63, or 72 °C). For Φ1, 72 °C caused 7 log reduction within 10 minutes. In contrast, 63 °C caused 3 log reduction over a 30-minute period and Φ1 remained stable over a 30-minute period at 50 °C. The thermal stability of Φ2 will be evaluated. These results show Φ1 may have a higher potential than Φ2 to control P. aeruginosa growth in an industry setting.

Examining Genetic Interactions Between the Akirin and MTA-Like Loci for Cardiac and Skeletal Muscle Development

Poster #6 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Graduate Student(s): Ariana Craft
Research Mentor(s): Scott Nowak

Congenital heart disease is a cardiac abnormality that is caused due to improper development of the heart. The severity of heart defects this disease produces can range from minor to severe, with some of the most severe cases being deformed or missing heart valves. To better understand the genetic mechanism(s) behind cardiac and skeletal muscle development, the Nowak lab has identified several genetic loci that have an impactful role in embryonic heart development. In previous work, our data suggests that Akirin works with the Nucleosome Remodeling and Deacetylase complex for proper heart and skeletal muscle development. For the purposes of this project one of the subunits of the NuRD complex, MTA-Like, will be examined and how it plays a critical role in cardiac development, cardiac function and skeletal muscle development. To achieve this goal, we recombined the toll-cGFP transgene onto an MTA-Like mutant and analyzed skeletal patterning and cardiac function in akirin, MTA-Like double heterozygous mutant embryos. To properly analyze these mutations, live confocal imaging was used to record and analyze heartbeats that are produced from the recombination of the MTA-Like and Akirin cross. Additionally, we quantified the number and type of skeletal muscle defects observed in the akirin,+/+,MTA-Like double heterozygous mutant embryos.

Filtration of Lead and Arsenic Through Pleurotus ostreatus and Pleurotus djamor Mycelium

Poster #18 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Kadi Doumbia, Hannah Perryman, Aisha Abundez, Olivia King, Allisa George, Patryk Weber, & Blake Ritter
Research Mentor(s): Christopher Cornelison & Daniel Ferreira

Toxic heavy metal contamination in water has been known to have detrimental effects on many living organisms. For example, lead contamination can lead to kidney impairment or anemia. Fungal mycelia have the potential to remediate this contamination via adsorption, removing the heavy metals from contaminated water. The goal of this project was to analyze the ability of Pleurotus djamor (pink oyster mushrooms), Pleurotus ostreatus (oyster mushrooms), and Trametes versicolor (turkey tail) mycelium to adsorb heavy metals as part of a filtration system. The Pleurotus genus has been shown to have adsorptive properties, therefore different species were tested to indicate which has better myco-filtration capacity. Turkey tail mushrooms are commonly used to break down xenobiotics because they secrete the enzyme laccase, which is highly promiscuous and oxidizer capable of degrading complex chemical structures. All three mushroom species were cultured on oak wood pellets and soybean hull in petri dishes (3.8 cm in diameter). Once fully colonized, the discs were removed and prepared for use as a vacuum filtration disc. Mycelial filter discs were separated into two groups: 3 for the 10 ppm (parts per million) of lead and 3 for 50 ppm of lead. 10 ml of water containing lead or arsenic were passed through the filter under a vacuum. Contaminant concentration post filtration was measured via ICP-OES analysis. Preliminary results have shown that the mycelium has been able to remove lead and arsenic from solution. These results indicate that myco-filtration could prove to be a sustainable and cost-effective solution to heavy metal contamination in water.

Identification of the BeAn 58058 Virus in a Pulmonary TB Patient
Poster #18 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Kayla MacDonald
Research Mentor(s): Tsai-Tien Tseng

Tuberculosis (TB) is a severe bacterial infection caused by Mycobacterium tuberculosis, killing 1.5 million per year due to drug-resistant strains and a vaccine that has poor success rates. Tuberculosis is becoming resistant to drugs ranging from multidrug-resistant (MDR) to total drug-resistant (TDR). Infection rates are also increased in low-income countries with high prevalence in countries such as China, which had 833,000 individuals diagnosed in 2019. To combat these challenges, phage therapy is being researched to be used conjunctively with antibiotics as a more significant form of treatment. Anonymized patient data was retrieved from Xu et al., 2022 at Tianjin Medical University General Hospital in China, suspected or diagnosed with pulmonary tuberculosis from 2018 through 2021. The first data set that was analyzed came from the sequence read archive, SRR19611430. The fluid was collected from the alveolar of the patient's lung and sequenced by the Illumina NextSeq 550 platform. Sequence reads were first trimmed and went through quality control with the fastp software. Kraken2 was then used to identify viral members within this data set. Despite not finding a TB phage, another virus was present in high amounts, BeAn 58058. A research article by Ferravante et al. 2022 explored the

relationship between coronavirus and the prevalence of other respiratory viruses, such as BeAn 58058. BeAn 58058 has often been identified in postmortem Covid-19 patients. Our finding potentially implies that some patients with TB may also be infected with BeAn 58058, similar to Covid-19 patients from Ferravante et al. 2022.

Impact of Microplastic Pollutants on Mosquito Development and Survival
Poster #14 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Brooklyn Galvan, Peyton Denson & Sofia Cuenca Rojas
Graduate Students: Kyle R. Swade & Christina M. Roth
Research Mentor(s): Andrew Haddow

The increasing use of plastics since the mid-20th century has led to widespread microplastic pollution in aquatic environments. Microplastics vary in shape and size, ranging from 1µm to 5mm. These microplastic particles accumulate in the sediment or remain suspended in the water column, after which they are consumed by aquatic or terrestrial organisms. Subsequent bioaccumulation of these particles may result in reproductive, endocrine, and/or digestive damage to exposed organisms. This project investigated the impact of 2µm microplastic particles on the development and survival of the mosquito, Aedes albopictus. By examining the effects of common environmental pollutants on Ae. albopictus, we seek to understand how such pollutants impact mosquito population dynamics.

Inappropriate Inheritance of Histone Methylation Perturbs Muscle Structure and Function
Poster #23 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Graduate Student(s): Josh Labus
Research Mentor(s): Brandon Carpenter

The genetic makeup of living organisms can be passed down through generations via DNA. How tightly this DNA is wrapped around nucleosomes can also be inherited and affect gene expression. In eukaryotic cells, DNA is wrapped around histone proteins, which can be post-translationally modified. For example, when these histone proteins are methylated, it affects transcription of the specific genes that are associated with the histone protein. Generally, H3K4, H3K36, and H3K79 methylation are associated with active transcription, while H3K9 and H3K27 methylation are associated with repressed transcription. Histone modifying enzymes are responsible for adding and removing histone methylation marks and cooperate with one another to regulate proper gene expression during development, including establishing germline versus

somatic cell fate. When these histone modifying enzymes don't function properly, germline genes can become ectopically expressed in somatic tissues. During maternal reprogramming, SPR-5, an H3K4 demethylase, removes the active H3K4me modification, while MET-2, a methyltransferase, adds a repressive H3K9me modification. It has been shown that this maternal reprogramming is antagonized by the H3K36 methyltransferase MES-4, which maintains transcriptional memory across a subset of germline genes over generations. The maternal loss of SPR-5 and MET-2 allows for MES-4 to maintain transcriptional memory unchecked, resulting in ectopic expression germline genes in somatic tissues. The double mutants spr-5; met-2 have shown significant developmental delay and muscle defects due to this aberrant expression. Recently, we conducted motility assays on spr-5; met-2 mutants and spr-5; met-2 mutants rescued by mes-4 RNAi feeding. We observed a significant decrease in the motility of spr-5; met-2 mutants, and that motility levels returned closer to wild type levels when we knocked down mes-4. In addition, motility assays were conducted on single mutants in early generations (both spr-5 and met-2). Interestingly, spr-5 mutants showed similar motility levels to wild type while met-2 mutants showed significantly lower motility levels. These mutants were stained in order to show possible muscle myofilament defects compared to those defects seen in the double mutant stains. RNA sequencing was conducted in order to look at gene expression levels. Interestingly, there was an overall dampening in the expression levels of muscle genes needed for proper development of muscle, which rescued under mes-4 RNAi. We expect phenotypes to get worse over generations as H3K4 methylation accumulates in these mutants. These results will give us insight into how errors in maternal reprogramming can lead to tissue-specific phenotypes during development, that are also expressed in human patients.

Interactions Between akirin and simjoang During Cardiac Development
Poster #4 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Armeta Hadjimirzaei
Research Mentor(s): Scott J. Nowak

One of the most fundamental organs to form during the earliest stages of development is the heart. In the fruit fly (Drosophila melanogaster), many genes and proteins work together for the formation of a fully functioning heart. The conserved nuclear transcription cofactor Akirin has been identified as a key regulator of both the skeletal and cardiac myogenesis programs in Drosophila. The current model for Akirin function holds that this regulation of myogenesis by Akirin occurs through interactions with chromatin remodeling complex activity. Earlier work in the Nowak lab found that akirin works with the NuRD/CHD chromatin remodeling complex to facilitate proper expression of the cardiac gene program. For this study, we focused upon interactions between akirin and simjoang (simj), a key component of the NuRD/CHD complex. Using live confocal imaging, we recorded heartbeat patterns in a variety of combinations of

single and double heterozygous embryos bearing mutations in akirin and simj. Our data indicates that interactions between these two loci are critical for the cardiac and skeletal muscle patterning process, strongly suggesting that NuRD/CHD activity through interaction with Akirin is a key regulator of these developmental programs.

Metagenome Assembled Genome of a Novel Phage from a Small-Scale White Cheese Processing Facility

Poster #36 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Samuel Smith
Research Mentor(s): Tsai-Tien Tseng

Next-generation sequencing (NGS) has been providing new opportunities in finding new phages from metagenomic data sets. The surface metagenome from a small-scale white cheese processing facility was originally sequenced by FoodOmics Laboratory at Hacettepe University using Illumina NovaSeq 6000 and deposited in NCBI Sequence Read Archive (SRA) under the accession number of PRJNA951084. One specific run from the above experiment, SRR24234328, was downloaded from NCBI SRA and subjected to the following data mining protocol with the goal of identifying new phages. First, Metaviralspades was used for de novo assembly of sequencing reads after adapter trimming with fastp to generate contigs and scaffolds, which may contain metagenome assembled genomes (MAGs) for phages. Contigs and scaffolds were then subjected to identification of mobile genetic elements, including plasmids and viruses, by geNomad. GeNomadwas also utilized for taxonomic assignments of viral genomes. One scaffold thus generated contained 43,851 nucleotides in length and a G + C content of 52%. Metaviralspades also reported a coverage of 1,256.523580 for this contig. Prediction with geNomad revealed this scaffold as a member of the Autographiviridae *family in the class of* Caudoviricetes*. Similarity search with BLASTN against nt_viruses revealed 90.41% identity to Enterobacterphage SDFMU_Pec as the most related entry, which is also a member of* Autographiviridae*. Among 74 open-reading frames (ORFs) predicted by PHANOTATE as implemented by the pharokka pipeline, the most noteworthy categories include: nucleotide metabolism with 11 ORFs, lysis with three ORFs, and phage head/packaging with nine ORFs, as well as a large terminase subunit of 616 amino acids. CheckV reported that the assembly is at a completeness of 100% with the presence of direct terminal repeats (DTR). CheckV also reported that the minimum information about an uncultivated virus genome (MIUVIG) quality is "High-Quality." This MAG is therefore considered as a complete phage genome. In conclusion, this study suggests the discovery of a novel phage, which potentially infects the genus of Enterobacter, from the surface microbiome in a small-scale white cheese processing facility.*

Metagenome Assembled Genome of a Putative Phage from a Continental Cheese Production Facility
Poster #13 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Elizabeth Iaryguine
Research Mentor(s): Tsai-Tien Tseng

Next-generation sequencing (NGS) has been providing new opportunities in the elucidation of microbiomes, especially in fermented foods. The goal of this study is to find new phages from a production facility for continental cheeses to further understand its microbiome. After sequencing with Illumina NextSeq 500, the Teagasc Food Research Centre from Ireland deposited the data under BioProject PRJEB22242 in NCBI Sequence Read Archive (SRA). ERR2102097 from the above BioProject was selected for our study to identify novel phages. After adapter trimming with fastp, metaviralspades was used for de novo assembly of reads into contigs and scaffolds, which potentially contain metagenome-assembled genomes (MAGs) for phages. Mobile genetic elements, such as plasmids and viruses, from contigs and scaffolds were then identified by geNomad, along with taxonomic assignments. One scaffold thus generated contains 21,935 nucleotides in length and a G + C content of 36%. Metaviralspades also reported a coverage of 48,144.931673 for this scaffold. This scaffold has been predicted by geNomad as a member in the class of Caudoviricetes*. Similarity search with BLASTN against nt revealed 95.56% identity to Lactococcus phage 62606 as the most related entry, which was originally isolated from dairy products and is also a member of* Caudoviricetes*. Within the pharokka pipeline, PHANOTATE predicted 41 open-reading frames (ORFs). The most noteworthy categories include: nucleotide metabolism with four ORFs, lysis with two ORFs, and phage head/packaging with five ORFs, as well as a large terminase subunit of 526 amino acids. CheckV reported that the assembly is at a completeness of 100% with the presence of direct terminal repeats (DTR). It also reported that the minimum information about an uncultivated virus genome (MIUVIG) quality is "High-Quality." This MAG is therefore considered as the complete genome a of phage. In conclusion, this study thus suggests the discovery of a novel phage that infects the genus of Lactococcus from a production facility for continental-style cheeses.*

Metagenome Assembled Genome of a Putative Phage from Young Cheddar Curds
Poster #8 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Christofer Serrano
Research Mentor(s): Tsai-Tien Tseng

Next-generation sequencing (NGS) has been providing new opportunities in the elucidation of microbiomes, especially in fermented foods. The goal of this study is to find new phages from young Cheddar curds that serve as a base for surface-ripened cheeses to further understand its related microbiome. Data from BioProject PRJEB15423 was deposited into NCBI Sequence Read Archive (SRA) by Teagasc Food Research Centre in Ireland after sequencing metagenomes of young Cheddar curds and surface-ripened cheeses with Illumina NextSeq 500. A specific run from the aforementioned experiment, ERR2212267, was selected for our study to identify phages that were unreported in the original publication. ERR2212267 contains sequence data from day 0 of the unsmeared Cheddar cheese curd which served as a control in the original study. First, metaviralspades carried out de novo assembly of reads into contigs and scaffolds, which potentially contain metagenome-assembled genomes (MAGs) for phages. Contigs and scaffolds were then subjected to identification of mobile genetic elements, including plasmids and viruses, by geNomad. Taxonomic assignments of viral genomes were also carried out by geNomad. One scaffold generated by metaviralspades contains 22,322 nucleotides in length and a G + C content of 36%. Metaviralspades also reported a coverage of 56.582834 for this scaffold. This scaffold has been predicted by geNomad as a member in the class of Caudoviricetes*. Similarity search with BLASTN against nt_viruses revealed 93.84% identity in comparison to Lactococcus phage BIM BV-114 as the most related entry, which was originally isolated from cheese brine and is also a member of* Caudoviricetes*. Among 45 open-reading frames (ORFs) predicted by PHANOTATE as implemented by the pharokka pipeline, the most noteworthy categories include: nucleotide metabolism with five ORFs, lysis with three ORFs, and phage head/packaging with five ORFs. Large terminase subunit of 526 amino acids was also predicted by pharokka. CheckV reported that the assembly is at a completeness of 100% with the presence of direct terminal repeats (DTR). CheckV also reported that the minimum information about an uncultivated virus genome (MIUVIG) quality is "High-Quality." This MAG is therefore considered as a complete genome. In conclusion, this study potentially discovered a novel phage from young Cheddar curds that infects the genus of Lactococcus.*

Modulation of Synaptic AMPA-Glutamate Receptors by Polysialic Acid: A Potential Therapeutic Strategy for Ameliorating Neurological Disorders

Poster #5 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Arianna Rodriguez & Allisa George
Research Mentor(s): Vishnu Suppiramaniam

The α-amino-3-hydroxy-5-methyl-4-isoxazolepropionic (AMPA) subtype of glutamate receptors is a crucial mediator of fast excitatory neurotransmission within the mammalian central nervous system. Precise regulation of AMPA receptors is essential for normal synaptic transmission. Numerous endogenous molecules play pivotal roles in modulating the functional characteristics

of AMPA receptors. One such molecule is polysialic acid (PSA), a highly negatively charged carbohydrate covalently attached to the neural cell adhesion molecule (NCAM), which is prominently expressed in hippocampal synapses. Although previous research has demonstrated that PSA-NCAM can influence the single-channel properties of purified and reconstituted AMPA receptors, its impact on native synaptic AMPA receptors has remained unexplored. In this study, we employed the isolation and functional reconstitution of synaptosomal AMPA receptors in lipid bilayers to investigate the effects of PSA on synaptic AMPA receptors. Our findings revealed that PSA, in a concentration-dependent manner, exerts several noteworthy effects on AMPA receptors. It enhances the single-channel open probability, prolongs the mean open time, and reduces the mean closed time of these receptors. Notably, the well-known AMPA receptor desensitization blocker, Cyclothiazide, was unable to block the effects of PSA. This implies that PSA can modulate AMPA receptor channel properties independently of desensitization blockade, a phenomenon observed in certain pathological conditions. Taken together, our results indicate that PSA enhances the single-channel activity of synaptic AMPA receptors. Beyond reducing the rate of desensitization, PSA appears to potentiate AMPA receptors through alternative mechanisms. A comprehensive understanding of the dynamics of the interaction between PSA and AMPA receptors holds the potential to expand the utility of PSA as a small molecule therapeutic compound in various disease states characterized by AMPA receptor dysfunction.

Search for Novel Arsenic-Containing Antibiotics
Poster #24 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Jayla Melvin, Eric Campos, & Shifa Maherali Jiwani
Research Mentor(s): Masafumi Yoshinaga

Arsenic, a widely recognized environmental toxin associated with various health risks, surprisingly exhibits potential applications in the realm of medicine. Antibiotics, crucial for combating infectious diseases, represent a cornerstone in healthcare. Recent research has shown a fascinating relationship between bacteria and arsenic, revealing that bacteria leverage environmental arsenic to synthesize unique antibiotics containing this element. A noteworthy instance of this phenomenon is observed in arsinothricin, the sole known arsenic-containing antibiotic. This compound has showcased its effectiveness in addressing antibiotic-resistant pathogens while showing selectivity in sparing human cells. This revelation paves the way for new possibilities in antibiotic research and development. Our objective is to build upon this unique connection and delve into the discovery of additional arsenic-containing antibiotics. This endeavor holds the potential to broaden the spectrum of resources available for combating infectious diseases and tackling the growing challenge of antibiotic resistance. The gene set (so-called biosynthetic gene cluster, or BGC) required for arsinothricin biosynthesis were used to

search sequenced genome databases, which led to the discovery of several prospective BGCs for arsenic-containing antibiotics. Among them, our target is those for arsenic-containing RiPPs (Ribosomally synthesized and Post-translationally modified Peptides), especially the one from Microbispora rosea. From our target RiPP BGC, we selected four genes, which we hypothesize are the minimum required to produce an arsenic-containing precursor of the encoded RiPP, and used them to transform Escherichia coli with a two-plasmid system. Expression of the transformed genes in E. coli was analyzed by SDS-PAGE, however, some of the gene-encoded proteins were not properly expressed. To solve the expression issue, we are currently optimizing the condition. Given that arsenic-containing peptides have never been discovered in nature, the discovery of arsenic-containing RiPP antibiotics will not only support our hypothesis but also have a big impact over the related fields.

Structure Disorder and Magnetic Behavior of an Olivine-Type Material
Poster #16 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Hamida Hassan
Research Mentor(s): Madalynn Marshall

Neutron diffraction is a powerful tool for investigating the Li content and site disorder for battery material like Li(Mn,Fe)PO4. The scattering length of neutrons varies significantly across the periodic table providing a unique sensitivity to lighter elements and elements with similar atomic mass. This allows for a more nuanced understanding of the mixed Mn and Fe occupancy on the atomic 4c site of Li(Mn,Fe)PO4 which crystallizes in the Pnma space groups. This knowledge is vital for optimizing the electrochemical performance of these materials in lithium batteries. In this study, we explore the solid-solution Li(Mn,Fe)PO4, which is a promising battery material due to its operation at a desirable voltage. From neutron diffraction measurements we will reveal the structural disorder of the mixed Mn/Fe occupancy on the 4c atomic site and the localization and quantity of Li in Li(Mn,Fe)PO4. Additionally, the magnetic structure of Li(Mn,Fe)PO4 will be discussed where below TN ~ 50 K, the magnetic scattering was found to correspond to the wavevector k = 0.

Survey of Bacteriophages in the Tibetan Glaciers
Poster #3 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Alyssa DeSantis
Research Mentor(s): Tsai-Tien Tseng

Analysis of the genetic variation found within the microbial communities of the Tibetan Plateau utilizing whole genome sequencing (WGS) increases our ability to understand the evolution of life in extreme environments. Recent literature demonstrates the differences in the microbial composition of three glacial habitats found in the Tibetan Plateau, cryoconite, snow, and ice, through the utilization of the Illumina HiSeq 2500 platform. Many of the Tibetan glaciers exist at low latitudes, making them incredibly susceptible to the effects of global warming. The reemergence of entrapped pathogenic microbes could have dangerous consequences and health risks in the future. This study aims to identify the composition of the viral genome found within the dataset discovered in a study by Liu et al. in 2022. The data used in this study was derived from run SRR18576996 from SRA accession number PRJNA813429. Quality control of the sequence reads was performed using fastp paired reads data processing on Galaxy. Kraken2 software with custom settings was used to identify the viral microbe taxonomy found within the sample. The most prevalent viral microbes identified in this sample are bacteriophages falling under the order Caudovirales. Our findings in this experiment expanded the understanding of the microbial composition found within the cryoconite of the Tibetan Plateau. Further analysis will likely reveal and allow for the identification of additional viral species and provide insight on any possible negative effects they may pose to future societies.

College of the Arts

Art and Design

Making Abstract Philosophy Concrete Through Collaborative Art
Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
3:00pm - 3:50pm
Undergraduate Student(s): Logan Mossor
Research Mentor(s): Jonathan Fisher & Karolin Mirzakhan

Philosophy and art overlap and entwine throughout history. Existentialist philosopher Albert Camus suggests artistic creation as an answer to existing in an absurd world. Chicana feminist philosopher Gloria Anzaldúa used hand drawn illustrations called "glifos" during her lectures to aid attendees in better understanding her philosophy. The late thirteenth century ink painting "The Pleasures of Fishes" by Zhou Dongqing depicts a passage from the book "Zhuangzi," an important Daoist text. In each of these examples, art is a means to better understand philosophy. I am a visual artist, and I intend to use one of my own chosen artforms, collaborative art, to accomplish the same end. As a collaborative artist, I gather many people together to realize one artistic vision. I have staged over twenty collaborative art events over the past three years, and have used research methods from Rita Irwin's essay "Communities of A/r/tographic Practice" and concepts from Allan Kaprow's essay "Manifesto" to better understand how participants are

impacted by collaborative art. My research has led me to believe that collaborative art will excel at making abstract philosophical concepts accessible to a larger audience. To explore this belief, I intend to stage three collaborative art events, each one designed to introduce a philosophical movement in a concrete and accessible way. The first event will be inspired by Albert Camus' "The Myth of Sisyphus," and will demonstrate existentialist philosophy. The second event will be inspired by Gloria E. Anzaldúa's "Light in the Dark/Luz en Lo Oscuro: Rewriting Identity, Spirituality, Reality," and will demonstrate Chicana feminist philosophy. The third event will be inspired by Laozi's "Daodejing" and Zhuangzi's "Zhuangzi," and will demonstrate Daoist philosophy. My presentation of these three events will demonstrate the value of using collaborative art as a means of teaching difficult philosophical concepts.

Parakeet Lost: Casting Light on North America's Forgotten Native Parrot
Visual Art (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Chantelle Chapman
Research Mentor(s): Jonathan Fisher

For centuries, the abundance of America's avifauna was one of its most storied treasures. Early accounts spoke of mile-wide flocks, and forests and shorelines that bristled with feathers. Many of these birds are now gone, driven to extinction through human action and inaction, leaving only fading shadows upon collective memory. Among the vanished birds of the United States, one of the most unique was Conuropsis carolinensis, *the country's only endemic parrot. Though named for the area where it was first studied, the Carolina Parakeet was common throughout the lands east of the Rockies, noted for its tolerance of snow. It seems impossible that such a remarkable creature could have been forgotten within the span of a human life, yet only 84 years after the declaration of its extinction, few people today are aware that an American parrot ever existed. The purpose of this project is to investigate the distinctive characteristics of* C. carolinensis, *with the aim of constructing a compelling, multi-faceted portrait of this lost species. In-depth research will be conducted into the cultural and natural history of the bird and the causes of its disappearance, comprising an examination of first- and second-hand historical accounts and contemporary ornithological scholarship, as well as preserved biological specimens. Following in the strong tradition natural history illustration, the findings of this research will be synthesized as a series of paintings, executed in gouache on paper, accompanied by informational text. Collectively, this body of work, presented in the exhibition format, will encourage consideration of the countless creatures which today face oblivion, and invite deeper contemplation of the precarious position held by even the most exceptional of species.*

The Art World of Isabella Gardner and Fenway Court
Oral Presentation (Prillaman Hall - Indoor Plaza)

Wednesday, April 17th
3:00pm - 3:50pm
Undergraduate Student(s): Ivy Kolkana
Research Mentor(s): Jessica Stephenson

"The Art World of Isabella Gardner and Fenway Court" presents a comprehensive examination of the influential cultural milieu created by Isabella Stewart Gardner, focusing on the inception and evolution of Fenway Court, now the Isabella Stewart Gardner Museum. This paper delved into the intricate tapestry of Gardner's relationships with prominent artists such as John Singer Sargent, Anders Leonard Zorn, James Abbott McNeill Whistler, Denis Bunker, and several other female artists, illuminating her pivotal role as a patron and tastemaker in the late 19th and early 20th century America. Beginning with the genesis of the museum, the paper traces Gardner's vision and the architectural marvels of Fenway Court, revealing the convergence of art, architecture, and personal passion in its creation. Gardner's deep-seated patronage emerges as a driving force behind the museum's establishment and its subsequent transformation into a beacon of artistic innovation and cultural exchange. Central to Gardner's artistic orbit were her close associations with luminaries like John Singer Sargent, whose mastery of portraiture and profound artistic vision resonated deeply with her sensibilities. The paper explores their symbiotic relationship, shedding light on Gardner's unwavering support for Sargent's artistic pursuits and their enduring legacy. Moreover, the paper explores Gardner's patronage of other renowned artists such as Anders Leonard Zorn, James Abbott McNeill Whistler, and Denis Bunker, elucidating the nuances of her engagement with their respective oeuvres and the impact of her support on their artistic trajectories. Finally, the paper examines Gardner's unique emphasis on fostering female artistic talent, highlighting her patronage of several female artists who flourished under her mentorship and whose works enriched the museum's collection and message.

Music

Analysis of Visayan/Bisayan/Cebuano Philippine Traditional Vocal Repertoire
Poster #27 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Mikkel Cullen
Research Mentor(s): Peter Fielding

This project will share in-progress analytic work assessing the scales, modes, and pitch collections of Visayan/Bisayan/Cebuano folk song repertoire of the Philippines. As a pilot study, this work will focus on a portion of the repertoire collected by Priscilla Magdamo; materials collected under the auspices of Silliman and Indiana University. Through use of Kodály-style

pitch maps and post-tonal mappings, a preliminary baseline of the repertoire is presented. In addition to establishing normative scalar patterns for this repertoire, preliminary pedagogical merits of the repertoire will be identified for potential use in Aural Skills I&II curriculum. Research outputs are of value to broad ethnomusicological and traditional music academic communities of the Philippines, as well as the broader Filipino diaspora stakeholders, including those residing in Georgia, the United States, and abroad.

Gregorian Chant: Timeless Importance
Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
3:00pm - 3:50pm
Undergraduate Student(s): Elise Hayen
Research Mentor(s): Edward Eanes

This presentation investigates Gregorian chant by unpacking the history of Chant, inspecting original Gregorian Chant leaflets, and connecting this ancient artform to the modern world. The author analyzes the Chant "Floribus ejus nec rosae" by providing a transcription, a performance, and description of its musical and artistic details. The author introduces ideas on further research of Gregorian Chant, such as the preservation of leaflets, geography and dialect, and materials used. Lastly, the author discusses the relevance of Gregorian Chant in modern society and reflects on its impact on the global music scene.

Theatre and Performance Studies

Generating Empathy in Artists Through Creation
Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
3:00pm - 3:50pm
Undergraduate Student(s): Caro Kok
Research Mentor(s): Margaret Baldwin Pendergrass & Chuck Meacham

A piece of thought-provoking art is often viewed as one which audiences will walk away from feeling inspired, enlightened, and connected – how do those thought-provoking aspects then affect those who make the art? Studies have been done to show the impact of representation in media, whether that be representation of race, gender, sexuality, class, or health in music, film, or theatre. Accurate and empathetic representation allows witnesses, audience or otherwise, more accurate and empathetic perspectives and, therefore, responses to those in real life being represented. This project is an exploration of the process of putting on a staged reading of "Girl After Doomsday": a play I started writing about my bipolar disorder and the way it affected my

relationships. Beginning the process, my goal was to expose my peers to my experience. The methodology included several table reads, bringing on collaborators, the casting process, putting on a show, and receiving feedback. It concluded with me walking away with my own new perspective on myself, my mother, and my disorder, gained through the process of creating a new piece of art. My collaborators walked away with new perspectives on themselves, the way they've been treated, and the way they treat others.

"It's Destructive but Seductive": Camp Aesthetics in Reefer Madness
Oral Presentation (Microsoft Teams)
Friday, April 19th
12:15pm - 12:30pm
Undergraduate Student(s): Taylor Mancil
Research Mentor(s): Thomas Fish

The presentation investigates camp style and its relationship to Dan Studney and Kevin Murphy's stage musical Reefer Madness (1998). Camp is commonly associated today with the 2019 Met Gala with the theme "Camp: Notes on Fashion," however, the term was popularized by Sontag's Notes on "Camp" from 1964 and originally coined by Chrisopher Isherwood in 1954. The presentation will draw upon the history and theories of camp aesthetic, how the term joined the social lexicon, and how it applies in practice to musical theatre performance. Specifically, it will examine how camp techniques were incorporated into my portrayal of Mae, the harlot hostess of the infamous reefer den, in KSU's spring 2024 production of Reefer Madness. Ultimately, by evaluating production moments and audience responses at talkbacks and in the classroom, it finds camp to be an important way to open audiences up to challenging themes surrounding abuse, addiction, and moral panic, allowing parody and pastiche to lead the conversation.

Southern Polytechnic College of Engineering & Engineering Technology

Civil and Environmental Engineering

An Analysis of Factors Influencing Crash Severity
Poster #4 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm

Undergraduate Student(s): Anielle Lenzer
Research Mentor(s): Sunanda Dissanayake

One of Georgia's greatest public health safety concerns is the vast number of crashes. Even with many laws for both pedestrians and motorists, Georgia along with 4 other states accounted for 47% of all pedestrian deaths in 2019. Between the years 2018 and 2022, there were nearly 2 million crashes with almost 14,000 of them involving pedestrians. Of those pedestrian crashes, about 1,400 were fatal. In 2020, researchers found that 58% percent of pedestrian crashes in Georgia occurred in Atlanta. Previous researchers studied hot spots and discovered that pedestrian fatalities occur more in urban areas, which correlates with that percentage. The goal of this research is to find which driving factors relate to higher fatalities and injury severities. This was done in hopes that the knowledge would be able to help reduce the number of pedestrian fatalities. This paper utilized crash data from GDOT. Many factors were analyzed, including Weather Conditions, Road Type, Holiday, and Day of the Week. By using the Cross-classification method factors could be identified as having correlation to crashes, or no correlation to crashes. It was found that the Day of the Week did not correlate with the severity of crashes. It was also found that the Weather Conditions, Road Type, and Holidays all have a relationship with pedestrian injury and the severity of those injuries. There lies immense importance in investigating and understanding the factors that contribute to this epidemic, in hopes of creating safer streets for pedestrians.

Biodegradable Soil Moisture Sensor Components and Their Effect on Plant Growth
Poster #22 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Justin Zhu, Katherine Gurno, Sydney Tarman, & Bryan Bae
Research Mentor(s): Roneisha Worthy

In contemporary agriculture, understanding and managing soil moisture levels is vital to maximizing crop yields while minimizing environmental impact. Traditional soil moisture sensors often incorporate non-biodegradable materials, raising concerns about long-term environmental impact and sustainability. In response to this challenge, the development and utilization of biodegradable moisture sensors have emerged as a promising alternative. This research seeks to investigate the significance of biodegradable sensor components on capsicum annuum plant growth in the context of sustainable agricultural practices. This study was conducted in a greenhouse at Kennesaw State University, by planting capsicum annuum seeds in pots of varying growing media: plain potting mix, 1:1 soil:manure blend, and 1:1:1 soil:manure:sand blend. Biodegradable materials (beeswax, soy wax, and balsa wood) were inserted an inch deep into numbered pots. Each pot received 200 mL of water every two to three days until the end of harvesting. Plants and materials were assessed (weighed and measured)

during harvesting 30, 60, and 90 days after growth. The predicted outcome of this study suggests that biodegradable material will have a negligible effect on capsicum annuum growth when compared to control plants. This result indicates that beeswax, soy wax, and balsa wood are acceptable materials for biodegradable moisture sensor components.

Development of Industrial Waste Incorporated Concrete for 3D Printing Construction in Chloride-Loaded Environment
Poster #8 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Cameron Ramsey
Research Mentor(s): Youngguk Seo

The transformation from over-exploitation to sustainable development has been prioritized in the construction industry as the mass production of concrete has caused enormous environmental and ecological issues. 3D concrete printing (3DCP) involves the process of assembling materials by printing a series of single filament stacks to build 3D models. It has gained popularity in the construction industry as it makes the core construction process faster, cleaner, and more cost-effective. However, the use of high-flow materials for 3DCP can result in poor performance due to the separation of materials, the generation of a large volume of voids, and the reduction in interlayer adhesion, which collectively put 3DCP buildings at risk of failure when exposed to chloride-laden conditions. To maximize the advantages of 3DCP, especially for roadways and marine infrastructure, this study develops new 3DCP mixes sourced from local industrial waste, such as fly ash, slag, and sewage sludge ash. The durability of the 3DCP mixes is then evaluated in a chloride-loaded environment, where chloride intrusion into the near-surface pores of the concrete is focused as an underlying damage mechanism. Since chloride ingress is attributed to chloride binding with cement hydrates at microscale, understanding cement hydration is the key to characterizing the physicochemical properties and complex interactions with chloride for durable 3D-printed concrete. The proposed research program aims at: 1) investigating the impact of embedded waste on 3DCP; 2) correlating the performance indicators of 3D printed concrete with mix design parameters; and 3) evaluating the impact of chloride ingress on the performance of 3D printed concrete using concrete resistivity model. The findings of the research will advance our understanding of cement hydration and its interactions with chloride and lead to an optimum design method for sustainable and durable 3DCP construction.

Elevating Bridge Inspection with Drone-Assisted 3D Modeling
Poster #14 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Frank-Cedric Kadjo & Kiara O'Neal

Research Mentor(s): Da Hu

Bridges play a critical role in global transportation networks, facilitating efficient travel and driving economic growth and societal integration. However, traditional inspection methods for ensuring their safety and integrity are increasingly seen as outdated, inefficient and prone to human error. These methods, which are often manual and visually based, no longer meet the demands of modern infrastructure management. Therefore, there is a need to shift towards more reliable and innovative solutions. Our research aims to pioneer a transformative approach to bridge inspection by developing and applying advanced 3D modeling techniques. We plan to use drone technology to capture high-resolution images of bridges from multiple angles and elevations, creating a comprehensive dataset to generate accurate 3D models of the structures. This strategy aims to offer a detailed bird's-eye view of the infrastructure, facilitating a more thorough and efficient inspection process. The primary objective of this study is to investigate the most effective methodologies for using drones to create 3D models of bridges. We will focus on aspects such as the optimal flight patterns for data collection, the resolution of imagery required for accurate model construction, and the software tools best suited for processing the collected data into usable 3D representations. By addressing these key areas, we aim to establish a standardized framework for drone-assisted 3D modeling of bridges, which could significantly enhance the accuracy and efficiency of bridge inspections. Moreover, we will assess the feasibility of integrating drone technology into existing bridge inspection regimes, considering potential challenges such as regulatory hurdles, the need for specialized training for operators, and the economic implications of adopting such technologies. Through a comprehensive evaluation of these factors, the research will provide valuable insights into the practicality of transitioning from traditional inspection methods to a more technologically advanced approach.

Are Electric Vehicles Really Emission Free? Estimating the Increase in Air Pollutant Emissions from Power Plants in Georgia
Poster #10 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Chrisley Licona
Research Mentor(s): Mahyar Amirgholy

The National Electric Vehicle Infrastructure (NEVI) Formula Program aims to expedite the development of public electric vehicle (EV) charging infrastructure in Georgia by investing $135 million over five years. By enhancing accessibility to charging stations for all users from various socioeconomic classes, the NEVI Formula Program facilitates the adoption of EVs, thereby significantly reducing vehicle air pollutant emissions. However, as the adoption of EVs and their total vehicle miles traveled (VMT) increase, the electrical energy consumption of EVs from the power grid, and consequently, emissions from power plants, are also expected to rise over time.

This research employs the Cambium model, developed by the National Renewable Energy Laboratory (NREL), to show that the CO2, CH4, and N2O emission rates of power plants in Georgia during the evening and night hours, i.e., from 7:00 pm to 5:00 am, are respectively 1117%, 1010%, and 1569% higher than these rates during work hours, i.e., between 9:00 am and 4:00 pm. In contrast, the majority of EV charging also occurs in the evening and overnight when emission rates peak, i.e., from 7:00 pm to 5:00 am. In the next step, we are developing a machine-learning model to predict the air pollutant emissions of power plants in Georgia with the rise in the electrical energy consumption of EVs from the power grid.

Identification of Factors Associated with Pedestrian Walking Speed in Georgia
Poster #32 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Mikela Zuniga
Research Mentor(s): Sunanda Dissanayake

In 2021, the NHTSA found that about 7,400 pedestrians died in crashes on public roads, mostly around retail spaces and roads with higher speed limits. Walking speeds are an important part of pedestrians' safety. These speeds let the Transportation Professionals determine the signal timings for crosswalks to let pedestrians safely cross the road. Typically, the speed value to determine the length of crosswalk times is the 15th percentile. Many characteristics are important when determining walking speed, such as the day of the week, weather, gender, trip purpose, and distractions that may affect the walking speeds of pedestrians. This study aimed to study three different factors and see how walking speed and pedestrian characteristics relate. Using a timer, the walking speeds of students at three locations at Kennesaw State University were determined. The characteristics studied include location, gender, and distractions. The distractions that may influence walking speed are phone calls, the use of headphones, screen times, and no distractions. It was found that the 15th percentile walking speed was 1.03 m/s, and the average speed was 1.29 m/s, which is consistent with other studies. Using cross-classification, it was found that there was only a relationship between location and walking speed. There was no relationship between gender and walking speeds as male and female walkers tended to walk at the same speeds. All speeds had more non-distracted walkers than distracted walkers; however, it was found that there was no relationship between distractions and pedestrian speed. The findings of this study could be used to improve the safety of pedestrians and as a result, reduce the number of pedestrian crashes.

Impacts of Traffic on Air Pollution in and Around Schools
Poster #5 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm

Undergraduate Student(s): Anxhelo Gjermeni, Brianna Greiner, Ali Rana, Brandon Perez, Brianna Saez, & Drew Peake
Research Mentor(s): M.A. Karim & Parth Bhavsar

Significant health concerns are associated with traffic-related air pollution, especially in urban areas where traffic congestion is a typical occurrence. This research study investigates the influence of traffic on Particulate Matter (PM) in and around schools during the drop-off and pick-up hours of Morris Brandon Elementary School. Particulate Matter (PM) is one of the many pollutants that automobiles generate and it is of particular concern because of its detrimental effects on respiratory health and general well-being. Children face heightened risks due to their developing respiratory systems, increased vulnerability to infections, and outdoor activity [1]. Through a combination of field measurements, air quality monitoring and statistical analyses, the study evaluates the spatial and temporal variations in PM concentrations in the vicinity of Morris Brandon Elementary School. Major road traffic volume and meteorological conditions such as temperature and humidity are taken into account. The purpose of this study is to shed light on the effects of traffic on PM levels surrounding schools, as well as the extent of exposure and any health risks to staff and children.

Metal Analysis of Plastic, Fly Ash C, SSA and Slag
Poster #5 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Alhagi Kebbeh
Research Mentor(s): M.A. Karim & Youngguk Seo

It's not surprising that there's a significant amount of recycled waste in landfills and the environment, potentially containing harmful metals that can contaminate soil and water sources. However, utilizing recycled materials in construction can contribute to lower energy consumption. This research aims to examine the metal content (Iron, Copper, Zinc, Lead, Magnesium, and Cadmium) in recycled materials and identify those with safe metal compositions for construction purposes. The study employs the Toxicity Characteristic Leaching Procedure (TCLP) and Fourier Transform Infrared (FTIR) Spectroscopy to quantify metal and other chemical contents in Plastic, Fly Ash C, Sewerage Sludge Ash (SSA), and Slag. The extracted parameters will be compared to TCLP regulatory levels to ensure they contain safe metal amounts. The acid extraction fluid used had a pH level of 2.88 ± 0.05. Each test underwent three trials for metal analysis, and an average of three trails, following data rejection procedure, was accepted and used for the analysis. It is expected that "); border-bottom: 1px solid transparent; background-size: 3px; vertical-align: 0.235278px; line-height: 0px; position: relative;">all of the waste materials will be non-hazardous based on the TCLP tests and be suitable for use as construction materials.

Metal Analysis of Rubber, Glass, Fly Ash F, and Sand
Poster #22 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Justin Jintai Chen
Research Mentor(s): M.A. Karim & Youngguk Seo

This study aimed to assess the metal content in commonly recycled industry waste used in construction materials, focusing on iron, lead, copper, zinc, cadmium, and magnesium. Experimental tests were conducted on five construction materials: glass, sand, fly ash F, and rubber. Toxicity Characteristic Leaching Procedure (TCLP) method and Fourier Transform Infrared (FTIR) Spectroscopy were adopted for the characterization of metals and other chemicals. The results were compared with TCLP regulatory levels to ensure the safety of metal contents. Three trials of tests were carried out for each test. Acceptable values were determined through outlier analysis based the ten percent rule. The PH level for the acidic acid extraction fluid was 2.88 ± 0.05. Glass exhibited a reportable amount of ion, measuring 0.13 mg/kg. It is expected that all of the waste materials will be non-hazardous based on the TCLP tests and be suitable for use as construction materials.

Sustainable Concrete Designs Using Landfill Waste
Poster #8 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Caleb Ludlam & Joseph Painter
Research Mentor(s): Metin Oguzmert

A considerable percentage of global waste and emissions is due to the construction industry, more particularly in the production of cement. Therefore, researching ways to reduce cement consumption and create more sustainable construction practices is vitally important. The primary goal of this project is to identify materials that are currently polluting landfills and can be a viable substitution for aggregate in concrete mixes by way of testing their compressive strength. Our team worked closely with the Research and Development Team from Belter Tech, a company based in Atlanta whose mission aligns with ours: to offer solutions to sustainable practices within the construction industry. Their team provided us with a number of recycled materials and cement used in this study. The recycled materials we analyzed consisted of shredded heat-treated plastics, shredded raw plastics, PIR insulating foam, shredded tires, and purified zeolite. To conduct our research, we abided by the standards set by ASTM International through every step of our investigation. We began by brainstorming concrete designs, varying the materials and percentage of them in each sample. Following a specified mixing and molding

process to ensure consistency among each sample, we carefully created each concrete cube. We then tested the compressive strength of each specimen 3, 7, and 28 days after molding. What we have seen so far and what we anticipate seeing is that several of these materials provide feasible alternatives for aggregate as it relates to the compressive strength of concrete, and further chemical as well as other long term physical tests could confirm practical uses of these recycled materials in the construction sector.

Electrical and Computer Engineering

Comparative Study of GaN Growth on Different Substrates: Implications for High-Temperature Device Performance
Poster #19 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Evelyn Sanders
Graduate Student(s): Manika Tun Nafisa
Research Mentor(s): Benjamin Klein, Zhe Chuan Feng, & Ian Ferguson

This study investigates the suitability of Gallium Nitride (GaN) grown on various substrates, including Sapphire (Al2O3), Silicon (Si), and Zinc Oxide (ZnO), for high-temperature semiconductor device applications. Created via the Metal Organic Chemical Vapor Deposition (MOCVD) growth process, the thermal properties and performance of these samples were analyzed through Raman spectroscopy at temperatures of 100 °C, 200 °C, and 300 °C, employing different laser powers to achieve clear, high-intensity spectra with minimal noise. The results at room temperature revealed the E2 (high) phonon mode peaks for GaN on Sapphire, Si, and ZnO at 568 cm-1, 565 cm-1, and 576 cm-1, respectively, with Full Width at Half Maximum (FWHM) values of 7.70 cm-1, 5.68 cm-1, and 6.03 cm-1, respectively. This indicates that GaN on Si has the best crystallinity at room temperature, evidenced by the narrowest FWHM, while GaN on Sapphire exhibits the least crystallinity. Upon heating from 100°C to 300°C, the E2(high) peak shifted to lower frequencies for all samples, with corresponding FWHM increases, indicating changes in lattice dynamics and crystal quality with temperature. The GaN on Sapphire, Si, and ZnO substrates showed peak shifts of 4.39 cm-1, 4.37 cm-1, and 2.98 cm-1, and FWHM increases of 2.69 cm-1, 3.38 cm-1, and 10.12 cm-1, respectively. These findings suggest that GaN on the Sapphire substrate might offer the most promising future for high-temperature semiconductor devices, such as High Electron Mobility Transistors (HEMTs), Schottky diodes, power ICs, RF amplifiers, and microwave devices, due to its superior crystalline quality at elevated temperatures, enhancing device reliability and efficiency.

An Affordable Instrumentation for Light Beam Induced Current Measurement of Solar Cells
Poster #11 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): David Beverly, Kevin Kellner, & Peyton White
Research Mentor(s): Sandip Das

Solar cells are used to convert sunlight into usable energy. However, during or after solar cells are manufactured, they often contain many defects. These defects reduce the power output of the solar cell. Therefore, inspection and measurements must be carried out to sort the good quality cells and discard the poor-quality cells which contain defects beyond permissible limits. Such defect identification is also important for research and development of solar cells. In this project, we have built a 3D-printer based system to scan solar cells using laser light. The solar cell is placed on the movable base of the 3D-printer, which is programmed to move in a raster pattern. As the base moves, the laser spot moves over the solar cell and generates a small current, which is then converted to voltage using a transimpedance amplifier and recorded using an analog-to-digital converter. The device was built by first stripping apart a commercially available 3D printer and then modifying its electronic circuitry to gain control over its operation and retrofitting our own circuit consisting of a microcontroller, laser driver, motor driver, and a power supply. The microcomputer controls the stage of the 3D-printer, the laser diode, and reads the output current/voltage data. To control the device and perform the experiment, a graphical user interface (GUI) was built. After the solar cell is fully scanned, the desktop-based GUI program constructs a picture of the cell using the current/voltage data that displays the quality of the scanned cell. Our research can lead to affordable LBIC instrumentation and can help improve solar cell technology.

Analyzing Internal Resistance in Lithium Nickel Cobalt Oxide (LiNiCoO) Vehicle Batteries for Enhanced SOC and SOH Prediction
Oral Presentation (Microsoft Teams)
Friday, April 19th
1:00pm – 1:15pm
Undergraduate Student(s): Mason Snyder, Anish Sankuratri, and Mustafa Raza
Research Mentor(s): Beibei Jiang

Internal resistance of a battery reflects its distinct characteristics, including factors such as state of health (SOH), state of charge (SOC), reversibility, thermal runaway, etc. Variation of the internal resistance with the testing currents (i.e. C-rate) suggests a relationship between internal resistance and the number of charges stored in the electrode materials (i.e. the SOC of the battery). Additionally, internal resistance is influenced by the homogeneity of the charge

distribution under various testing currents (i.e. whether the charges are locally distributed near the surface area due to diffusion limitations or homogeneously stored in the electrode materials). The determination of internal resistance and the examination of the correlation between internal resistance and deliverable capacity can be utilized to predict the SOH and SOC of the battery, and even to understand its aging mechanisms. The paper introduces a simple approach based on modified intermittent current interruption (ICI) methods to characterize the internal resistance at controlled voltage (or SOC). The paper elucidates that the lifetime of a battery can be divided into four stages - initial stages, transition states, stable states, and aged stages, wherein each stage exhibits a unique relationship between internal resistance and SOC. The stable stage of the battery is characterized by the lowest internal resistance among the four stages. Both the stable stages and transition stages exhibit a distinctive decreasing trend in internal resistance while increasing SOC. The paper also identifies a robust correlation between the usable capacity of the battery and internal resistance, in which the deliverable capacity experiences a significant drop when internal resistance increases, particularly in aged batteries and batteries tested under large testing current. An analytical model is proposed to correlate the rise in internal resistance with changes in deliverable capacity, SOC, and SOH under various testing currents. Furthermore, when integrated with the Electrochemical Impedance Spectroscopy (EIS) methods, the correlation of internal resistance becomes a valuable tool for predicting SOC and SOH and comprehending the battery's aging mechanisms.

Concrete Bridge Crack Segmentation using Deep Learning
Poster #25 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Kiara O'Neal & Frank-Cedric Kadjo
Research Mentor(s): Da Hu

This research project tackles the inefficiencies and limitations inherent in conventional bridge inspection methods, particularly the challenges of detecting structural cracks. Traditional approaches are characterized by their labor-intensive nature and significant time and cost requirements and often necessitate temporary bridge closures, causing traffic disruptions and inconvenience. This study proposes an innovative solution that integrates advanced computer vision techniques with drone technology to revolutionize the bridge inspection process. In addressing the critical need for safety and maintenance in transportation infrastructure, this research adopts a methodology that leverages drones equipped with high-resolution cameras. These drones are utilized to capture comprehensive aerial imagery of bridges, focusing on identifying cracks and structural deficiencies. The collected data undergoes processing to support accurate and efficient crack detection, serving as a vital tool for maintenance and safety decision-making. The findings from this study indicate that adopting this automated crack detection system significantly improves the precision and reliability of bridge inspections. By offering

infrastructure managers detailed insights into the condition of bridges, including the presence and severity of cracks, the proposed approach not only enhances the safety and durability of bridges but also streamlines the inspection process. This advancement allows transportation authorities to bypass the drawbacks of traditional methods, achieving cost savings and reducing operational disruptions. This research stands as a landmark in the application of technological innovation to bridge safety, marking a significant leap forward in the domain of infrastructure maintenance and management.

Design of a Novel Controlled Radiation Capsule for Improved Brachytherapy Cancer Treatment

Poster #12 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): David Roque, Junia Nguyen, Cassidy Moreau, Luke Ezzell & Kevin Lu
Research Mentor(s): Hoseon Lee

Annually, approximately 7 million undergo cancer radiation therapy, with 3.5 million cured. Brachytherapy (internal radiotherapy) has two delivery methods: High-Dose Radiation (HDR) and Low-Dose Radiation (HDR). HDR employs high-energy radiation with higher risks to surrounding tissue; LDR has lower risks but longer treatment. In conclusion, the proposed capsule is a combination of the advantages of HDR and LDR resulting in minimizing the radiation risk and treatment time with the potential applications on intracavity cancers. A nuclear radiation simulation tool called TOPAS is used to simulate the difference between the conventional I-125 radiation seed and the proposed design. The results show that conventional seed emits radiation omnidirectionally, and the proposed device blocks the radiation everywhere except the opening "window" where the radiation targets the tumor. For this project, the dosimetry calculations were conducted to figure out the amount of grams of I-125 and the number of radiation seeds in order to determine the dimensions of the capsule. To design the capsule, Solidworks was used to create the inner and outer cylinders and walls, as well as windows through which the radiation can be released. The dimensions are based on dosimetry calculations and TOPAS simulations. COMSOL, a Multiphysics simulation software, is used to simulate both the electromagnet and permanent magnet, allowing easy adjustments to the material and size of the permanent magnet, as well as the current in the electromagnet. These modifications enable finding optimal conditions where the permanent magnet is weak enough to repel yet strong enough to stay attached when the capsule is inactive. Target cancer types are intracavitary cancer such as esophageal, cervical, nasal, oral cavity, but can also include cancers in the eye and brain, due to very localized radiation and minimal risk to surrounding healthy cells and tissue.

Developing an AC Power Generator for Wireless Coupling in Radiation Capsule Circuit
Poster #38 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Sowjanya Palagani & Batool Batool
Research Mentor(s): Hoseon Lee

This Project main goal is to design a capsule inside and outside of Body for cancer treatment. A halfwave rectifier circuit was used to convert AC to DC current to drive the electromagnet inside the capsule. The inner capsule is moved up and down to control the opening and closing of the capsule. This is done using an electromagnet (solenoid). The electromagnet needs a DC current to move up or down. If there is an AC current to solenoid it will fluctuate. Input current should be sinusoidal because it minimizes harmonic distortion, reduces power losses and is compatible with most electrical devices and systems. Current through solenoid should be DC, because it produces a constant magnetic field within the solenoid coil, which is often required for various applications like electromagnets and inductors. For this circuit Frequency is 13.56MHz, and from that a DC current of 5mA is achieved, which is constant current. To test the circuit, an AC power signal generator is designed, and the Model of AC Power signal generator is XP-720 has 3 fully regulated supplies; The voltages range from 1.25 to 15 volts for both positive and negative voltages at 1 Ampere. Other voltages include 3 to 30V and 5V at 3 Amperes and the frequency of the AC power supply is limited to 60 Hz. After testing the AC power signal generator, an AC signal at 60 Hz was achieved.

Development of a Wearable Oximeter to Monitor Blood Oxygen Levels in Children with Sickle Cell Disease
Poster #37 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Tiger Wang
Research Mentor(s): Paul Lee

Sickle cell disease is a chronic condition that affects many people around the world, especially those of African descent. Such a condition requires a lifetime of monitoring, as people with sickle cell disease are likely to suffer from episodes of anemia, which can cause immense pain and life-threatening complications. One of the more severe complications arise from the red blood cell's reduced ability to carry oxygen, leading to stroke. People who have sickle cell disease will require constant monitoring of their blood oxygen levels to prevent stroke. Currently, people suffering from sickle cell disease have to primarily resort to conventional monitoring methods that require a collection of blood samples. However, children who have sickle cell disease are less likely to

cooperate or tolerate invasive methods of monitoring. Because of this, there is a need to research and develop a non-invasive device that is able to monitor the blood oxygen status of young patients. This research project aims to use near-infrared spectroscopy, or NIRS, technology to develop a wearable oximeter that can provide blood oxygen level readings without the need to extract blood samples. The device will use a near-infrared light emitter and a sensor to capture oxygen concentration in tissue and display the readings onto a screen. A major part of the development of a prototype is the design and assembly of the PCB board which contains the emitter and the sensor. This process entails designing a schematic in EagleCAD and importing the PCB design for production. Once the PCB is received, the on-board microcontroller will be programmed to control light emission and the capture of data through sensors. Finally, the components will be integrated into the wearable device. Other researchers will calculate scattering coefficients and other formulas for the interpretation and calculation of near-infrared light data. These calculations will be integrated into the device, and a complete functional prototype will be used in real-patient testing in children hospitals around Atlanta. The end goal is to produce a wearable oximeter that is both cost effective to produce and accurate enough to serve as a viable blood oxygen level monitor.

Effects of a Wi-Fi Link on the Performance of a Path Following Autonomous Ground Vehicle
Poster #3 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Anthony Iwejuo & Austin Cagle
Research Mentor(s): Billy Kihei

As vehicles become more automated and connected, the future of safe and efficient travel will be dependent on efficient wireless networks. Artificial intelligence (AI) demands high power resources and computing resources that can be resource-intensive for mobile robotic systems. A new paradigm involving the remote computing of A.I. can enable robotics that are built lighter and more power efficient. In this study, we compare a locally run artificial intelligence algorithm for autonomous ground vehicle navigation against remote computation through various wireless links to highlight the need for low-latency access to remote computing resources over Wi-Fi network calls. Our findings show that Wi-Fi links can support remote autonomous navigation applications for autonomous vehicles under certain conditions.

Enhanced State-of-Health and State-of-Charge Estimation for Batteries via Internal Resistance Variations and Usable Capacity Correlations
Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
1:00pm - 1:50pm

Undergraduate Student(s): Taylor Shurns, Michael Woodall, Braeden Arnold, Tanya Mudrik, & Tara Joshi
Graduate Student(s): Yan Chen
Research Mentor(s): Beibei Jiang

*Internal resistance of a battery reflects its distinct characteristics, including factors such as state of health (SOH), state of charge (SOC), reversibility, thermal runaway, etc. The paper develops a simple approach based on modified intermittent current interruption (ICI) methods for characterizing the internal resistance (**Rint**) and variations of internal resistance (**ΔRint**) at different SOC and different C-rates. The decreasing trend of **Rint** while increasing SOC, alongside the notable increase in **Rint** coupled with capacity loss, highlights the potential of **Rint** as a reliable indicator for assessing both SOC and SOH of the battery. More importantly, the paper presents a pioneering study on **ΔRint** between discharged states and charged states and identifies a strong correlation between **ΔRint** and the usable capacity of the battery, indicating that **ΔRint** could be an enhanced parameter for predicting the SOC and SOH of the batteries in Battery Management System (BMS) applications. The **ΔRint** model, which allows us to focus on the changes caused by charge transfer during the lithiation and delithation process, provides a more robust solution for predicting SOC and SOH of the battery while overcoming cell-to-cell variations in battery packs.*

Enhancing Spatial Awareness of Robotic Dog: Integration of LiDAR and Depth Data
Poster #7 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Charles Koduru & Shrey Patel
Research Mentor(s): Muhammad Hassan Tanveer & Razvan Voicu

The development of robotic systems has expanded across various sectors, including industry, security, and user assistance. For these systems to be effective, they must possess the capability to be aware of their surroundings. This awareness is typically achieved through the use of sensors. Enhancing these primary sensors with supplementary sensing methods and fusion, such as RGB-D via stereoscopic or other techniques, increases accuracy and yields more detailed results. To address the inherent limitations of 2D LiDAR (Light Detection and Ranging) and RGB-D cameras, a complementary approach is adopted. LiDAR sensors allow a robot to scan and map its environment enabling it to plan a path and accurately avoid obstacles. However, thin or metallic objects can cause noise in the LiDAR scan that appear as irregularities on the map. By cross-referencing data from a depth camera (RGB-D) a three-dimensional perspective is introduced, equipping the robot with a holistic field of view by giving context to the mapping irregularities. Using ROS simulation tools such as Gazebo and RVIZ, LIDAR, and RGB-D data will be collected and tested to understand how it can subsequently be fused into a single dataset.

Previous studies for LiDAR and RGB-D cameras have been used for indoor applications, in contrast, our research focuses on both indoors and outdoors resulting in a more optimized algorithm for environment scanning and navigation. Utilizing the GoAir 1 robot dog, testing and data capture can be generated in uneven outdoor terrains where trees, roots, and bushes can limit the navigation of traditional wheeled mobile robots. By using generative mapping techniques such as Simultaneous Localization and Mapping (SLAM) and Generative Adversarial Networks, autonomous path planning, and obstacle avoidance in various environments can become more efficient.

Further Developing the Efficiency of Remote Charging Through Near-Field Analysis of a Patch Antenna Array in the Fresnel Region
Poster #37 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Shil Shah & John Gauger
Research Mentor(s): Hoseon Lee & Walter Thain

Wireless charging is most commonly known as very close distance charging, such as charging your phone on a pad charger, or earbuds charging inside the earbud case, where the distances are approximately 1cm. This type of wireless charging has been around for a long time and it is based on inductive charging. But what if there was a wireless transmitter in a wall that could charge a desktop sitting on a desk via a receiver? This cannot be done through inductive charging like the phone or earbuds and requires antennas. Far-field wireless power transfer has also been investigated for the past couple of decades. However, there is a fundamental limitation of very low power in the far-field. In this project, near-field analysis will be conducted on a patch antenna plus arrays of patch antennas to understand the limitations of Fresnel field wireless charging and determine to what extent it can be used. This research includes CST antenna simulations as well as testing of a physical antenna in the newly acquired Starlab Antenna Measurement System by MVG. Variables such as efficiency, focal distance, and optimal Fresnel field are calculated to determine the optimal near-field distance and power output of the antenna. These variables can be implemented to determine charging times based on battery size, distance, and optimal antenna array size to achieve the most efficient speed. This research will give us a better understanding of the feasibility of wireless power transfer in the Fresnel field based on quantitative analysis from simulation results and calculations.

Hardware Design of Earbuds with Biometric Sensors and ear-EEG
Poster #10 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Colby Baldwin, William Hall & Zach Williams

Research Mentor(s): Hoseon Lee

Recently there has been a burst of wearable electronic devices from VR headsets to AR glasses to smart watches and biometric sensing rings. One recent patent from Apple was on earbud-based sensors for biometric sensing as well as EEG signals from the ear. There is an Ear-EEG device called MN8 that measures EEG signals in the ear while listening to music but has only one channel per year with limited applications and a high cost. OpenBCI has ear EEG with no audio and a bulky circuit that connects on the back of the head. This project is on developing an in-house earbud hardware for EEG and biometric sensing. The hardware includes circuit design, microcontroller board layout, antenna, battery, and interface between the hardware and software. The circuit design required amplifiers due to the micro-scale amplitudes of the EEG signals, and filters to filter out noise and separate the EEG signals based on frequency. A priority for the microcontroller was to minimize the size as much as possible. Based on the antenna, microcontroller, charger, and signal board the possible designs are a 2-board solution or a 3-board solution for the layout. A nRF53 chip was used to interface with the hardware, allowing us to send data from the user's brain to a phone via Bluetooth. Utilizing BLE and the onboard ADC, analog signals can be sent as digital signal values to the phone for analysis. For the battery, 3V lithium-ion batteries. Analysis of the tradeoff between size and gain of a planar, inverted-F antenna versus a chip was conducted to find the optimal solution for the ear-EEG hardware. Recently, the first and only antenna measurement chamber has been acquired at KSU, which will be utilized to test the antennas for the earbud. Future work includes PCB fabrication and testing.

Influence of Al2O3 Passivation Layer Thickness on the Thermal Stability and Quality of MOCVD-Grown GaN on Si
Oral Presentation (Microsoft Teams)
Friday, April 19th
2:30pm - 2:45pm
Graduate Student(s): S M Atiqur Rahman & Manika Tun Nafisa
Research Mentor(s): Ian T. Ferguson & Benjamin Klein

This research delves into the significant impact of varying thicknesses of the Al_2O_3 passivation layer on the thermal stability and crystalline quality of GaN on Si structures, an essential aspect for the next generation of high-temperature electronic and optoelectronic devices. By adopting metal-organic chemical vapor deposition (MOCVD) for the growth process, we analyzed structures with different $A_{l2}O_3$ passivation layer thicknesses: none, 2 nm, 10 nm, and 20 nm, each built upon the GaN layer. Through Raman spectroscopy, we meticulously assessed the changes in the E2 (High) phonon mode's peak position and full width at half maximum (FWHM) from room temperature up to 300°C. The outcomes highlighted a pronounced relationship between the Al_2O_3 layer thickness and the GaN on Si structures' thermal behavior

and crystalline state. The structure with no Al_2O_3 layer presented a notable peak shift from 563.23 cm-1 at room temperature to 558.75 cm-1 at 300°C, with FWHM expanding from 9.15 cm-1 to 14.90 cm-1, indicating the least thermal stability. Remarkably, the structure with a 20 nm Al2O3 passivation layer exhibited the highest thermal stability, with the peak position altering minimally from 564.29 cm-1 to 560.15 cm-1 and FWHM increasing from 7.10 cm-1 to 10.76 cm-1 over the same temperature range. This structure stands out as the most favorable for high-temperature operational environments, evidencing that optimal Al_2O_3 passivation layer thickness can significantly improve GaN on Si devices' thermal stability and crystalline quality. Such findings are vital for designing and developing robust devices capable of enduring extreme thermal conditions, particularly in power electronics and high-frequency transistor applications, where material performance and device reliability are paramount.

Low-Cost Shortwave-Infrared Spectroscopy (SWIRS) for Stroke Risk Screening in Pediatric Sickle Cell Disease
Oral Presentation (Microsoft Teams)
Friday, April 19th
2:00pm – 2:15pm
Undergraduate Student(s): Katie Cho
Research Mentor(s): Paul Lee

Sickle cell disease (SCD) has a profound effect on the brain. In sub-Saharan Africa where most SCD patients (~75%) live and access to medical care is limited, ~11% of SCD children will develop a stroke by the age of 20. Although early identification is critical to treatment, transcranial doppler ultrasound (TCD), the standard screening tool, is not widely available in low-resource settings due to its high cost and need of trained personnel. Speckle contrast optical spectroscopy (SCOS) may provide a user-friendly and cost-effective solution to this unmet need. SCOS is an emerging optical technique that can quantify blood flow in deep tissues (> 0.5 cm) with an inexpensive instrumental cost. Traditionally, SCOS uses a near-infrared (NIR,700-900nm) light source and a CCD/CMOS array to detect variations in the spatial speckle patterns at the tissue surface that are caused by moving red blood cells. However, NIR SCOS suffers from an insufficient SNR for the noninvasive brain monitoring and the detected signals are significantly contaminated by the extracerebral layer contribution. Therefore, the project goal is to investigate the feasibility of an affordable SWIR SCOS system for assessing brain blood flow in deep tissues by performing a computational verification in comparison with the NIR SCOS system. From the basis of work done previously, instrumental noise factors will be added to the simulations, as well as a more realistic three-layered tissue model. Depth sensitivity at SWIR and NIR SCOS will be compared by assessing relative changes between extracted cerebral blood flow indices (BFI).

Motion Detection within a Car

Oral Presentation (Microsoft Teams)
Friday, April 19th
2:00pm - 2:15pm
Undergraduate Student(s): Annie Solomon & Christian Sao
Research Mentor(s): Sumit Chakravarty

Using a systematic motion detection system, it becomes possible to track the amount of motion occurring within varying areas, and assess the overall disruption and harm it can cause. Assessing the amount of movement within a car can interpret the conditions the driver is experiencing, and allow for the evaluation of the overall disruption and distress that is being tolerated. By understanding the abundance or lack of movement within an area, one can gauge the risk produced. The overall effect passenger interactions have on a driver's ability to maintain a decent level of security is significant. Radar usage in junction with car systems is becoming especially prominent within automobile design. Autonomous car systems and basic car networks are incorporating radar, allowing for gesture recognition of traffic controllers and safety tracking of drivers. The goal of this project was to utilize radar and micro-doppler signatures to track movement within a car, and assess the danger produced. This design and product would ensure the driver's atmosphere is calm and undisturbed, promoting a safer driving environment. This procedure would include a radar system detecting the total motion, and micro-doppler signature generation to demonstrate the overall amount of motion occurring. The device utilized is the AWR6843ISK mmWave sensor provided by Texas Instruments. The software used to interpret and collect data is MATLAB

Neuromorphic Swarm for Solving Combinatorial Optimization Problem
Poster #34 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Stephen Colletta, Nathan Hamilton, David Cruz & Brianna Jenkins
Research Mentor(s): Yan Fang

Combinatorial optimization problems prevail in engineering and industry. Some are NP-hard and thus become difficult to solve on edge devices due to limited power and computing resources. Quadratic Unconstrained Binary Optimization (QUBO) problem is a valuable emerging model that can formulate numerous combinatorial problems, such as Max-Cut, traveling salesman problems, and graphic coloring. QUBO model also reconciles with two emerging computation models, quantum computing and neuromorphic computing, which can potentially boost the speed and energy efficiency in solving combinatorial problems. In this work, we explore neuromorphic QUBO solver composed of a swarm of spiking neural networks (SNN) that conduct a population-based meta-heuristic search for solutions. The proposed model can achieve

about x20 40 speedup on large QUBO problems in terms of time steps compared to a traditional neural network solver. We also explore the hardware-software codesign for the proposed solver via high level synthesis.

RF System for Concurrent Polarization Control and Beam Steering in IoT Sensors in LoRa Networks

Poster #39 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Tad Moskwa, Angel Ortiz & Matt Lanum
Research Mentor(s): Hoseon Lee, Walter Thain & Ahyoung Lee

LoRaWAN is a communication for long range, wide area networks, that can communicate at much greater distances than WiFi or Bluetooth with less power consumption. Potential applications include improved network communication reliability for 5G/6G networks, and improved reliability at extended distances for Internet-of-Things (IoT) sensors deployed at remote distances. The problem is that current LoRaWAN gateways use monopole antennas with gain of 5 to 7 dBi, which is too low to reach distances of 10 miles or more. This project is on using antenna arrays and designing an RF system to control the beam steering and match the polarization with the receive antenna to maximize the signal power to the receiver IoT sensors. For outdoor applications, the motivation is to extend the distance between LoRa gateway and IoT sensors to beyond 10 miles to 30 miles or more. The RF system was designed using Keysight SystemVue and simulated via phased array analysis. The system is comprised of a TX phased array RF chain with the antennas co-located for dual polarization simulation. Algorithms created in the onboard script editor are used to construct 3D beam plots and beam polarization graphs. For indoor applications, an alternate approach is investigated using Bluetooth IoT sensors. A 4x4 array antenna is used to determine the direction of each IoT sensor using angle of arrival (AoA) and angle of departure (AoD). On the transmitter's side, the protocol packets are modified for locating purposes in low signal strength environments. The antenna array is used to find differences in the phase to locate the transmitting device. The benefits for indoor applications are to locate IoT sensors that are hidden, hard to see, and/or reach.

Single-Channel Direction of Arrival System for Vehicle-to-Everything Communications

Poster #33 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Samuel Amoah
Research Mentor(s): Billy Kihei

Accurate estimation of Direction of Arrival (DoA) for safety messages in Vehicle-to-Vehicle (V2V) networks is important for supporting collision avoidance. While single-channel receiver DoA methods are cost-effective and feature low computational complexity to achieve a low angular resolution, on the other hand multi-channel receiver DoA methods feature highly complex systems to achieve a high angular resolution. However, the V2V context does not need a high angular resolution due to the larger dimensions of vehicle compared to their antenna locations. This work develops a novel DoA method utilizing a single-channel receiver method for V2V which uses a three-element antenna array. The antenna elements are amplitude biased such that DoA sensing, and data recovery can take place simultaneously. The system has been shown experimentally to have a high accuracy and low false alarm rate.

STEM Peer Augmented Success & Support (STEM-PASS)-Using TI-Robotic Kits and EEG-enhanced Brain Augmented Technology Research of Attention

Poster #3 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Amelia Dodson, Fernanda Herrera-Candanedo, & Jonathan Yeager
Research Mentor(s): Cyril Okhio

This research was conducted to investigate attention and learning related issues. Electroencephalography (EEG) techniques were used to analyze the effects of immersive content on learning outcomes and the efficacy of differing music genres within the learning environment. Examination of the impacts of components, such as the Eriksen Flanker Task, Music, and Immersion Technologies (VR and AR), were studied using EMOTIV Tools such as EPOC Flex, EPOC X Headsets, zSpace 3D laptop, and Oculus Quest 2 Headset. Participants were fitted with the above Tools and put through the Eriksen Flanker Tasks which utilizes congruent, incongruent, and neutral stimuli to evaluate attention. This test was completed once without music, three times with unique music, and then once more without music. Participant data was analyzed in MATLAB for Alpha, Beta, and Theta waves, which are associated with attention and concentration. Analysis showed that activities requiring minimal engagement like 3D Cube observation without manipulation were associated with passive focus, while activities accompanied by distraction required a higher degree of cognitive effort for focus to be maintained. Overall, this research produced an enhanced understanding of attention dynamics in immersive environments.

Supporting the Learning of Complex Molecular Biology Concepts with a Mixed-Reality (MR) Storytelling Experience

Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th

11:00am - 11:50am
Undergraduate Student(s): Sonaj Sanders, Gabe Purcell, & Andrew Daugherty
Research Mentor(s): Lei Zhang

Complex molecular biology concepts such as DNA damage and repair mechanisms involve an intriguing process with different types of proteins and their interactions and present a learning challenge to students at all levels with traditional instructional approaches. Recent practices of combining immersive technologies such as virtual reality (VR) and wearable augmented reality (AR) with digital storytelling to explain complex science concepts through an embodied and experiential learning experience have seen positive evidence in increasing learning engagement and motivation, providing promising new pedagogical strategies to supplement textbook instructions. This research project utilizes the latest MR technologies (wearable augmented reality and immersive virtual reality) and devices and develops a custom immersive and interactive storytelling experience centering around the main DNA repair mechanisms: the roles of MRN complex and p53 protein molecules. The immersive story breaks down the complexity of the concepts with engaging sci-fi narratives and reinforces learning through gameplay interactions. The overarching goal of the project is to explore how a blended virtual and augmented storytelling experience helps with a learner's comprehension of complex molecular biology concepts and to understand the overall learning experience among users. The effectiveness of the MR storytelling experience and learning outcome will be accessed through a small-scale user study.

Engineering Technology

Numerical Investigation of Vortex Breakdown of a Compound Delta Wing at High Angles of Attack
Poster #21 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Lily Richard
Research Mentor(s): Gaurav Sharma

Delta wings are the leading wing geometry in modern aerospace engineering, being present in today's most advanced planes such as NASA and Lockheed Martin's recently unveiled X-59 quiet supersonic aircraft. The wings offer exceptional performance and maneuverability at supersonic speeds. As delta wings stand at the forefront of engineering, much research and computations have gone into their construction and performance. Many studies today, including this investigation, use computer simulation to imitate the flow around wing geometry to observe the conditions and quantify the results by solving the complicated sets of Navier-Stokes

equations. This investigation uses Ansys Fluent to study wing geometry at supersonic and sub-sonic speeds. Though there are multiple types of delta wings, this investigation specifically examines compound delta wings. These wings take on a similar triangular shape to other delta wings but contain a secondary sweep angle to their wing. The investigation sought to observe how the geometry of the leading edge affected vortex breakdown and general flow conditions as the angle of attack grew (specifically focusing on high angles of attack: ranging from 0 to 20 degrees). The investigation used multiple different 3D-modeled wings developed in the program SolidWorks. The leading edge of these models took different forms involving the length of the leading edge, the primary sweep angle (ranging from 170 to 250 degrees) and the secondary sweep angle. The research found that the shape of the leading edge greatly affects the performance of a compound delta wing at high angles of attack.

Robot Drone Navigation in Complex Terrains for NASA's Space Exploration
Poster #11 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Christine-Marie Lirazan, Thomas Brown, Solomon Fleury, Emilio Castaneda, Johnston Ejoga & Timothy Van Ryn
Research Mentor(s): Turaj Ashuri & Amir Ali Amiri Moghadam

Within the past century, space agencies worldwide have expanded their presence beyond Earth. A standout example is the Ingenuity Mars Helicopter mission in 2020. Alongside this, soft robotics has emerged as an exciting field with the potential to transform how robots operate. Soft robots, made of flexible materials and driven by inflation or tendons, offer versatility in movement. This project aims to create a new type of robot combining a quadruped walker with a drone, featuring 3D printed soft legs designed for navigating Mars' rugged terrain. First, a literature review was conducted to investigate common defects in contemporary drone designs, concluding that the integration of legs rather than wheels mitigates the issue of limited ground mobility. Using tools like SolidWorks for designing the body of the robot and a microcontroller for coding the brain and sensors, a hybrid ground-aerial drone was developed capable of maneuvering through Martian landscapes, including sandy and dusty areas. This robot's design enables it to explore narrow, inaccessible spaces like caves, which were previously off-limits. While this prototype marks a crucial step, future versions will improve attachment systems and enhance leg flexibility and freedom of movement, promising significant advancements in space exploration.

Industrial and Systems Engineering

Blood Donation Frequency Related to Social Media Usage and Preferences

Poster #17 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Isabel Acklen
Research Mentor(s): Robert Keyser, Lin Li, Joy Li, & Maria Valero

The decline in blood donations from younger generations, coupled with an aging baby boomer donor base, presents an ongoing public health concern. Blood transfusion is a crucial service of health care systems, contributing to saving and improving millions of lives every year. However, the shortage of blood donors threatens national supplies in many countries, including the United States. The aging blood donor population plus increasing life expectancy worldwide have contributed to an imbalance between new demand and the current supply of blood. Collaborating with MEDIC Regional Blood Center, this project aims to support the larger study effort of recruiting and retaining young blood donors by looking into how donation frequency impacts the preference of using mobile apps for donation and investigating significant factors that affect the likelihood of donating blood. By gathering and analyzing information on mobile app preferences from blood donors, this project aims to allow for the creation of a successful app that will welcome and encourage a younger, more technically savvy generation of donors in their blood donation journey.

Design and Analysis of High-Bypass Turbofan Engine Nacelle to Enhance Performance
Oral Presentation (Microsoft Teams)
Friday, April 19th
1:30pm - 1:45pm
Undergraduate Student(s): Mouhamadou Diop
Research Mentor(s): Adeel Khalid

The CFM56-7B, a high-bypass turbofan engine developed by CFM International in collaboration with General Electric and Safran Aircraft Engines, represents a cornerstone in modern aviation propulsion, extensively powering aircraft models like the Airbus A320, Boeing 737 NG, and Embraer E-Jet families. The aviation industry is grappling with multifaceted challenges, including those related to environmental sustainability, rising fuel costs, and higher competitiveness. Continuous improvements in aircraft and engine economy are essential to meet these challenges. The objective of the research is to identify opportunities to enhance the performance and efficiency of the CFM56-7B engine, one of the most popular engines in the market. With the intention of modifying the nacelle's profile to increase pressure inside the inlet, an examination of wind speeds and pressure on the CFM56-7B engine's inlet is presented. The efficiency and performance of the engine can be increased by optimizing the airflow through the nacelle, which can result in less fuel being used and fewer pollutants. The size and shape of the nacelle are modified in this research. The goal is to determine the optimal combination of these

parameters that will help maximize the air pressure before the compressor. This will help increase inlet and compressor efficiency and overall engine performance.

Evaluating the Health Benefits and Cost-Effectiveness of Dental Sealant Reapplication among Children and Adolescents
Poster #34 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Graduate Student(s): Pritam Deb & Jayden Ayash
Research Mentor(s): Christina Scherrer

Dental caries, commonly known as cavities, persist as a prevalent chronic disease among children. Dental sealants, which are transparent coatings applied to the molars, have been proven to prevent over 80% of caries in these teeth. However, the effectiveness of sealants diminishes over time, primarily due to their potential to detach shortly after application due to inadequate bonding, or else gradually over time. Notably, dental insurance coverage for resealing teeth after the initial sealant has been lost varies widely, with many policies only covering the cost of the initial application. This study employs a Markov model-based discrete event simulation to explore four distinct resealing policies for the first molars of a hypothetical cohort of 7-year-olds who have just received their initial sealants. We assess the health impact of these policies in terms of the reduction in first molar caries and the decrease in disability-adjusted life years (DALYs), alongside cost-effectiveness from reduced cavity fillings. The findings of this study aim to provide valuable insights to policymakers and insurance providers regarding the cost-effectiveness of including first molar resealing in their coverage policies.

Implementation of Sustainable Lean Management Practices in a Small-Medium Sized Enterprise
Poster #36 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Ryan Waltman
Research Mentor(s): Parisa Pooyan

In a world facing unprecedented environmental challenges, the urgency for sustainable practices within organizational frameworks has never been more critical. By harmonizing economic principles with environmental stewardship and social responsibility through the scope of Triple Bottom Line (TBL), sustainable lean management practices emerge as indispensable tools for navigating the complexities of our contemporary global landscape. This research project delves into the imperative adopting of such practices within an Atlanta-based Small to Medium-Sized Enterprise (SME) with ~200 employees by following a sequential approach encompassing

multiple steps. Initially, top-level management of different divisions was interviewed, followed by subsequent interviews with floor-level and high-level employees of each division to gather diverse perspectives over a 6-month period. Thereafter, a survey with targeted questions was constructed based on the initial data analysis as well as the insights gained from all rounds of the interviews to elicit specific information pertinent to the TBL strategies. The resulting analysis brought to light multiple solutions including: 1) introducing a short media clip for new hires to offer headway for the executives to express expectations and deliver general information; 2) providing clear written guidelines as well as short media clip from experienced employees for task implementation; 3) offering frequent and constructive feedback mechanisms to enhance employee performance; 4) establishing solid pathways for promotion and growth to boost employee morale and engagement; and 5) devising a strategy for continuous improvement with specific next-step outlines for follow-up assessments. We believe that our adopted holistic approach, reflecting the TBL principles, ensures a comprehensive understanding of the issues at hand and offers a creative potential for SMEs to not only mitigate environmental degradation but also foster resilient, socially equitable organizations through supportive and inclusive atmospheres, which is ultimately poised for long-term economic success without sacrificing the bottom line.

An Ordinary Differential Equations Model to Assess the Impact and Cost-Effectiveness of Fluoride Varnish for Young Children
Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
1:00pm - 1:50pm
Graduate Student(s): Mahdiyeh Soltaninejad
Research Mentor(s): Christina Scherrer & Glenn Young

Receipt of fluoride varnish (FV) is recommended at regular intervals as soon as teeth emerge to help prevent dental decay. This project leverages modeling using ordinary differential equations (ODEs) to offer insights into the impact and cost-effectiveness of increasing FV application among children aged 1-5. We employ a modeling approach including five health states, perfect dental health through early decay and decay, for pediatric teeth, with and without FV application. The transition rates between these states are determined through a combination of prior research findings and nationally available dental health data. Traditionally, modeling of oral health dynamics has been done using Markov models. Here we use an ODE-based model, commonly used in other healthcare modeling. ODEs offer a continuous representation of dental health dynamics, to capture continuous changes in dental enamel remineralization, making it well-suited for modeling the impact of FV applications on young children's dental health over time. The simulation model is implemented in MATLAB, following a large hypothetical population with an initial age of one year. We present simulation results on the impact of FV application on the progression and regression of early decay, overall number of cavities, and

disability-adjusted life years (DALYs). We calculate cost-effectiveness in cost per averted cavity and cost per averted DALY. We then compare model results from the ODE to those from a more conventional Markov model. This research represents the first use of ODE modeling to analyze oral health intervention strategies, thus providing a novel framework for oral health research. While Markov models have traditionally been the only choice for oral healthcare cost-effectiveness analysis, the ODE-based approach shows promise in this context, allowing for considering continuous dynamics in the evaluation process. Results of this research also demonstrate that FV application is cost-effective under a reasonable variety of assumptions and treatment intervals.

Resin-based versus Glass Ionomer Dental Sealants: A Detailed Literature Review for Cost-Effectiveness Analysis
Poster #19 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Graduate Student(s): Jayden Ayash & Pritam Deb
Research Mentor(s): Christina Scherrer

Oral health has proven to be a crucial factor in the healthy upbringing of children. Due to the high prevalence of dental caries in children and adolescents, it is essential to increase access to preventive oral health tools aimed at reducing decay. Dental sealants are clear coatings applied to the molars that have been shown to prevent >80% of caries in those surfaces. These sealants typically come in one of two compositions: Resin-based or Glass Ionomer. Glass Ionomer sealants have become increasingly popular over the past decade due to their hydrophilic property allowing them to be applied easier in wet mouth environments in comparison to hydrophobic Resin-based sealants. In this research study a detailed literature review was conducted to highlight the differences in retention rate and caries prevention rates for these two dental sealants. Results from this research will be used to estimate parameter inputs for a Python-based simulation model to estimate the cost effectiveness of reapplying unretained dental sealants in adolescents.

Mechanical Engineering

Survey of Background Noise Level Inside Classroom on a College Campus
Poster #39 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Charles Packer, Antonio Patino, & Rosaly Flores Jimenez
Research Mentor(s): Laura Ruhala & Richard Ruhala

Sound level measurements are made for twenty classrooms and learning spaces on the Marietta Campus of Kennesaw State University in Georgia, USA. Excessive background noise in learning spaces diminishes the speech intelligibility from the speaker to the listeners and vice versa. Initial measurements are taken using an iPhone and NIOSH (National Institute for Occupational Safety and Health) Sound Level Meter application, and the noise measured is in empty or nearly empty classrooms with no one talking. In addition, conformance with ANSI-ASA S12.60-2010/Part 1 (Acoustical Performance Criteria, Design Requirements, and Guidelines for Schools) is evaluated. The Larson Davis Sound Level Meter, a Class 1 precision sound level instrument, is used to give a better understanding of the type of noise that is of highest significance. Nine of the twenty classrooms and learning spaces surveyed exceeded the maximum recommended background noise level of 35 dBA, with the most excessive violators located in the Mathematics and Textiles buildings with their HVAC systems operating. Next, a set of more controlled measurements are made, including accelerometer measurements on various parts of the target HVAC unit at each mode: high setting, low setting, and off. In addition to the sound level meters, the BK Connect system is used with both binaural headset microphone measurements and single microphone measurements to give a better understanding of the type of noise that is of highest significance. Following ASHRAE standards, it is shown that within the collected data, the most likely noise sources are due to turbulent air flow and fan noise. KSU is considering a trial modification of the duct-flow system in one classroom to reduce flow velocity and its associated noise level.

Analysis of Vortex Breakdown Over Compound Delta Wings
Poster #27 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Madison Sanford
Research Mentor(s): Gaurav Sharma

The phenomenon of vortex flow formation inherent to the compound delta wing geometry facilitates lift generation on the wing. At a specific angle of attack, the vortices undergo breakdown, resulting in a complete cessation of lift generation. It is widely acknowledged that vortex breakdown typically occurs within the range of 10 to 15 degrees, precipitating a significant decline in the lift coefficient. This phenomenon poses a considerable hazard to aircraft, potentially leading to mid-air stall events. Precisely determining this critical threshold is imperative for comprehending the behavior of the delta wing across both supersonic and subsonic flows. A combination of SolidWorks for geometry creation and Ansys Fluent for preliminary

simulations is employed to elucidate this critical threshold. Leveraging the computational capabilities of Ansys Fluent, particularly through the utilization of continuity and momentum equations, is anticipated to yield comprehensive insights into the flow field encompassing the compound delta wing. The iterative execution of simulations encompassing various angles of attack aims to pinpoint the formation and breakdown of vortices, thereby interpreting lift and drag coefficients, alongside other pertinent data essential for identifying the critical threshold associated with this phenomenon.

Classifying Road Debris Using Deep Learning Technique in Artificial Intelligence
Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
1:00pm - 1:50pm
Undergraduate Student(s): Joshua Daniel, Devon Hulse, & Arya Shah
Research Mentor(s): Sathish Gurupatham

According to a study done by AAA Foundation for Traffic Safety in 2016, road debris was a factor in an average number of 50,658 police-reported crashes between the years 2011-2014. This work addresses the critical problem of road debris detection and classification, a major threat to road safety, especially on highways. Road debris, such as barrels, car parts, puddles, salts, and trees, can cause accidents. Leveraging deep learning, we explored three pre-trained convolutional neural network (CNN) models - VGG16, MobileNetV2, and InceptionResNetV2 - to classify five types of road debris. We divided our dataset into training, validation, and testing sets, initially with 146, 73, and 49 images. After augmenting the dataset, we increased it to 875 training thermal images, 375 validation thermal images, and 114 testing thermal images. We evaluated the models' performance over various epochs with a learning rate of 0.0001, an Adam optimizer, and a batch size of 10. The VGG16 model emerged as the top performer, boasting a 100% training accuracy and a 96.65% validation accuracy. In testing, it correctly classified 90.35% of the images. Visualized confusion matrices showed consistent superiority for the VGG16 model across all debris types. This work underscores the efficacy of deep learning models in detecting and classifying road debris, with VGG16 as the most accurate and efficient model. It also emphasizes the importance of image augmentation, significantly improving model performance by expanding the training dataset's size and diversity. These findings have substantial implications for road safety. Implementing deep learning models for road debris detection can substantially reduce accidents, making roads safer for all users. Road authorities and safety organizations can leverage this research to develop automated systems for timely debris detection and removal, enhancing road safety.

Design and Development of a Compliant Knee Joint for Bipedal Robots
Poster #1 (Convocation Center, East & West Activity Wings)
Thursday, April 18th

1:00pm - 1:45pm
Undergraduate Student(s): Aaron Grann, Maddie Bishop, & Majazz Allah
Research Mentor(s): Ayse Tekes

There is still an ongoing effort in the design and development of legged robots in the field of robotics. Bipedal robots can imitate the walking gait cycle, hopping, and jumping type locomotion. To accomplish the gait cycle, the four phases of the gait cycle as double support phase, the pre-swing phase, the single support phase, and the post-swing phase should be successfully alternated in a sequence. Compliant mechanisms have been utilized in biomimetic designs due to their inherent properties such as bending of their flexible members rather than joints when forced and their ability to be manufactured as a single piece. This work presents the design of a single-piece robotic knee consisting of upper and lower legs which are combined using a compliant rolling contact hinge to allow for vertical motion in the foot. The hip of the robot houses two stepper motors to actuate the legs, additional two stepper motors for the swing of the hip. Additionally, we developed MATLAB Simscape model of the robot for rapid motion analysis.

Design and Development of Flexible Robots
Poster #37 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): William Thompson
Research Mentor(s): Ayse Tekes

Compliant mechanisms incorporate flexible members which imitate the motion behavior we see in the nature. The flexible links bend to create relative motion between the two neighboring links when subjected to input force, torque, or displacement. They provide several advantages due to their inherent properties such as less number of requirement to achieve desired outcomes, less friction, and thereby improved performance and accuracy. Additionally, due to the advances in additive manufacturing, development of compliant mechanisms is made simpler. Some of the preferable filaments are polyurethane thermoplastic (TPU) and polypreplane (PETG). In this research I worked on the redesign of a soft robot and a compliant five mechanism. The compliant five bar mechanism is designed to be utilized as an actuator to bend the flexible beams while driven by a single motor with gears and a linkage system. The 6 degrees of freedom robot is built and a sensor is attached to the top plate to obtain the mathematical model of the robot using experimental data.

Design and Development of Sustainable and Clean Energy Production and Conversion System
Poster #33 (Convocation Center, East & West Activity Wings)

Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Peter Samaan, Clay Love, Claire Brownyard, James Kyle, & Duy Pham
Research Mentor(s): Ashish Aphale

Clean energy is rapidly becoming the primary energy source for big businesses. The study of lanthanum strontium manganate (LSM) and chromium (Cr) degradation will prove useful for future endeavors with energy storage system longevity and efficiency. Chromium is present in stainless-steel, which is used in industry as, amongst other things, a cost-efficient option for mass manufacturing of battery and electrical housings. Under heat, chromium evaporates in small amounts from the stainless-steel components, which interferes with the efficiency of energy transfer. By utilizing an yttria-stabilized zirconia (YSZ) electrode with LSM, we replicate a small-scale, real-world energy conversion system using heat and oxygen as catalysts. Sample cells, both with and without Cr, had a YSZ electrode and a thin, porous film of LSM. Exposing each cell to temperatures up to 800°C over a period of roughly 10-11 days each yielded data for Nyquist plots and current vs time graphs that demonstrate effects of Cr on the efficiency of the fuel cell under realistic conditions. Our research centers upon the presence of Chromium in electrical systems, and its deteriorating effects on transfer systems over predetermined time and temperature cycles.

Design and Development of Flexible Machines and Soft Robots
Poster #27 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Oreoluwa Dawodu
Research Mentor(s): Ayse Tekes

Soft robots (machines designed to adjust to different production levels) have gained a lot of interest because of their anatomy-like properties and flexible mobility, which is different from the traditional rigid (mostly one-way) mobility of hard robots. There are multiple projects in this department, but I am working on the computer-aided design of the improvement of the mudskipper robot and other soft robots like the compliant knee joint, although that is my secondary project. My research methods aren't methodically primary as I will be mostly doing internet research on how to design some mechanical parts, there will be a lot of experiments to test the robots. My anticipated result is an improved design of the mudskipper robot that is faster, more durable, flexible and can move on land and in water efficiently.

Development of Portable Insect Treadmill for Optical Imaging of Walking Fruit Flies Using Stereomicroscope

Poster #7 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Brandon Kim & Kevyn Locke
Research Mentor(s): Dal Hyung Kim

One way of observing the behavior and movement of walking insects, a locomotion compensator, nullifies the movement of the insects to create a controlled environment for observation. This allows for uninterrupted monitoring of the subject without restriction from a tether. Specifically with the Drosophila Melanogaster (fruit fly), this instrument in conjunction with a stereomicroscope can be used to observe the neural activity of fruit flies genetically edited to produce fluorescent proteins in the brain. However, typically these instruments provide little to no modularity, space efficiency, and portability. The overall purpose of this research is to design and develop a portable insect treadmill that can be integrated with the stereomicroscope. To achieve this, we conceptualized design ideas, used the 3D modeling software SolidWorks to fabricate the design, iterated and improved prototypes, and developed an effective motor control system to operate the locomotion compensator. Our results highlight the portability of our system compared to prior versions, the efficacy of the control mechanisms, and a potential application of the instrument to observe the neural activity of the fruit fly.

Effect of Passive Bleeding on a Non-Slender Compound Delta Wing
Poster #38 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Zach Richards
Research Mentor(s): Gaurav Sharma

In this study, we examine the role of passive bleeding in optimizing the aerodynamic efficiency of a non-slender compound delta wing, a critical aspect for enhancing aircraft stability and maneuverability during high-angles of attack (α). Utilizing Ansys Fluent for our Computational Fluid Dynamics (CFD) analysis, this research investigates the impact of integrating passive bleeding holes on the wing surfaces. These strategically positioned perforations are designed to redirect airflow from areas of high pressure to regions of lower pressure, potentially energizing the boundary layer and delay flow separation. The investigation focuses on determining the optimal arrangement of these bleeding features—evaluating variables such as hole size, distribution, and placement—to discover their influence on key aerodynamic parameters including lift, drag, and vortex behavior. Preliminary results reveal that a carefully located passive bleeding system can significantly lessen flow separation issues, leading to improvements in lift-to-drag ratios and stall characteristics. This presents significant insights into capitalizing passive bleeding as an effective, low-cost strategy for the aerodynamic refinement of non-slender

compound delta wings, suggesting wider applications in the design of a more agile and fuel-efficient aircraft for both military and future commercial aviation sectors.

Heat-Activated Artificial Muscle for Heavy Duty
Poster #15 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Christian Scott Sargent
Research Mentor(s): Jungkyu Park

When comparing human muscle tissue with traditional robotic artificial muscles, there are apparent disadvantages observed within the artificial muscles, such as lack of flexibility, heaviness, and noise produced. To alleviate these issues, new elastic artificial muscles are being produced and researched. These artificial muscles are made from fishing line and conductive thread coiled together, and are activated by heat stimulation. One of the limitations of these coiled muscles however is the time taken for the muscles to cool down and expand after the heat stimulation has been removed. What is being addressed in this research project is how can the cooling time for the artificial muscles be reduced. The proposed method of reducing cooling time in this project was a graphite based coating over the coiled artificial muscle in order to, in theory increase thermal conductivity. In order to test for cooling time in the artificial muscles, I (in person) stretched the artificial muscle across a digital measuring device, marking and measuring the muscles length before and after being heated by a current (5 volts and 0.8 amperes). Then cooling time was measured (in 5 trials), indicated by how long the muscle took to expand back to the measured original length. Cooling time was compared between an artificial muscle with and without a graphite based coating. While results are currently not substantial, the data so far has indicated that with a graphite solution, the artificial muscles exhibit a faster cooling time. With a graphite coating, cooling time on average was 19.21 seconds, while with no coating, the average cooling time was measured to be 23.07 seconds. By the time of the spring symposium, a broader data pool will exist from testing, and equations will be present in results proving thermal conductivity changes.

Numerical Investigation of the Vortex Breakdown of Compound Delta Wings at High Angles of Attack
Poster #11 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Elizabeth Owens
Research Mentor(s): Gaurav Sharma

Compound delta wings have attracted considerable attention in aerospace research due to their enhanced agility, improved maneuverability, and ability to maintain consistent airflow at high angles of attack. However, as the angle of attack increases, the stability of vortices diminishes, ultimately leading to vortex breakdown. A comprehensive understanding of these critical thresholds is imperative for elucidating the behavior of compound delta wings across subsonic and supersonic flows. Nevertheless, the scarcity of research specifically dedicated to compound delta wings and their critical thresholds necessitates a more thorough investigation. The Reynolds number serves as a crucial indicator, signaling that at elevated levels, the flow becomes increasingly erratic and turbulent. Computational data generated through Ansys Fluent, a commercially available Reynolds Averaged Navier–Stokes Solver, can shed light on the breakdown phenomenon at various angles of attack. This study seeks to utilize advanced software and existing research to improve the reliability of results in this domain. It is anticipated that computational findings will corroborate the occurrence of vortex breakdown with increasing angles of attack, typically within the range of 10 to 15 degrees. Critical thresholds will be discerned through the analysis of lift and drag coefficients derived from numerical simulations.

Numerical Analysis of Vortex Breakdown Over a Compound Delta Wing
Poster #5 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Andrew Marion
Research Mentor(s): Gaurav Sharma

Supersonic flight holds paramount significance in the domain of global air forces. The efficacy of delta wings in supersonic flow conditions has been widely acknowledged. This success is primarily attributed to their low wing thickness, which serves to mitigate wave drag. Additionally, delta wings exhibit a vortex lift phenomenon, stemming from the generation of leading-edge vortices at elevated angles of attack. Consequently, since the 1950s, military aircraft have extensively employed delta wing configurations. Despite the predominance of subsonic operations due to cost and fuel efficiency considerations, delta wings encounter a phenomenon termed vortex breakdown at lower speeds and heightened angles of attack. Vortex breakdown manifests as the rupture of leading-edge vortices, resulting in diminished lift and altered aerodynamic behavior. This research endeavors to deepen our comprehension of vortex breakdown evolution over a compound delta wing configuration. Numerical simulations were employed to scrutinize the flow dynamics over the wing. These simulations encompassed a Mach number range spanning from 0.3 to 2.0, coupled with angles of attack varying from 0° to 15°. The simulations were executed utilizing Reynolds-Averaged Navier–Stokes transient computations, supplemented by the Spalart-Allmaras turbulence model. The findings reveal that compound delta wings exhibit vortex breakdown, particularly at elevated angles of attack. This investigation contributes essential insights into the mechanisms underlying vortex breakdown

over compound delta wings, laying the groundwork for future investigations aimed at devising strategies for its control.

Outlining Structural Behavior for Internal Patterns Within Additive Manufacturing
Poster #26 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Kyle Vipperman & Salim Kortobi
Research Mentor(s): Mohammad Jonaidi & Simin Nasseri

Recent technological improvements and a large consumer base has made the practice of 3D printing a cost-effective and intuitive method for fabrication. With this, the ability to extrude a design layer by layer has the potential to solve several complications of subtractive manufacturing and paves the way for new ideas. One such example is a 3D printer's ability to create internal shapes and patterns within a singular body. This is important because machining requires a path for a cutting tool, which is an impossibility within a completely enclosed volume. This study represents an educational approach for learning structural behaviors of 3D printing and also investigating the strengths and weaknesses of three patterns that are widely used in structural design. These patterns include hexagonal, circular, and diamond configurations. Each one of these patterns handles their load path slightly differently, and the structural properties of the filament material combined with an additive method of manufacturing can potentially yield unexpected findings. The data generated from this research project holds significant value for several reasons, offering fresh insights into maximizing strength while minimizing material usage. This is crucial not only for cost considerations but also for applications such as rocketry, where weight plays a pivotal role in product design and performance optimization.

Surface Wave Elastography with a Novel Cost-Effective Modality
Poster #25 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Nahtecia Housen
Research Mentor(s): Muhammad Salman

The primary objective of this study is to create a reliable and affordable approach for identifying diseases like bone tumors. Due to the high costs involved, current hospital tools such as MRI machines are not always accessible. As a solution, this research recommends the use of PCB Piezotronics accelerometers, which are readily available and more cost-effective. These accelerometers are small, lightweight, and can measure the vibrations in a structure caused by changes in stiffness, making them ideal for detecting changes in bone stiffness. To determine the relationship between bone stiffness and the vibrations produced, beef and chicken bones will be

utilized as they closely mimic human bone. These bones will be subjected to various loads and accelerations. Additionally, a block of wood will be utilized as a baseline for the experiment to compare the results with those obtained from the bones. The ultimate goal of this experiment is to produce a band that can accurately, reliably, and efficiently detect changes in bone stiffness. This band will be affordable and non-invasive, making it accessible to a wider population. This research has the potential to improve the quality of life for many people, especially those who cannot afford expensive medical procedures, by developing a more accessible and cost-effective method for detecting bone diseases.

A Study in Electrochemical Performance of Perovskite based Energy Storage Systems
Poster #40 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am – 10:45am
Undergraduate Student(s): Ben McKinney, Duy Pham, & Jake Irvin
Research Mentor(s): Ashish Aphale

With energy demands increasing globally, robust energy storage devices like supercapacitors are becoming integral part for providing reliable energy storage. The material morphology of such devices dictates their properties and efficiency. Perovskites, with a general structure of ABX3, where A is cation, B is anion, has shown great potential for supercapacitor electrodes due to its stability, and its ability to exhibit high electrical conductivity. In this work, we study the electrochemical performance of strontium-based perovskites LaSrMnOx and their role in energy storage applications. Electrodes were synthesized using solid state synthesis at 900C and the performance of LSM electrodes was assessed using electrochemical methods such as cyclic voltammetry (CV), impedance spectroscopy (EIS), and galvanostatic charge-discharge (GCD) to provide insight on its electrochemical properties. The results generated will provide a better understanding into the specific capacities, and charge discharge behavior of the electrode, along with ohmic, non-ohmic, and Warburg resistances.

Self-Powered Smart Safety Helmet for Improved Road Safety
Poster #5 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Charles Goode, Luke Hammond, & Jordan Bailey
Research Mentor(s): Valmiki Sooklal & Sandip Das

Many casualties and life-threatening accidents involving bicyclers occur at nighttime when visibility is poor. The lack of adequate and reliable lighting poses a major threat to the bicyclists as it becomes difficult for other vehicle drivers to see the slow-moving manual pedal bicyclists clearly at night. This project is aimed at developing a self-powered smart bicycle helmet that uses

a combination of solar and wind energy harvesting devices for illuminating an array of LEDs and also for detecting crashes. The helmet uses software to identify a possible crash by analyzing changes in acceleration and orientation. Power is supplied from thin film solar cells mounted on the exterior surface of the helmet and wind driven micro turbine generators on the front surface. A mobile app has also been developed with the ability to notify preselected contacts with the cyclist's location upon detecting a crash. The mechanical aspect of the project involved the design and fabrication of a helmet shell using SolidWorks software and 3D printing. For the wind harvesting component, the primary objectives were to identify an efficient motor, optimize blade design, and determine effective mounting locations to maximize power output. Considering typical biking speeds of 8-12 mph, various blade configurations have been tested to achieve optimal performance while ensuring a compact, unobtrusive fit within the helmet's form factor. The helmet also features strategically designed cavities for accommodating all electrical components. The project has successfully developed a smart helmet utilizing hybrid renewable energy harvesting technologies that is capable of providing additional safety features to cyclists particularly at night time and in the event of a possible crash.

Understanding the Role of Conducting Polymers for Improving Supercapacitors
Poster #41 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am – 10:45am
Undergraduate Student(s): Duy Pham, Jake Irvin, Jacob Dileonardi, & Ben McKinney
Research Mentor(s): Ashish Aphale

Supercapacitors (SCs) are a prominent energy storage device that is considered a viable route for many clean energy applications. The SCs attributes are quick power delivery along with significant energy storage capacity. Therefore, the recent research focus has been on developing advanced electrodes for better performance. In this research, the goal is to understand the role of electrode synthesis and the influence of the resulting nanostructure on the charge storage capacities of the electrodes. Experimental results show the charge transfer mechanisms with Faradaic redox (reduction/oxidation) reactions at the interface of electrode and electrolyte during the energy storage process. Experiments are conducted to evaluate electrode performance using cyclic voltammetry (CV), electrical impedance spectroscopy (EIS), and galvanostatic charge-discharge (GCD). The data observed will be discussed in this presentation. The electrode's morphology and chemistry have been analyzed using a scanning electron microscope (SEM) and Fourier transform infrared (FT-IR).

Robotics and Mechatronics Engineering

Advancing Pathogen Elimination: A Self-Driving UV Robot System Equipped with Sophisticated Navigation and Smart Disinfection Methods
Poster #6 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Charles Koduru & Chelsea Koduru
Research Mentor(s): Muhammad Hassan Tanveer & Razvan Voicu

UV-based mobile robots have proven effective in eliminating pathogens, there is an increasing need to enhance their functionality and guarantee their security. This work explores how digital twin technology can be used to improve the performance and dependability of UV-based mobile robots designed to disinfect pathogens. Virtual twins, or virtual copies of actual systems or devices, offer a unique chance to model and examine UV robot behavior in real time. We can properly mimic the mobility, UV emission patterns, and pathogen disinfection efficacy of UV-based mobile robots by building digital twins of them. This procedure creates a dynamic feedback loop that allows robot algorithms and parameters to be adjusted continuously, leading to continuous progress. This reduces the possibility of UV exposure threats to people and the environment while also improving disinfection efficiency. Our work investigates how sensor data, ambient parameters, and UV characteristics can be combined to create an accurate digital twin for UV robots. We can improve the robot's ability to adapt to different surfaces and environments while using less energy by incorporating real-world data. Furthermore, in order to facilitate adaptive decision-making based on real-time pathogen identification and guarantee a thorough and efficient disinfection procedure, we look into the integration of machine learning techniques. The utilization of digital twins in UV-based mobile robots has the potential to transform the field of pathogen disinfection through enhanced performance, reduced operational hazards, and the ability to operate autonomously. The research has the potential to have a significant impact on the protection of public health, public safety, and infection control protocols in a variety of contexts, such as public transportation, healthcare institutions, and workplaces. The world is facing persistent health difficulties, but the combination of UV robot technology and digital twin technology has the potential to create safe environments from harmful diseases.

AI-Cancer Annotation and Recognition Evolution (AI-CARE): Transforming Pathology
Poster #28 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm
Undergraduate Student(s): Preston Brantley
Research Mentor(s): Razvan Voicu & Muhammad Hassan Tanveer

The meticulous task of identifying and annotating cancer cells in medical images represents a significant challenge in pathology. Trained pathologists face a demanding workload, as they must meticulously examine hundreds, if not thousands, of cells in a single patient's sample, identifying subtle morphological differences that distinguish cancerous cells from healthy ones. This process is not only time-consuming but also prone to human error, given the strenuous nature of the work and the nuanced variability among cancer cells. Addressing this issue, integrating advanced AI systems, such as GPT-4, into the diagnostic workflow presents a promising solution. The research focuses on developing an AI assistant trained to recognize the intricate patterns and characteristics of cancerous cells, such as abnormal cell membrane structures and enlarged nuclei, by analyzing a comprehensive dataset that includes annotated cancerous cells, unannotated cancerous cells, and healthy cells. The potential of GPT-4 to process and interpret medical images with high precision can significantly augment the pathologists' efforts, reducing the time required for diagnosis and increasing the accuracy of cancer detection. By automating the annotation process, such a tool can provide early detection and help pathologists focus on more complex cases and decision-making aspects of patient care, enhancing overall healthcare delivery. However, cancer's heterogeneity poses a significant challenge to developing an effective AI diagnostic tool. Cancer cells exhibit a wide range of variations in appearance and behavior, necessitating a model that can adapt to and accurately identify these diverse characteristics. Focusing on specific types of cancer, such as those affecting breast tissue, permits refining of the model's accuracy in more controlled contexts. Preliminary efforts and results leveraging OpenAI's GPT-4 vision capabilities have shown significant promise in classifying objects and deciphering image content. Further advancements are underway towards autonomous annotation, aiming to revolutionize this intricate process.

Development of Intuitive Mechanism for Position Control of Soft Robot
Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
1:00pm - 1:50pm
Undergraduate Student(s): Kyra S. Magee, Jason Yu, Praneeth Rayapudi, Jacob Riad, Sama Abbadi, & Stephan Sellers
Research Mentor(s): Amir Ali Amiri Moghadam & Turaj Ashuri

This study presents the development of a master/slave system utilizing a twin Stewart mechanism as a specialized joystick with 6 Degrees of Freedom (DOF). The aim is to create an intuitive and single-handedly controllable interface for surgeons, enabling precise manipulation of a soft robot's end-effector. The design process involves selecting the Stewart mechanism for its 6 DOF capability, determining its size based on the surgeon's hand motion range, and manufacturing it through 3D printing. Rotational potentiometers are integrated onto each leg for accurate displacement sensing, translating hand motion to passive leg movements, mapped to desired bending actions in the active links of the soft robot through calibration. An

Electromagnetic (EM) tracker attached to the robot end-effector senses its position, mapped to bending deformation of robot legs via kinematics models, and fed back to the controller for synchronization. The user interface comprises the Stewart mechanism joystick, potentiometers, EM tracker, and a controller, offering intuitive control for precise soft robot motion, enhancing surgical precision in minimally invasive procedures.

Enhanced Navigation Algorithm for UAVs and Mobile Robots using Low-Grade GPS and IMU Modules
Poster #35 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Shrey Patel & Charles Koduru
Research Mentor(s): Muhammad Hassan Tanveer & Razvan Voicu

Global Positioning Systems (GPS) have been widely used for mobile robot and unmanned aerial vehicle navigation for localization of the respective robot positions. This is often integrated with Inertial Measurement Units (IMU) for accurate positioning and odometry. A common navigation algorithm used to integrate these two sensors is using previously obtained velocity values and heading direction from IMU to calculate the current position, also known as dead reckoning, and fusing it with GPS data to calibrate the calculations and fix unexpected position errors. Such methods are simple to implement but are highly vulnerable to errors in environments with low satellite connectivity and thus, require high-grade sensors, often expensive. To achieve accurate functionality in a constantly changing environment, this research proposes a ready-to-implement algorithm that integrates low-grade GPS and IMU modules uniquely by separately defining the weight of each GPS data entry to control its effect on Odometry. The weightage of each entry is determined based on collection factors such as the number of satellites used for GPS triangulation and is fused with IMU data sets to calibrate odometry and update path. This research study explores the proposed application of utilizing GPS and IMU for robot navigation between the Unitree GO1 robot dog and DJI Tello drone. A Socket Communication protocol is used to transmit positional and orientation data, between the UAV and the robot dog, to establish a navigation system that adjusts the UAV's position for landing on the robot dog. It advances the integration of GPS and IMU technologies for precise navigation of mobile robots and UAVs, presenting a novel algorithm that effectively mitigates the challenges posed by environments with poor satellite connectivity and the potential for sophisticated and cost-effective navigational solutions in robotic applications.

Material Development for Interdigitated Sensors for Trace Contaminants
Poster #35 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
1:00pm - 1:45pm

Undergraduate Student(s): Tyler Slivers
Research Mentor(s): Ashish Aphale

With advancements in the technology used for fields of medicine and other disciplines, the need for sensitive measuring devices is crucial for these technologies to work. An interdigitated sensor is a device that can fit on a finger. These devices are used to detect contaminants based on the capacitive nature of the interdigitated electrodes. This project focuses on development of electrode for measuring molarity of acid in a diluted aqueous solution, then determine the response signals generated by the sensor. The preliminary results show that the developed sensor is capable to generate signals at very low molarity values such as 0.001 molar of potassium chloride (KCl). Results from electrochemical testing of sensors generated between frequency range of 1KHz – 1mHz will be discussed. Changes in the impedance as a function of molarity of solution will be analyzed. Our project utilize the results from experiments to gain an understanding of material coatings role in sensitivity of sensor detection, as well as to determine the role of electrode placement distance in sensor overall detecting capabilities.

Mosaic Swarm Robotics: Emulating Natural Collective Behaviors for Efficient Task Execution with Custom Mobile Robots
Poster #16 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Jonathan Ridley, Arielle Charles, & Charles Koduru
Research Mentor(s): Muhammad Hassan Tanveer & Razvan Voicu

Mosaics, as an artistic expression, involves the meticulous arrangement of diverse tiles to form a unified composition. Drawing inspiration from this concept, the field of swarm robotics seeks to emulate nature's collective behaviors observed in ant colonies, fish schools, and bird flocks, employing multiple agents to accomplish tasks efficiently. Our research explores the concept of mosaic swarm robotics, where numerous nodes with specialized functions are deployed across various domains, including applications for outdoor data capture and environment mapping. We utilized custom mobile robots operated by Raspberry Pi microcontrollers. By establishing an elaborate web of client-to-client communications to enable true localized swarm interactions needed to procure a robust and adaptable system that can be operated through clustering techniques and wireless sensor networking. This research aims to localize swarm navigation through ArUco markers to accurately track the position of a robot in a collaborative environment. The foundational algorithms developed will not only serve the immediate purpose but also pave the way for future applications, extending to drone systems to facilitate seamless collaboration across multiple domains.

Robotic Navigation in Complex Terrains

Poster #20 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Jelan Womack, Jenn Price, & Chebet Ngeny
Research Mentor(s): Turaj Ashuri

Rovers have been the preferred method to explore Mars's adverse environment since 1997 with Sojourner, as they return data on the environment & eliminate the limitations of sending a human. Although rovers have plenty of pros, such as being more durable and efficient, there are 2 main problems they face on Mars, power loss and wheel capturing. These problems arise due to Mars' rocky valleys, sand traps, and sandstorms. For instance, Sojourner was abandoned because of its power loss due to its solar panels getting covered with magnetic airborne dust from sandstorms. Spirit launcher, launched in 2003, had been experiencing problems on its right wheel since 2006 but got caught in an unexpected sand trap in 2010, causing it to lose contact and terminating its mission. Curiosity, launched in 2012 and still running, has been our longest functional rover but has visible wear and tear on its wheels due to them being made from aluminum. Our team set out to build a multi-terrain rover with deformable wheels using soft robotics. Our wheel is composed of a hard, rigid inner skeleton that contains compartmentalized actuators that expand the soft outer shell of the wheel. When the wheel expands it increases the surface area of the wheel, allowing it to get more traction and escape the sand trap. Our final design combines the PVC suspension system, Arduino mega motherboard, and deformable wheels together to form a prototype of a Mars exploration rover.

Search and Rescue Operations Utilizing a Robot Dog with Custom YOLO V8 Models and Depth Camera Data
Poster #5 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Aiden Kovarovics
Research Mentor(s): Muhammad Hassan Tanveer & Razvan Voicu

Natural disasters are occurring more frequently across the globe, post analysis and data capture for these events are vital for search and rescue operations. The need for environment mapping by identifying objects is evident, particularly in navigating complex disaster scenarios such as individuals trapped under debris. In post-disaster scenarios, search and rescue (SAR) teams face the challenge of processing extensive data to locate trapped individuals. Implementing a machine learning model can streamline this process by efficiently scanning environments to identify potential survivors. This research explores the application of custom datasets to create a YOLO V8 model to optimize human detection in conjunction. It integrates this model with a robot dog equipped with a depth camera, enabling better analysis of environments with uneven terrains.

The model is trained on images of trapped individuals under rubble in search and rescue scenarios. These images are labeled using ROBOFLOW to create a custom dataset for training a YOLO V8 model. The integration of YOLO V8's bounding box and segmentation data with the Intel RealSense depth camera aids in determining the exact location of the trapped person. The collected data points are crucial in determining the optimal angle of rescue, and the incorporation of a colored map and grayscale video further aids in distinguishing debris from human subjects. Experimental results highlight the effectiveness of the custom dataset in conjunction with YOLO V8 for human trapped location detection in rubble environments. Furthermore, the visual accuracy is confirmed through displayed segmentation of human subjects in different rubble scenarios. Accuracy of the trained model is represented by analytical graphs derived from validation test data, which show the precision of different model weights. Integrating machine learning models and robust robotic mobility can enhance the efficiency and effectiveness of disaster response efforts.

The Voice-To-Text Implementation with ChatGPT in Unitree Go1 Programming.
Poster #4 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Andrea Martinez Angulo, Sheriloye Henry, & Charles Koduru
Research Mentor(s): Muhammad Hassan Tanveer & Razvan Voicu

The application of large language models (LLMs) has become more widespread as they are increasingly being integrated in various ways. LLMs, such as ChatGPT, are revolutionary models capable of processing large amounts of data to output human-like texts as well as executable code. This research explores these applications as it investigates the implementation of ChatGPT with the Unitree Go1 Robot Dog, specifically focusing on integrating voice prompts to instruct the Unitree Go1 robot dog. The methodology involves creating an interface to facilitate communication between the ChatGPT API and the Unitree Go1 SDK. To achieve this integration, a second WiFi adapter was utilized to bridge the communication between the robot dog and LLM. The code is then generated for user inspection and executed upon approval. This connection simplifies the process to control the robot dog allowing users with limited knowledge to execute commands. Additionally, those with coding experience can utilize this to expedite the process of software development. Research in this technology holds immense potential for enabling users to explore and experiment with different functionalities of the robot dog, contributing to enhanced comprehension and testing capabilities within the field of robotics.

Wellstar College of Health and Human Services

Exercise Science and Sport Management

Acute Metabolic and Perceptive Responses to a Multi-Ingredient Pre-Workout Supplement and CrossFit®-Style Exercise
Poster (Microsoft Teams)
Friday, April 19th
4:30pm – 4:45pm
Undergraduate Student(s): Wil King
Graduate Students: Christopher Staples, Ashley Hines, James Henley, Wysmark Chaves, & Jacob Fanno
Research Mentor(s): Gerald Mangine

Pre-workout supplements often contain several ingredients known to alter blood flow and substrate utilization, but no study has investigated the acute effects of such formulations on CrossFit® (CF) performance. PURPOSE: To examine the effect of a pre-workout supplement and exercise duration on metabolism and perceived effort following a CF workout. METHODS: Experienced adults (≥2 years of CF-experience) completed four weekly visits in randomized, cross-over fashion. Upon arrival, participants completed pre-exercise subjective ratings before ultrasound images of vastus lateralis (VL) and rectus femoris (RF) were collected to quantify cross-sectional area (cm2; CSA). They were connected to a metabolic cart for 10 minutes while oxygen consumption (VO2) and respiratory quotient (RQ) were monitored and then donated a blood sample to measure lactate concentrations. Participants then consumed either S or placebo (P), rested 40 minutes, and then completed a 5- or 15-minute circuit of rowing, barbell thrusters, and box jumps for 'as many reps as possible'. All PRE-assessments were repeated post-exercise. RESULTS: Repeated measures analysis of variance revealed significant ($p < 0.05$) condition x time interactions for CSA, blood lactate, and VO2. Except for VL CSA (~0.9 cm2 difference between 5S and 5P, $p = 0.018$), no pre-exercise differences were observed. Post-exercise CSA (RF & VL) was approximately 8.8-11.7% greater during S (both durations) compared to P (both durations). Likewise, blood lactate was 22.4% higher following S (both durations) than P (both durations), though differences between 5S and 5P were not seen until 5-minutes post-exercise. VO2 was 12.2-12.4% greater after 5S compared to P (both durations), whereas 15S was 7.6% higher than 15P but no different than 5P. No other differences were noted. CONCLUSION: The pre-workout supplement led to greater acute increases in muscle size, oxygen consumption, and blood lactate at the same perceived effort.

Biomechanical Differences in Crawling between Typically Developing Infants and Infants with Limb Loss
Poster #14 (Convocation Center, East & West Activity Wings)
Thursday, April 18th

4:00pm - 4:45pm
Undergraduate Student(s): Feby Takawy, Larissa Brehm, & Analise Oliver
Research Mentor(s): Mark Geil

In 2022, the Centers for Disease Control and Prevention published updates to their checklists for the milestones children should achieve during typical development, and removed crawling entirely, citing a lack of normative data, inconsistent definitions, and variability timing of crawling onset (1,2). This project collected normative kinematic and spatiotemporal data on typically developing (TD) crawling infants and crawlers with limb loss (LL). Eleven TD infants were assessed every two weeks between onset of crawling and transition to walking. Six LL infants were assessed once without the use of a prosthesis. Infants crawled on a pressure-sensing mat that was used to calculate crawling speed, cadence, percent limb support, anterior-posterior pressure ratio, and bilateral pressure ratio. As TD children grew, crawling became faster, with some reducing speed as they began to walk. Crawling width became narrower, and the percent of each cycle with all four limbs on the ground was significantly reduced. Children in the LL cohort were older than in the TD cohort. They crawled slower, showed significantly narrower stride width, and bore more weight on arms. Study outcomes showed demonstrable changes during neuromotor development. Several measures, including speed, width, and percent quadruple limb support, were sensitive to differences in a typical and atypical population. These data fill the gap cited by the CDC and may be useful reestablishing crawling as a development milestone. In addition, understanding of the biomechanics of typical crawling development could enable early detection of some atypical development patterns such as those found in cerebral palsy, which is often not detected until children have progressed to walking.

Does Greater Mental Effort During Exercise Enhance Strength Adaptations in Older Women?
Poster #12 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Emmanuel Dadzie, Kayla Anderson, Kaden Buford, Payson Gignac, & Rachel Carlstrom
Graduate Student(s): Lacey Harper, William Reed, & Breanna McDonald
Research Mentor(s): Garrett Hester

Background: Strength training is well known to slow down sarcopenia, the age-related loss of muscle strength. However, the prevalence of strength training is low, primarily in older women. Elastic band (EB) training offers a more accessible alternative, and it is possible a unique cognitive approach could enhance strength adaptations following training. The purpose of this study was to determine if heightened mental effort during EB training increases strength more than EB training alone. Methods: As part of an ongoing study, four older women (65-79 yrs.)

with no prior training were randomized into a control (CON; n=2), EB training (EB; n=1), and EB training with high mental effort (EB+ME; n=1). Muscle strengthening exercises were carried out with elastic bands 3 days/week for 6 weeks. EB performed the exercises with generic, conventional instructions, while EB+ME did the same exercises but were instructed to "imagine their muscle contracting maximally". Before and after the intervention period, strength was determined using a handgrip dynamometer. Percent change was calculated for each individual and group averages were compared. Results: EB demonstrated a 30.3% increase in strength, whereas EB+ME exhibited a 15.83% increase. CON demonstrated a 1.61% decrease in strength. Conclusions: While our sample size is far too small for gross interpretation, our preliminary findings suggest EB training increased handgrip strength, but greater mental effort did not appear to provide added benefit. More formal analysis will be performed in the future when we have a larger sample size. If our finding holds true, it is possible the lack of mental effort towards the handgrip muscles specifically, since this muscle group was not trained, could be a contributing factor. Nonetheless, the increase in handgrip strength with EB training is noteworthy.

Effects of Nontraditional Exercise Interventions on the Cardiovascular System
Poster #6 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Alyssa Baban & Sydnei Alcorn
Research Mentor(s): Daphney Carter

Patients on bedrest or with casts face issues with loss of muscle mass, however, a 5-min blood flow restriction (BFR) protocol may mitigate these changes. BFR can be painful and uncomfortable, thus our purpose is to see if a 3-minute BFR protocol is a preferable alternative. Methods: This is an ongoing study. Using a within-subject design, participants complete 4 visits with familiarization on visit 1. On visits 2-4, participants have one of three conditions with either cuff inflation on the dominant arm for 0-min (CON), 3-min (BFR3), or 5-min (BFR5) cycles. Following a 5-min rest with the dominant arm abducted 90 degrees measures of pain, discomfort, and tissue saturation index were recorded. The BFR pressure is determined as 80% of the minimum pressure necessary to stop blood flow. In the 30 seconds of cuff inflation, participants rate pain and discomfort with separate 10-point scales. The slope of tissue saturation index (measured via near infrared spectroscopy) following 15 sec after cuff deflation was recorded as a measure of microvascular function. For statistical analysis, we plan to calculate three change scores (first cycle-baseline; fifth cycle-baseline; last cycle-baseline) and compare these using a two-way Bayesian Repeated Measures ANOVA. Results: Currently, one male (age: 19yrs, weight: 77.8kg, height: 176.5cm) has completed this study. His change in discomfort (A.U.) was lower for BFR3 (Last cycle: 1) and CON (Last cycle: 0) when compared to BFR5 (Last cycle: 2). His change in pain (A.U.) was the same for BFR3 and BFR5 (Last cycle: 1) while

CON had no pain. Microvascular function (%/s) appears highest in response to BFR3 (Last cycle: 0.83) when compared to BFR5 (Last cycle: -0.20) and CON (Last cycle: 0.00). Conclusions: Based on preliminary findings, shorter inflations for additional cycles may be preferable in effectiveness and with less discomfort.

Physical Activity and How it Affects the Mental Health of College Professors
Poster #20 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Jakeria Wallace
Research Mentor(s): Mari-Amanda Dyal

This study presents an examination of the correlation between physical activity and mental health among college professors. Physical activity is defined as bodily movement that's produced by the skeletal muscles that requires energy expenditure, it can include swimming, walking, running etc. Engaging in consistent physical activity has proven to provide numerous health benefits, one of those benefits consist of maintaining a positive mental health. The World Health Organization defines mental health as a "state of well-being in which an individual realizes his or her abilities, can cope with the normal stresses of life, can work productively and can make a contribution to his or her community". With all, there remains a gap when understanding the relationship between physical activity as it relates to the mental health of certain professions such as college professors. This study provides insights into the potential benefits of physical activity as it relates to the mental well-being of college professors. Peer reviewed articles discussing previous research of correlation between physical activity and mental health was used to analyze the gap in physical activity and mental health as it relates to college professors. A sample of college professors were selected, and data was collected through surveys. International Physical Activity form (IPAQ) was used to measure physical activity level of the respondents and the Mental Health Inventory (MHI) was used to measure their mental health. Statistical analyses were conducted to examine the correlation between physical activity and mental health outcomes. The overall findings suggest that college professors participating in physical activity consistently have a significant positive impact regarding their mental health. This study highlights a correlation between physical activity and the mental health of college professors. Participating in physical activity may lower levels of stress, increase overall mood, reduce levels of anxiety and depression.

The Power of the Mind to Enhance Physical Function in Older Women
Poster #35 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am

Undergraduate Student(s): Rachel Carlstrom, Kayla Anderson, Kaden Buford, Payson Gignac, & Emmanuel Dadzie
Graduate Student(s): Lacey Harper, William Reed, & Breanna McDonald
Research Mentor(s): Garret Hester

Background: Utilizing a heightened mental effort during strength training may enhance outcomes, particularly in older adults. Despite the well-known benefits, participation levels in strength training are low, so more research is needed on accessible modalities such as elastic band (EB) training. The purpose of this study was to determine if mental effort increases physical function outcomes following EB training. Methods: As part of an ongoing study, 4 healthy, older (65-79 yrs) women were randomized into three groups: control (n=2), EB training (EB) (n=1), and EB training with mental effort (EBME) (n=1). The EBME group was instructed to "imagine their muscle contracting maximally" during each training session, whereas generic, conventional instructions were given to the EB group. The exercise groups performed 3 full-body EB training sessions per week for 6 weeks, and these sessions were virtually supervised. Before and after the intervention period, maximum walking velocity (MWV), total chair rises in 30 seconds (CR30), and number of chair rises completed in 5 seconds (CR5) were measured for each patient. Given the smaller sample sizes, percent change (pre to post) was calculated for each individual and compared across groups. Results: During MWV, EBME exhibited a 5.61% faster MWV, EB a 1.20% slower MWV, and the control a 10.24% faster MWV. In CR30, EBME demonstrated a 15.38% increase, EB a 25.00% increase, and the control a 2.22% decrease. For CR5, EBME showed an 8.00% increase, EB a 29.61% increase, and the control a 9.65% decrease. Conclusion: While our sample size is far too small for gross interpretation, our preliminary findings suggest EB training has positive effects on physical function with no apparent added benefit from using heightened mental effort. More formal analysis will be performed in the future when we have a larger sample size.

Pre-Workout Supplement on HIFT Workout Kinetics
Poster #38 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm – 1
2:45pm
Graduate Student(s): Miranda Chapa
Research Mentor(s): Gerald Mangine

High-intensity functional training (HIFT) programs modify workouts daily, but commonly emphasize fast-paced work by, for example, instructing that 'as many repetitions as possible' (AMRAP) be completed within a duration. Multi-ingredient pre-workout supplements (S) often contain ingredients thought to aid in energy availability, and these might be useful for maintaining power during HIFT. Therefore, to examine the acute effects of a multi-ingredient

pre-workout supplement and exercise duration on exercise kinetics within a high-intensity functional training workout, 12 men and 10 women with HIFT experience (≥ 2 years) were recruited to complete four experimental visits across four consecutive weeks in randomized, cross-over fashion. On each visit, participants either consumed S or a non-caloric placebo (P), rested 40 minutes, and then completed a 5- or 15-minute AMRAP circuit of rowing, barbell thrusters, and box jumps. The rowing ergometer recorded average strokes per minute (SPM), 500-m split pace, calories per hour, and power on each round. A three-dimensional camera monitored barbell velocity and power during thrusters. Meanwhile, in-ground force plates measured average peak force, mean impulse, and rate of force development (RFD) on all box jumps. Analysis of variance with repeated measures revealed a main condition effect for SPM ($p = 0.041$), where a faster pace was averaged during S (30.4 ± 0.9 SPM) compared to P (29.1 ± 0.7 SPM). Condition x time x sex interactions ($p < 0.05$) were also noted for mean impulse and RFD on the box jumps. However, sex differences predominantly influenced the interaction for mean impulse while post-hoc analysis did not reveal specific differences for RFD. No other differences related to supplemental condition were observed, including repetitions completed. Thus, the multi-ingredient supplement enabled a faster rowing pace to be maintained, and differentially affected box jump impulse in men and women, during both a 5- and 15-minute HIFT AMRAP.

Understanding Virtual Reality
Poster (Microsoft Teams)
Friday, April 19th
12:15pm - 12:30pm
Undergraduate Student(s): Gavin Alvarez-Bynum
Research Mentor(s): Kyu-Soo Chung

This project aims to create a more well-established definition of virtual reality. We conducted this project using literary reviews of contemporary research papers focusing on various fields and definitions of virtual reality. We found that seven elements made up virtual reality, interaction, simulation, artificiality, immersion, telepresence, and full body different levels of immersiveness that affected the presence and engagement of the user, using different VR headsets. The three different VR headsets allowed us to discover human interactions with VR, ultimately helping us understand new ways of thinking about human cognition connected with VR. We also discovered a survey system called the System Usability Scale (SUS), developed by Brooke in 1996. SUS allows usability practitioners to measure how usable a product is. The SUS system consisted of 10 unbiased statements that scored on a 5-point strength scale ranging from 0-100. The System Usability Scale represents a key binding factor between all aspects we've focused on in VR development and grants a baseline system to use as a determinator when comparing future VR systems. Utilizing this baseline, we can more evenly factor in presence, telepresence, and vividness and the comparisons between them to establish each factor's importance and minimum/maximums to help future VR developers understand how to focus

development on their projects to reach general goals. Presence in virtual reality is the feeling of being in a false reality, a better sense of presence relates to a more real feeling of reality. Vividness is the expansion of presence, while presence convinces you of reality vividness is how abstract it is, the depths of sensation and beauty, the breadth of feeling inspired by reality. Telepresence is the human experience of presence in an environment as a communication medium instead of technological hardware.

Health Promotion and Physical Education

Assessing How Existing Healthcare Resources Struggle to Address High Infectious Disease Incidence in Kampala, Uganda
Poster #21 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Jada Brown
Research Mentor(s): Matthew Lyons

Introduction/Purpose: Informal urban settlements (empirically referred to as slums) are characterized by poor housing, inadequate healthcare resources, and high rates of infectious diseases. Women in slums are more severely impacted for a variety of reasons such as lack of access to education and gender inequity. We need to assess the perspectives of women living in these areas to successfully intervene. The purpose of the current study is to give the women in Kampala, Uganda a voice to promote change in their communities so that the healthcare industry can be improved. Method: To assess the issues in existing healthcare services, researchers spoke to the affected women directly to get their perspectives. This was conducted using 6 focus groups of women from 3 different community center sites in Kampala, Uganda. These groups consisted of a total of 60 young women ranging from 18 years old to 25 years old. The method used to analyze the qualitative data was Braun and Clarke's thematic analysis approach. This consisted of creating codes and organizing themes, re-coding, and further organizing into four thematic clusters. Results: The analysis resulted in the identification of healthcare vulnerabilities in the form of the four thematic clusters based on the perspectives of women who use these resources. For cluster 3 specifically, researchers found that the current healthcare infrastructure is overwhelmed by need. The combination of there being a large quantity of sick people and the low quality of the centers leads to poor health outcomes. Conclusion: It is necessary for us to know what changes to be made through the perspectives of the women in Kampala. By understanding the problem firsthand, we have a better chance to find an appropriate solution. This research is pivotal to the process of improving healthcare resources in Sub-Saharan Africa.

An Evaluation of Adolescent Health Programs in Georgia

Poster #16 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Emerson Sweet
Research Mentor(s): Evelina Sterling

Georgia's Department of Adolescent Health and Youth Development (AHYD) Program is based on the positive youth development approach recommended by the Division of Adolescent and School Health (DASH) at the Centers for Disease Control and Prevention (CDC). This program engaged youth within their communities, schools or organizations, peer groups and families in a productive and constructive manner. It utilizes and recognizes young people's strengths and promotes positive outcomes for young people by providing opportunities, fostering positive relationships and furnishing the support needed to build on their strengths across all This evaluation of adolescent health programs in Georgia is aimed to assess the reach, effectiveness, and impact of existing programs on the health and well-being of adolescents in the state of Georgia across all 14 health districts. A thorough analysis of program data, surveys, and key informant interviews collected in 2022-2023 was completed. Overall, this evaluation found that through a combination of education, resources, and support, these programs have helped to improve adolescent health, particularly related to at-risk behaviors (including pregnancy prevention). More specifically, it addresses communication, goals setting, decision making, and addressing the benefits of abstaining from risky behaviors and promoting positive youth development. However, there is still room for improvement in addressing health disparities among marginalized communities and increasing access to healthcare for all adolescents in Georgia. Recommendations were made to further enhance and expand these programs to meet the diverse needs of adolescents and youth in the state. The lack of specificity on mental health is another challenge significantly impacting adolescent health issues within the state. By examining the effectiveness and gaps in current strategies, this assessment seeks to inform future policy decision and enhance the3 overall well-being of Georgia's youth.

Don't Give Up: The TOPOWA Study of Mental Health Trajectories among Young Women in Kampala, Uganda
Poster #6 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Arthur Pena Aguilar
Research Mentor(s): Monica Swahn

Uganda has the highest alcohol consumption rates and other substances of abuse in sub-Saharan Africa, especially among young people. Substances use among adolescent girls and young women (AGYWs) pose a major threat to their health and education in urban slums. Studies have

shown that, due to cultural and social norms, alcohol and illicit drug use may be underreported among AGYWs. The study presents baseline findings on the prevalence of recent substance use among AGYWs in the urban slums of Kampala city. In August 2023, a total of 300 AGYWs, ages 18 to 24, were recruited across three slum areas in Kampala, as part of an observational prospective cohort study to examine the effect of vocational training on the mechanistic pathways of mental illness (TOPOWA). As part of the baseline assessment, participants were asked to complete an interviewer-administered survey as well as provide a urine sample to test for metabolites of 16 different drugs, including alcohol (EtG), amphetamine (AMP), methamphetamine (MET), opiates (OPI), and marijuana and cannabis (THC) using the rapid urine drug screen kits. The urine screen indicated that the most prevalent of the detected substances of use was alcohol metabolite (Ethyl glucuronide (EtG)), with 10% (30) of women having consumed it within the past 72 hours, followed by cannabis or marijuana (THC), with 4.0% (12) testing positive. Only two women tested positive for benzodiazepines; one woman tested positive for tramadol; and another woman tested positive for methamphetamine. Alcohol use and cannabis were the most consumed substances. The prevalence of recent use of the other drugs of abuse examined in this screening was relatively low in this population. However, it is of urgent concern if drugs such as benzodiazepines, tramadol, and methamphetamines are used without a prescription and are accessible in the community.

The Impact of Student Stress on Physical Wellbeing
Poster #18 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
4:00pm - 4:45pm
Undergraduate Student(s): Isabelle Fevrier
Research Mentor(s): Mari-Amanda Dyal

This study will explore the intricate relationship between student stress and its impact on physical health. It will explore how stressors such as academic pressures, jobs, and lengthy commutes impact physiological manifestations and various aspects of physical well-being in students. The literature this research builds upon is diverse, ranging from in-depth looks at how the body responds to stress, such as the actions of the brain when under stress, to how stress causes disturbances in sleep, diet, and physical activity. For this specific research, physical health will be defined as sleep schedule, frequency of sickness, and daily fatigue. There will be an evidence review to identify the relationship between chronic stress and physical health as well as identify gaps in the literature as it pertains to student stress. After this evidence is reviewed, a survey instrument will be developed to examine the relationship using validated tools. This will be administered to students via convenience sampling methods and a sample of no less than 50 participants. The data will then be collected and analyzed by researchers using a variety of statistical analyses to determine the relationship. It is anticipated that student stress will have a negative impact on each of the physical health dimensions identified for this research, which will

inform future recommendations for research and practice in this area. This research should highlight the need for a more holistic approach to a student's well-being, such as introducing and practicing coping strategies that will address both academic stressors and their physiological effects. This research hopes to contribute to the continuing development of support systems and interventions that help students become healthier and more resilient in the face of their stressors.

The Impact of the Availability of School Campus Resources on Students Success
Poster (Microsoft Teams)
Friday, April 19th
3:15pm - 3:30pm
Graduate Student(s): Fatima Darame
Research Mentor(s): Mari-Amanda Dyal

Student success is a crucial topic in higher education. It includes many aspects such as academic accomplishment, personal developments, professional preparedness, and general well-being. One element that may contribute to student success is the availability of college campus resources. Campus resources consist of a variety of programs and facilities designed to help students succeed academically, socially, and individually. These resources may include academic advising, tutoring centers, libraries, health centers, recreational facilities, transportations, etc.... Previous studies have reported that campus resources have an influence on student achievement including retention rates, academic achievement, and general well-being. However, there is a need for a thorough knowledge of how the availability and use of a wide range of campus resources affects the success of students. With that stated, there is still a gap in knowing the connection between the availability of college campus resources and student achievement, which the current study seeks to address. A literature review will be conducted to determine the current state of research on college campus resources and student achievement, both individually and collaboratively. A survey will also be done to collect data directly from college students regarding their utilization of campus resources. The results of this study are expected to corroborate the research goal of investigating the link between the availability of college campus resources and student achievement. It is expected that increasing availability and consumption of campus resources would lead to higher levels of student success. Despite significant investments made by colleges and universities in providing campus resources, there is a lack of comprehensive understanding of how these resources interact to influence student performance. The current study seeks to close this gap by investigating the link between the availability of college campus services and student success outcomes.

Retirement Preparedness in the Atlanta Metro
Poster #38 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am

Undergraduate Student(s): Veronica Wright
Research Mentor(s): Mari-Amanda Dyal

As baby boomers move further into the "senior" category and generation x tails right behind them, the topic of retirement has become a subject of public discussion. Retirement, however, is an intimidating endeavor that requires plenty of preparation. Preparation, in fact, for practically every facet of life. While retirement as a general concept, as well as the financial aspect, have been the subject of much research and public discourse, the relationship between age and preparedness for retirement in a more qualitative regard has not received nearly as much attention. This research seeks to help fill this gap in understanding. An evidence review has been conducted to perform a status check on the relationship between age and retirement preparedness. A survey has been created that will be distributed to the population of interest – adults aged 60 and over in the Atlanta Metropolitan Area. The Kennesaw State University Internal Review Board has been consulted for human subject protection prior to the recruitment of participants. Upon the completion of data collection, the collected data will be managed and analyzed using a variety of statistical techniques. The results of this study will help us understand if there is more attention that needs to be pulled toward retirement planning for individuals who are approaching retirement age. If older adults are answering the survey with low rates of preparedness, this is a topic that needs to be explored more. While retirement is a familiar concept to everyone, the non-financial aspects of retirement often get swept under the rug. It is vital to ensure that adults understand what retirement entails in regards to housing, social support, etc. This research seeks to bridge the gap in this understanding.

A Systematic Review of the Impact of Stress on Young Adult Women
Poster #28 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Olivia Hauser
Research Mentor(s): Evelina Sterling

Stress can be a double-edged sword. On one hand, stress is unavoidable and can often be invigorating and energizing. On the other hand, too much stress can turn into a physical, mental, and emotional burden. In fact, today's mental health crisis has become a silent pandemic in the lives of young women. In addition to "normal" stressors that we all face, young women are disproportionately affected by mental health issues simply due to all the other inherent stressors and inequalities that come with being a girl or woman in the world today. This study entails conducting a systematic review of peer-reviewed research conducted within the past 5 years focusing on stress and women ages 18-35. Issues related to risk factors, diagnosis, coping, treatment, and long-term impacts were considered. We started with citations from electronic searches and from examination of reference lists of primary review articles using mostly

MEDLINE and Psych (n=~1000); retrieving full manuscripts for detailed evaluation; excluding any reviews/commentaries; cross sectional studies; stress is not the only exposure factor; etc. Information was coded, including country, year, study design, study population characteristics, total sample size, stress measurement methods of these studies, and outcome data., resulting in a final sample of 15-20 studies. We will conduct a supplemental exploratory survey about KSU women students (N=50) to compare to the results of the systematic review, especially on how mindfulness and gratitude play a role in decreasing stress. The results better describe stress among young women, particularly about the effectiveness of internal coping mechanisms as young women learn to navigate daily and long-term stressors. Considering the high incidence of reported stress as well as the complex interplay between gender and life events, this study highlights the need for additional research to support gender equality in mental healthcare.

Understanding the Needs of Georgia's Hispanic/Latinx Population Regarding Adolescent Health

Poster #7 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Aylin Diaz
Research Mentor(s): Evelina Sterling

Georgia's Department of Public Health's Adolescent Health and Youth Development (AHYD) Program is based on the Positive Youth Development Approach as recommended by the Centers for Disease Control and Prevention. This approach engages youth within their communities, schools and organizations, peer groups, and families in a productive and constructive manner. Overall, the AHYD program aims at preventing HIV, STIs, and pregnancy among all youth. In Georgia, the Hispanic/Latino population has grown to over 10% of our total population. However, adolescent health programs within Georgia have not specifically focused on the cultural differences among the large Hispanic/Latino community. This study takes the existing AHYD programs and seeks to investigate how these programs resonate with the Hispanic/Latino communities, including variability in countries of origin. First, a thorough literature review was conducted regarding Hispanic/Latino youth, at risk behaviors, and the cultural competency of current programs. More specifically, the AHYD programs were further analyzed for how they address the unique needs of the Hispanic/Latino communities, especially beyond just translations to Spanish. Finally, recommendations were provided in terms of best practices that need to be incorporated into the programming as well as any evaluation measures. As the Hispanic/Latino population continues to increase in Georgia, it becomes more evident that improving the health and well-being of Hispanic/Latino children in critical to the state's future. We will see a few models that will show the increase within the Latino population within the Metro Atlanta area. While existing state-funded programs have focused on largely oral health, obesity and nutrition, mental health, unintentional injuries, reproductive and sexual health have

been ignored, often due to stigma and cultural expectations. There has been a series of events taken place to insure we take the proper measures such as translation of the surveys that we release to our Hispanic audience. The next steps will be interviews with the proper translation. More steps must be taken to ensure their safe passage to adulthood across all areas.

Young Women's Perspectives on Social Services in the Slums of Kampala, Uganda: Qualitative Focus Group Findings from the TOPOWA Study
Poster #37 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Sarah Macke
Research Mentor(s): Matthew Lyons

Slum dwelling youth in Sub-Saharan Africa (SSA) experience significant social vulnerabilities and health disparities, and young women in these contexts are disproportionately impacted. At the same time, communities in SSA do have existing resources which provide some amelioration of the difficult circumstances faced by these young women. This research project, based on an ongoing NIH R01, explores young women's perspectives on the social services they are receiving from a local organization. Using a combination of inductive and deductive thematic methods, we analyzed baseline focus group data from a community-based cohort study (6 groups, 60 participants). We found a variety of themes related to the benefits of these services, as well as some themes related to service-related challenges. Benefits included: increased economic autonomy; increased confidence, motivation, and self-reliance; increased optimism, pride, and satisfaction; increased social connection; improved social standing; and improved stress management. Challenges included: negative community perceptions of the social service organization; other program participants as sources of stress; and challenges being on time to training, traveling to training, or balancing training with other responsibilities. Young women in SSA are an underserved, understudied population, and their perspectives on social services are not frequently reported in the scientific literature. Our work begins, therefore, to fill a research gap by providing insight into the emic perspectives of these key stakeholders. Despite some challenges, overall, the young women reported significant benefits of training, with improvements in confidence, social standing, and economic success in response to their training experiences. These findings should prompt future research on how to build on the successes of existing programs and address the challenges that these young women report.

Nursing

Building Capacity through Training for Nursing Curriculum Evolution in Vietnam
Poster #29 (Convocation Center, East & West Activity Wings)

Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Kristin Tran
Research Mentor(s): Miranda Hawks & Dung Ngo

The purpose of this pilot study was to assess and enhance the existing undergraduate nursing curriculum at one nursing school in Vietnam. Current socioeconomic considerations in Vietnam such as nursing shortages, resource deficits, and a lack of nursing training opportunities contribute to undergraduate curriculum development. In addressing these concerns, one outcome of this pilot study is to apply for prospective funding to create a curriculum revision model that adequately equips nurses to address the unique healthcare requirements of Vietnam. One long-term objective of this pilot study is to propose a model for revising the nursing curriculum while considering the unique challenges and opportunities of nursing in Vietnam. Another long term-objective of this pilot study is to be able to prepare nurses to raise cultural awareness and awareness of the healthcare needs of Vietnamese patients. Two methods of data collection will be considered for building the model of curriculum revision including surveys and semi-structured interviews based in theoretical approaches including hermeneutics and dialectics. Nursing deans (n=2), nursing lecturers (n=8), and nursing students including current students in their fourth year (n=6) and alumni (n=9) participated in the online workshop that was the foundation of the pilot study. Findings provided recommendations for curriculum enhancement, involving stakeholders such as Ministries of Education & Training and the Vietnam Nurse Association. These recommendations included modifications to the nursing curriculum, biennial revisions, and various improvements such as additional nursing electives and increased clinical practice hours. Motivations for these revisions ranged from adapting to changing competence criteria to preparing nurses for international employment and responding to societal needs. Limitations including a small sample size and logistical challenges during the pandemic were present. A revised curriculum model will result in establishing a well-rounded foundation of training for nursing in Southern Vietnam.

Examining the Use of Service Learning in Nursing Education
Poster #3 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
10:00am - 10:45am
Undergraduate Student(s): Alexis Arnoux
Research Mentor(s): Tracy Ruegg & Casaundra Wyatt

Service Learning is an experiential learning method that implements servitude or volunteerism to enhance academic knowledge and critical thinking skills. This instructional method can be useful in nursing education as a modality to expose students to many types of nursing practice. Activities completed outside the classroom can stimulate interest in specialty areas of nursing.

The purpose of this narrative review is to examine how volunteerism/service learning is utilized within nursing education, specifically examining its effect on the attitudes of nursing students toward specialty nursing education. A review of the literature was conducted that included published peer-reviewed studies that included qualitative, quantitative, and mixed methods design. The search strategy included utilizing two databases: Google Scholar and the Kennesaw State University Library System which included databases such as Scopus, Supplement Index, and EBSCOhost. A search was conducted on published articles using search terms such as, "service learning" AND "volunteerism" AND "nursing students" OR "nursing education" OR "nursing curriculum" AND/OR "health science students." The initial search yielded twenty-one articles using the search terms and briefly scanning the title and abstract. Four articles were selected to be the final review sample. This review demonstrated that service learning can potentially complement traditional nursing education. Volunteerism can potentially improve nursing students' understanding of curriculum concepts, confidence, and awareness of needs within diverse patient populations. Improving upon the education methods of nursing and health science students can prepare them for their roles as empathetic, capable clinicians ready to serve a community. Implementing service learning as a teaching method allows students to directly interact with their community while actively learning. A limitation of this review is that only four studies were found to provide tangible educational recommendations. More research needs to be conducted on the impact of service learning/volunteerism to further evaluate its effectiveness within future nurses' education.

Generation Z Nurses: Exploring Learning, Communication, and Support Needs
Poster #39 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Violet Riggle & Zaynab Khan
Research Mentor(s): Margot Hedenstrom

Recruitment and retention of nurses remain significant challenges in healthcare, particularly with the entry of Generation Z into the profession. This cohort, born between 1997 and 2006, represents a generation of "digital natives" who have also experienced education and life during the pandemic. Understanding their learning needs, communication styles, and support requirements is crucial for attracting and retaining nurses, thus improving patient outcomes.This study aims to identify the mentoring and support needs of first-degree nursing students, exploring measures that could be implemented to support their success both in nursing school and as registered professional nurses. Through a convenience sample of nursing students at Kennesaw State University, supplemented by outreach to other nursing schools participants will be invited to online audio focus groups. These focus groups will utilize an open-ended survey questionnaire to explore student success learning needs, including mentoring and support needs. The collected data will be qualitatively analyzed by the research team, identifying

themes and patterns within the responses. Participants' identities will be protected through de-identification of transcripts. Inclusion criteria encompass nursing students born between 1997 and 2006, aiming for a diverse representation of male and female students. The findings from this study will provide valuable insights into the needs of Generation Z nurses, informing interventions and support measures that can enhance their success in nursing education and practice.

A Local Assessment of Nurse Practitioners' Viewpoints on Mentorship Programs
Poster #16 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Gracie Zimmerman & Casandra Miranda
Research Mentor(s): Roxanne Bennett

Nurse practitioners (NP) begin their career with minimal formal on the job training following graduation. Research shows that mentorship of novice NPs by more experienced NPs has a positive correlation in improving transition to practice (TTP) issues, such as burnout and job dissatisfaction. Mentorships are crucial for NPs as they provide valuable support and assistance in applying academic knowledge to the healthcare workforce. Despite these benefits, there are few formal accessible options locally. A literature review was conducted to recognize prior attempts and gaps in research for NP mentorships. A 13-question survey was developed to further determine the interest and perceived benefit of mentorship on novice NPs. Kennesaw State University Institutional Review Board determined the survey exempt due to minimal risk. Using an anonymous link or QR code, this survey was distributed to 175 active members of a local advanced practice nursing organization (CANAP), along with a consent letter to describe the purpose of the research. Data was collected and analyzed to view trends on the current availability of NP mentorships and their perceived benefits. In total, 54 participants completed the survey which equals a 31% response rate. Most respondents believe that mentorship programs are beneficial for TTP issues (85%, 46/54). Also, most survey participants (85%) would either be willing to mentor in the future or are considering it (yes: 41%, 22/54; considering 44%, 24/54; no 15%, 8/54). The survey data shows that most NPs from a local organization agree mentorship programs are beneficial for novice NPs and are also willing to participate in them as mentors. The results of this survey suggest that local organizations would be an ideal setting for NP mentorship programs, which will reduce transition to clinical practice issues.

Post Traumatic Growth in Palliative Care Nurses during the COVID-19 Era
Poster #2 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm

Undergraduate Student(s): Aliyah Johnson
Research Mentor(s): Kawther Hamash

Nurses are considered the backbone of the healthcare team as they work to advocate for patient's rights to care. Recently palliative care nurses have been exiting the profession at high rates since COVID-19 because of high stress levels which affects their Posttraumatic Growth (PTG) leading to high burnout rates. Implementing a wellness intervention to promote PTG scores can enhance growth levels, reduce stress, increase retention rates, and promote nurses' well-being (Salimi, Pakpour, Rahmani, Wilson, & Feizollahzadeh,2020). Aim: This study aims to provide baseline measures for the posttraumatic growth levels among palliative care nurses to administer a blog intervention at a later stage to analyze its effect on nurses' posttraumatic growth. Method: The study used an electronic survey in the pretest phase for a diverse group of 226 registered nurses. The survey assessed five factors of PTG (i.e., relating to others, new possibilities, personal strength, spiritual change, and appreciation of life). Results: The PTG levels were 12.9 for factor 1 (0-35), 15.9 for factor 2 (0-25), 20 for factor 3 (0-20), 6.4 for factor 4 (0-10), and 10.1 for factor 5 (0-15). PTG factor 3 "personal strength" recorded the highest score indicating that nurses felt stronger in palliative care units. PTG Factor 1 "relation to others" had the lowest score. A post-survey given to the same group of registered nurses awaits results to see if their responses differed or remained the same following the implementation of the online blog writing intervention. Recommendations: Based on our findings, there is a need to implement self-care measures for palliative care nurses to help improve their PTG levels specifically in appreciation of life, relation to others, and new possibilities. Further recommendations will be based on post-test results to determine if the self-care intervention was effective to be applied to a larger nurse population.

The Transition of Africa-Educated Nurses to the American Healthcare System: A Phenomenological Study
Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
9:00am - 9:50am
Undergraduate Student(s): Elizabeth Maciejewski
Research Mentor(s): Chinomso Nwozichi

By 2030, there will be a projected national deficit of 918,232 registered nurses (RNs) in the United States workforce. One of the ways that the United States is currently using to alleviate the shortage is immigration. In 2021, almost 2.8 million immigrants were employed as healthcare workers, with one of the largest regions of birth for immigrant nurses being Africa at 13.9%. However, it has not yet explored how these nurses manage the complexities of migration while still performing their duties as nurses after COVID-19. Because of this, our research seeks to answer the question, "How are African-educated nurses transitioning into working in

American hospitals?" We conducted a phenomenological study by interviewing African-trained immigrant nurses currently working or have worked in an American hospital for the past five years. The transcribed interviews were analyzed using Nvivo 14 and presented in themes and subthemes. Six themes emerged from the analysis. The results showed that a significant portion of the participants experienced some form of racism, culture shock, and communication barriers. Participants were forced to develop a thriving mindset amid heavy performance demands in the clinical setting. Many participants found social relationships to be the most crucial and helpful coping mechanism, and they also described their transition as involving adapting over time. These results agree with prior research on African nurses' migration, especially regarding the racism and language barriers experienced by these nurses. Moving forward, it is essential to offer social support for immigrant nurses and work to decrease the racism projected towards them. Future studies should attempt to find solutions to the problems felt by immigrant nurses, especially during the initial phase of transition, and explore the role that the hospitals and industry have in the transition of African-educated nurses.

Undergraduate Healthcare and Allied Professional Students Experience learning how to Manage Behavioral Symptoms in Persons with Alzheimer's Disease and Related Dementias

Poster #13 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
11:00am - 11:45am
Undergraduate Student(s): Debora Blay
Research Mentor(s): Modupe Adewuyi & Joy Li

Dementia, a progressive brain disorder, profoundly impacts memory, cognition, and behavior. As the condition advances, individuals often display challenging behaviors like wandering, posing significant care challenges. Healthcare professionals play a crucial role in managing these behavioral symptoms and providing education and support to informal caregivers and families, facilitating effective management. Therefore, it's essential for healthcare programs to equip graduates with requisite knowledge and skills for optimal care provision. To explore undergraduate healthcare and allied professional students' perceptions and experiences regarding learning to manage behavioral symptoms in individuals with Alzheimer's disease and related dementia. This research employs a secondary analysis of qualitative data gathered from an ongoing larger study investigating the use of gamified virtual reality in dementia care education. Participants eligible for this study are enrolled in undergraduate healthcare or allied programs, aged 18 or older, and have completed coursework focused on dementia care. Recruitment was conducted through advertisements in student organizations, flyers, and the social media platforms of the KSU College of Health and Human Services. Six consenting participants engage in a 90-minute focus group discussion after completing a brief socio-demographic survey. Thematic analysis is applied to examine the data. Revealed three prominent

themes: limited knowledge about behavioral symptoms, a lack of experiential learning opportunities, and perceived inadequate competency in managing these symptoms. These themes offer insights into the challenges faced by students in acquiring skills related to behavioral symptoms management in dementia and highlight areas for educational enhancement

Social Work and Human Services

Accessing How Food, Housing, Alcohol, and Drugs Drive Sexual Exploitation and HIV Transmission
Poster #27 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
12:00pm - 12:45pm
Undergraduate Student(s): Jonathan Jones
Research Mentor(s): Matthew Lyons

This study looks at the socioeconomic variables that lead to the commercial exploitation of children and young women for sex. Mostly caused by a number of social variables, such as food insecurity, violence, poor or unstable housing, poverty, and inadequate access to medical treatment . In the hopes that healthcare might be revitalized this cohort study was conducted. Participants were gathered from three locations in separate affected communities, all women from 18-24. Braun and Clarke's thematic analysis approach was used to analyze recordings from 6 focus groups consisting of 10 young women. Our research identified a number of modifiable social vulnerabilities that have an immediate impact on one's physical health, along with a few community tools that may be used to mitigate such vulnerabilities. There proved to be four thematic clusters that each identified a distinct social driver of physical health. All of which gets used to leverage these young women and children into what's called "survival sex". This risky practice exacerbates HIV transmission. Highlighting the negative outcomes connected to changeable social-ecological factors and resources could lead to better situations for the young women and children in Kampala Uganda. Especially those caught in a cycle of abuse driven by food, housing, and drugs.

Community-Engaged Scholar Network Alumni Survey Report of Findings and Recommendations
Poster #11 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
2:00pm - 2:45pm
Undergraduate Student(s): Savanah Blanco, Monique Boyce, Destiny Brooks, Olivia Brown, Amari Cody, Ansley Cole, Daisy Garcia, Elisabeth Guss, Sebastian Ladino,

Hazel Lee, Madeline Morgan, Uchenna Ogbonna, Richard Parham, Rosland Szechenyi, & Chasmine Wilder
Graduate Student(s): David Brockway
Research Mentor(s): Darlene Xiomara Rodriguez & Jennifer W. Purcell

The Engagement Scholarship Consortium (ESC) is an international association of community-engaged universities. It has two signature programs: (1) the Emerging Engagement Scholar Workshop (EESW), aimed at preparing doctoral students and early career faculty for community-engaged scholarship and (2) Outreach and Engagement Practitioners Network (OEPN), aimed at providing new and established professionals with targeted professional development and a community of support for managing and leading community-engaged initiatives at their institutions of higher education and/or community. As part of EESW's and OEPN's future programming, in 2023, they undertook a survey to determine if, when, and how their programming has shaped their alumni's career trajectory and gathering recommendations for future programming by the ESC more generally. Through a community-university partnership, the ESC, along with staff from KSU, Michigan State University, and the University of Colorado-Boulder are using this research to inform ESC's Strategic Plan, which will be shared with its members during the 2025 national conference. Students enrolled in the KSU Human Services Program's HS3600: Program Development and Evaluation course, under the supervision of their professor, have played an integral part in this multi-phase research endeavor. Phases 1 and 2 were completed and presented at the 2023 Symposium for Student Scholars and the 2023 ESC Conference. Here, we aim to report on Phase 3, whereby HS3600 students, organized into four evaluation teams, conducted (1) a targeted literature review, (2) analyzed the qualitative alumni survey data, and (3) conducted virtual interviews with program stakeholders. This poster presentation will feature the program evaluation matrix on one of the principal areas of concern that emerged in 2023 from the ESC membership: the health and wellbeing of boundary spanners within higher education. We will also present data analysis from the alumni survey and make recommendations to the ESC Strategic Planning Committee. This systematic investigation culminates in a report of findings to the ESC Board of Directors to inform the next phase in the strategic planning process.

Community Resiliency and Individual Resiliency Among Young, Slum-Dwelling Women in Kampala, Uganda: Results from the TOPOWA Study
Poster (Microsoft Teams)
Friday, April 19th
12:00pm - 12:15pm
Undergraduate Student(s): Abigail Gilliard
Research Mentor(s): Matthew Lyons

Intro: Young women in sub-Saharan Africa experience a variety of stressors and negative health outcomes. Women who dwell in slums are at particular risk of high stress and poor health. In order to survive in these difficult environments, young women have to develop significant resiliencies that help them deal with the challenges they face. The slums of Kampala, Uganda represent one such environment in which young women face significant challenges but also display incredible resiliency. However, these young women's perspectives are poorly understood and rarely reported in the scientific literature. Methods: As part of an ongoing NIH-funded R01 intervention study, we conducted six focus groups with ten young women each dwelling in the slums of Kampala (n = 60). We asked about proximal drivers of stress and resiliency, as well as service experiences. We used thematic analysis to inductively identify themes. Results: We identified a series of both community level and individual level resilience factors. Community level resilience factors included family support, friendship and social ties, community leadership, sports and other social organizations, religious community, and seeing others succeed. Individual level resilience factors included persistence, optimism, self-reliance, hard work, saving money, and dance. Conclusions: This poster presents the perspectives of a vulnerable population whose voices are rarely reported in the scientific literature. They underscored the critical importance of optimism and positive social ties in surviving the most difficult circumstances. They also highlighted a variety of community and individual level resources that should be invested in to address the proximal drivers of stress in this community. These findings warrant attention from policymakers, interventionists, and researchers seeking to promote health among young, slum dwelling women.

Inadequate Housing and Poor Sanitation Contribute to the Spread of Infectious Disease Kampala, Uganda: Results from the TOPOWA Study.
Poster #3 (Convocation Center, East & West Activity Wings)
Thursday, April 18th
3:00pm - 3:45pm
Undergraduate Student(s): Alayna Bhula
Research Mentor(s): Matthew Lyons

Significant health disparities plague the youth of Kampala, Uganda, stemming from a multitude of social determinants such as limited healthcare accessibility, substandard housing, and pervasive poverty. These inequities disproportionately affect young females within the community due to compounded challenges including restricted healthcare access and entrenched gender norms. Establishing meaningful connections with these marginalized women is paramount, enabling us to discern the most suitable intervention strategies. The goal of this study is to fulfill the responsibility of amplifying the voices of women in Kampala, Uganda, thereby cultivating a more cohesive and empowered community. Methods: As a component of an ongoing R01 intervention study supported by NIH, Six focus groups were held with three distinct locations in the Kampala, Uganda region. Ten young women, ranging in age from 18 to

25, who were suffering in the Kampala, Uganda area were included in each group (n = 60). Four thematic groups were identified through a thematic analysis. Results: Using the viewpoints of the women who use these resources as a basis, the analysis produced four theme clusters that represent healthcare vulnerabilities. In particular, Cluster 2 concentrated on how poor housing and sanitation allow infectious diseases to spread. Participants stated that poor housing, improper sewage, and overcrowding all contribute to the development of infectious diseases. Conclusion: This research shows the social factors that contribute to the health burden and transmission of infectious diseases, typically overlooked by sources such as scientific literature. Reviewing this subject and giving it greater attention is vital since we must understand what adjustments should be made in order to better their community. They also outlined a range of resources that should be used at both the communal and individual scales in order to address the primary causes of stress in Kampala, Uganda.

Storytelling as Relational Practice: Critically Engaging Class-Based Inequality in Growing Up Poor

Oral Presentation (Prillaman Hall - Indoor Plaza)
Wednesday, April 17th
9:00am - 9:50am
Undergraduate Student(s): Jalyn Lankford & Seema Steele
Research Mentor(s): Cameron Greensmith

Utilizing an intersectional analysis of poverty (Mattsson, 2014, Royce, 2015), this presentation attends to the stories and lived experiences of young people experiencing the plight of class-based inequality (Danforth, 1997). This paper offers an intervention into the ways young people are framed by adults as innocent and developmentally incapable of understanding complex phenomena (Kelly & Brooks, 2009) We base our inquiry within the lessons learned in the 2020 documentary Growing Up Poor, which follows three families in rural/suburban Ohio who have endured the realities of poverty, racialization, and health inequality at the onset of the COVID-19 pandemic. We utilize a phenomenological inquiry to prioritize centering the lived experiences of the young people by highlighting the ways their stories can be used as a conscious-raising tool for helping professionals to challenge inequality, power, and uplift the stories of marginalized children and youth (Gold, 2012). Greensmith and Sheppard (2017) note that helping professionals' perceptions of children as innocent does a disservice to their experiences of racism and inequality. As the authors note "storytelling provides a platform to trouble narratives of racial harmony and progress by [centering] the storyteller—they are the authority of their own story" (Greensmith & Sheppard, 2017, p. 10). We suggest that the method and practice of storytelling aligns the helping professional with relational practice to uplift the voices, experiences, and stories of marginalized groups within the helping relationship (DuBois & Miley, 2021; Greensmith & Sakal Froese, 2018; Segal, 2013).