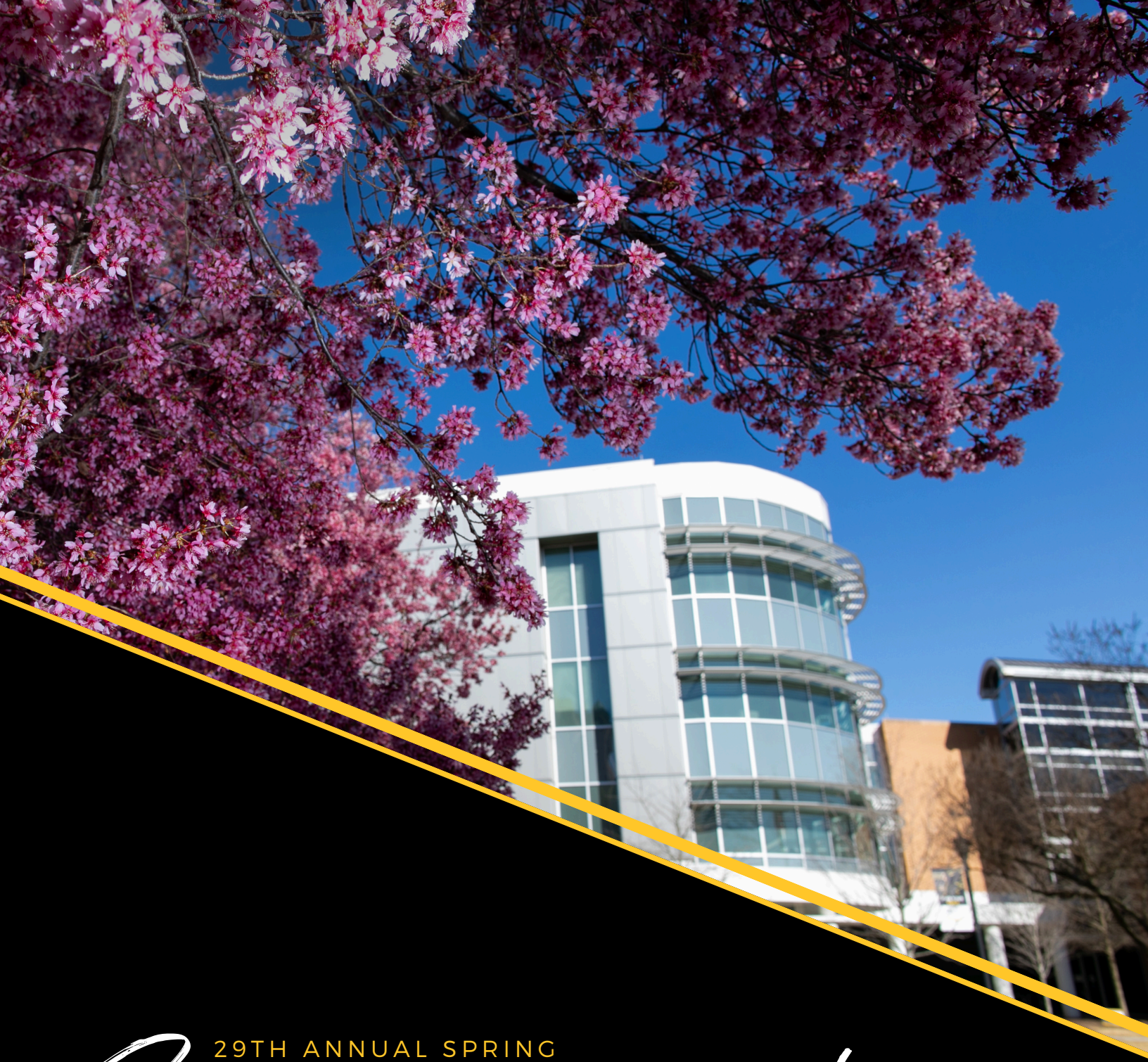

29TH ANNUAL SPRING

Symposium of Student Scholars

APRIL 16-18, 2025

Program

Wednesday, April 16:
Oral Presentations and Performances

9:00am – 9:50am: College of Science and Mathematics (CSM)

10:00am – 10:50am: WellStar College of Health and Human Services (WCHHS)

11:00am – 11:50am: Radow College of Humanities and Social Sciences (RCHSS)

12:00pm – 12:50pm: College of Computing and Software Engineering (CCSE)

1:00pm – 1:50pm: Southern Polytechnic College of Engineering and Engineering Technology (SPCEET)

2:00pm – 2:50pm: College of Architecture and Construction Management (CACM)

3:00pm – 3:50pm: Geer College of the Arts (GCA) & Coles College of Business (CCOB)

4:00pm – 4:50pm: Bagwell College of Education (BCOE)

Thursday, April 17:
Poster and Visual Arts Presentations

9:00am – 5:00pm: All Presentations

Friday, April 18:
Virtual Presentations

12:00pm – 5:00pm: All Presentations

Bagwell College of Education

Educational Leadership

Affirmative Action Ban and FAFSA Delay Impact on Multi-Marginalized Students
Poster #5 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Prevailer Idowu & Angelie Santos-Silvano
Research Mentor(s): Debalina Maitra

The FAFSA has introduced what was initially seen as a beneficial policy aimed at improving students' access to financial aid. However, the plan has backfired, making it increasingly difficult for students to file their FAFSA applications. At the same time, the Supreme Court's 2023 decision to ban Affirmative Action has removed race as a factor in college admissions, further complicating access to higher education for historically disadvantaged groups. This project investigates key questions related to these developments: "How do the removal of Affirmative Action and the challenges associated with FAFSA affect the experiences of multi-marginalized undergraduate students? In what ways do these issues alter their educational and career trajectories, and how do they perceive the equity of financial aid policies without race-conscious admissions?" To gain insight into this situation, we systematically searched 15 articles using Google Scholar and other academic databases like the KSU library system with keywords such as "Affirmative Action Ban," "FAFSA Glitch," and "Marginalized Students." Our findings indicate that many students are disenrolling from school or certain undergraduate majors due to the barriers created by these new laws. Our preliminary findings conclude these changes have a significant impact on those students, making them feel less welcomed in their pursuit of higher education. By identifying the systemic barriers created by these policy shifts, this research aims to inform higher education institutions and policymakers about the unintended consequences of these changes. Our overall goal is to bring awareness about the impact students are navigating since the shift in admission policy ensuring financial aid, admission and retention policies provide equitable access to them.

Grief Leadership in Higher Education: Navigating Loss with Empathy and Institutional Support
Oral Presentation (Microsoft Teams)
Friday, April 18, 12:45pm – 1:00pm
Undergraduate Student(s): Soleis Ohonde
Research Mentor(s): Chinasa Elue

Higher education leaders are often tasked with guiding their institutions through moments of crisis, including grief and loss within their communities. The COVID-19 pandemic, social injustices, and economic instability have heightened the need for leaders to address grief not only as a personal experience but also as an institutional challenge. This study examines the emerging concept of grief leadership—the ways in which higher education leaders navigate and respond to grief among faculty, staff, and students while maintaining institutional priorities. Using a qualitative research approach, this study explores the lived experiences of senior and mid-level leaders in higher education, analyzing their strategies for supporting grieving individuals and fostering a culture of care. Preliminary findings reveal three key themes: (1) balancing institutional demands with human empathy, (2) developing grief-responsive policies and support structures, and (3) the need for intentional leadership training on grief navigation. The study introduces a framework for grief leadership that emphasizes proactive engagement, resource allocation, and long-term policy shifts to create more compassionate institutions. By presenting this research, we aim to provide higher education professionals with practical insights and evidence-based recommendations for integrating grief leadership into administrative practices. This presentation will engage participants in a discussion on how to cultivate grief-informed leadership, explore institutional best practices, and reflect on the role of empathy in sustaining well-being within academic communities.

Student Liaisons for Autism: Using College Students in Bridging the Communication Gap

Oral Presentation (Prillaman Hall)
Wednesday, April 16, 4:00pm – 4:50pm
Undergraduate Student(s): Anna A Mittal & Sophie Debord
Research Mentor(s): Michael Ota

This action research focuses on supporting college students with autism by pairing them with RBT-certified student liaisons. These liaisons will monitor and coach students who have social, communicable, and executive functioning challenges. Research studies have shown that people with autism are less likely to graduate, get a job, or get married. Students with autism usually receive help throughout K-12 school, specifically with a 504 plan, but there are hardly any resources in higher education to help them. The student liaisons would bridge the gap between the students with autism and the rest of their college experience. There would be an observation period to assess where the liaisons are most needed for each individual student and then stage an intervention by coaching, creating goals, and developing much-needed skills that would increase their standard of living. Our research will take the data and make a connection between student liaisons and how they can help students with autism in higher education be more successful. Student liaisons will help the students make connections, plans, and develop skills that they would retain for the rest of their lives. We predict that our research will show that not only will this study increase and better the lives of college students with autism, but that ABA services on

campus would not be hard to achieve and would ultimately make many people's lives more efficient by developing much needed skills that would not only help them in college, but out of college and into the rest of their lives.

Elementary & Early Childhood Education

Black Education Is Black Liberation: Using Principles of Sankofa with the Black Teacher Archive
Poster (Microsoft Teams)
Friday, April 18, 2:30pm – 2:45pm
Undergraduate Student(s): Aubry Robertson, Aryanna Finch, & Ah'Zaiah Rolle
Research Mentor(s): Marrielle Myers

As America's classrooms become more diverse, the teaching population remains essentially unchanged. Data from a 2021 study by the National Center for Education Statistics (NCES) reported that over 80% of public school teachers are white. This is in stark contrast to the K-12 student population, where over 50% of students identify as Black, Latinx, Asian, Indigenous, or bi-racial. This mismatch in the teacher and student population has persisted for several decades, and research indicates the need for change to ensure that students from historically marginalized groups experience academic and social success. The Black Teacher Archive is a digital archive dedicated to documenting black teachers' experiences, activism, and impact in the US during the Jim Crow and Civil Rights eras. It focuses on preserving historical records and the role of black educators in shaping education. We used quantitative research methods in the Black Teacher Archive to a) explore the concept of fugitive pedagogy, b) understand the definition of diversity, c) examine and unpack stereotypes, and d) search for instances of the word equity. Findings revealed that a diverse definition of the word "teacher" was present during the Jim Crow and Civil Rights eras. Classroom teachers relied heavily on churches and community organizations to also take on the work of being a teacher. We also found that African Americans were frequently victimized by stereotypes, leading to unfair treatment by society, including lower pay for Black teachers. Finally, our search for the word equity directed us to the word equality. It became clear that Black educators fought for equality in the workplace, socially, and economically, likely due to false narratives of "separate but equal." This research provides critical implications for teaching in today's society, which seeks to rewrite history, ban justice-oriented curricula, and erase students' opportunities to study history.

Family Dynamics in Asian American Children's Books
Oral Presentation (Prillaman Hall)
Wednesday, April 16, 4:00pm – 4:50pm
Undergraduate Student(s): Temur Usman
Research Mentor(s): Jinhee Kim

The children's books act as both mirrors—helping kids see their own experiences—and windows, allowing them to understand different family dynamics. This study examines the portrayal of family life in Asian American children's books, with particular attention to male characters within family dynamics. By analyzing 18 selected books published in English from 2008 to 2024, it explores how narratives surrounding male characters reflect the complexities of Asian American families. The sampled books underwent content analysis, focusing on relationships with other family members, cultural elements, and intergenerational interactions. The findings reveal that while some books celebrate cultural heritage and strong family bonds, there remains a need for more diverse representations of male characters in Asian American families. This research highlights the importance of culturally relevant literature in making children's books more inclusive and representative of diverse experiences.

Stories about Reading in Schools and What They can Tell Educators about Teaching Reading
Poster #20 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Alana Zanoni
Research Mentor(s): Roberta Gardner

This research project titled "Stories about Reading in Schools and What They Can Tell Educators About Teaching Reading" takes a look at the personal and professional experiences of teachers regarding reading and how those experiences influence teaching practices. The research explores how teachers motivate themselves as readers, their reading strategies when faced with difficult texts, and their expectations for students' reading development. This is done through looking at how personal experiences with reading shape one's attitudes and strategies. The study aims to uncover how a teacher's reading journey influences their approach to supporting and motivating students in the classroom. Additionally, understanding this provides important insights into effective methods of creating a love of reading and engagement among students. Utilizing a quantitative approach, this study conducts in-depth thirty-minute interviews and surveys with teachers, as well as a portraiture methodological framework. This method allows the collection of personal stories and experiences, creating diverse perspectives that influence teaching practices in reading. Although this study is ongoing, we hope to provide insightful information for educators, emphasizing the critical importance of understanding students' reading experiences to strengthen literacy education and effectively support diverse student needs.

Stories about Reading in Schools and What They can Tell Educators about Teaching Reading
Poster (Microsoft Teams)

Friday, April 18, 4:00pm – 4:15pm
Undergraduate Student(s): Arin Hilson
Research Mentor(s): Roberta Gardner

Stories about reading in schools and what they can tell educators about reading is based on the practices of personal reading lives of teachers. This project is based on their instructional practices, focusing on how their reading habits influence the reading journey and experience for their students. By looking into the past and present lives of educators through portraiture methodology (Lawrence-Lightfoot, 1997), the study explores how personal reading habits such as prevalence of reading for enjoyment and the obstacles that come along with it can inform educational approaches in the classroom. By interviewing teachers this research aims to gather data that will give insight into how personal reading will influence material selection, strategies and student engagement for promoting a supportive and positive reading environment. This research highlights the significant role educators' reading experiences play in building a classroom's reading culture. This study will also mention the experiences of aliteracy, promoting various highlights of understanding the obstacles that both students and educators come face to face with in developing a lifelong reading habit.

Stories about Reading in Schools and What They can Tell Educators about Teaching Reading
Poster #26 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Azaria James
Research Mentor(s): Roberta Gardner

This research study aims to investigate how teachers' literacy experiences connect to the value of identity in literacy development, including their exposure to diverse literature. Educational policies prioritize the Science of Reading, yet little attention is paid to teachers' motivations and lived experiences related to reading. This study examines how teachers' reading journeys might impact their approaches to reading instruction. Portraiture (Lightfoot, 1997) and lived experience techniques are used in this research to document the backgrounds and reading experiences of aspiring teachers to better understand their impact on literacy teaching.

Stories about Reading in Schools and What They can Tell Educators about Teaching Reading
Poster #16 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Cecilia Akins
Research Mentor(s): Roberta Gardner

There is no doubt that reading is a fundamental skill in each person's life. Teachers play a pivotal role in the development of reading skills and relationships with reading. This project seeks to explore pre-service teachers' relationships with reading throughout their lives, with hopes of initiating the conversations that will improve their reading lives, and in turn that of the children they teach. This research investigates the reading lives and experiences of pre-service teachers and how they affect their plans for approaching teaching reading in their future classrooms. To gather information, subjects will be interviewed with questions focusing on personal experiences and feelings. To organize data, the "Portraiture" methodology created by Sarah Lawrence Lightfoot (1997) will be used. This methodology focuses on each subject as a whole person, capturing their individuality as he or she answers interview questions. The results of this research will showcase the complex relationship between pre-service teachers' reading lives and experiences and their plans for teaching reading.

Stories about Reading in Schools and What They can Tell Educators about Teaching Reading
Poster #24 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Savannah Gill
Research Mentor(s): Roberta Gardner

Despite the growing emphasis on the Science of Reading in literacy instruction, teachers and educators must examine their own personal motivations and experiences as readers that shape their lives. Teachers' past reading experiences can both directly and indirectly affect a student's learning experience with that teacher, which can potentially damage or benefit an essential development in reading skills; this research aims to bridge the gap in the literature through finding out teachers' personal and professional experiences can shape a teachers' attitudes, motivations, and practice as both readers and future educators. Methods include an interview with participants and post surveys. Qualitative results of the study are to be analyzed through the process of thematic analysis using portraiture, (Lawrence-Lightfoot, 1997).

Inclusive Education

Maintaining Harmonious Multilingualism in Trilingual Families in the. U.S.
Poster #33 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Matt Newton & Feby Takawy
Research Mentor(s): Jayoung Choi & Tuba Angay-Crowder

The aim of this presentation is to discuss the findings of the research that explored how parents in multilingual families managed the complexities of language and literacy instruction for their children in the United States. Despite the growing number of trilingual households, little is known about the specific strategies parents employ to foster literacy development and address linguistic tensions within the home. Using a qualitative case study approach and drawing upon the framework of Harmonious Multilingualism (HM) (De Houwer, 2020), this research explored the literacy practices of two trilingual families. Our research was guided by the following questions:

1. *What strategies did multilingual families employ to foster literacy development in their children in the U.S.?*
2. *How did multilingual families sustain HM within the home?*

Family 1 speaks Greek, Arabic, and English, while Family 2 speaks Mandarin, Spanish, and English. Participants were selected through purposeful sampling to ensure representation of families actively engaging in trilingual literacy practices. The selection criteria included: (1) Parents raising at least one trilingual child (ages 5–12) in the U.S., (2) Commitment to incorporating all three languages into daily interactions and literacy activities. (3) Willingness to participate in multiple rounds of interviews and surveys. Families were identified through social media, multilingual parenting forums, and educational outreach programs. Data sources included parent surveys to gather background information on language use and literacy practices. We also conducted initial and follow-up interviews with parents to explore their strategies, challenges, and perceptions of HM. Data were analyzed through iterative coding and thematic analysis, identifying key patterns in how families sustain multilingual literacy environments. This study contributes to a deeper understanding of home-based and school-based literacy practices in trilingual households. Findings offer insights for educators, policymakers, and multilingual families seeking to foster literacy development while preserving cultural and linguistic identities.

Trilingual Families' Literacy Practices with Implications for Classroom Teachers: Through the Experience of Manuscript Writing as Student Researchers

Oral Presentation (Prillaman Hall)
Wednesday, April 16, 4:00pm – 4:50pm
Undergraduate Student(s): Brianna Arias & Mary Dang
Research Mentor(s): Jayoung Choi

Immigrant families extreme lack of support on all fronts, especially when it comes to trilingual/multilingual literacy practices at schools. Due to lack of resources, it is challenging for families and teachers alike to aid in the students' literacy development in all languages involved. We need to learn more about effective familial literacy practices that can be conducted by any public-school teacher, and replicable by parents at home. The purpose of this presentation is to

explore the process of creating a manuscript and being published through the lens of undergraduate and graduate researchers.

In this presentation, we discuss the process of writing a manuscript aimed to help public-school teachers provide as much literary support to multilingual students in the classroom. Typically, in American schools, English is the only language of interest when it comes to literacy. The goal of this study is to create a greater understanding of various languages among public-school teachers and the best way to practice literacy of heritage languages at school in addition to literacy at home. Additionally, we look into ways that teachers can communicate to the parents of the multilingual students the several literacy practices that are the most efficient in the classroom that can also be managed at home. The expected result of this manuscript is for teachers to adopt literacy practices in the classroom and become knowledgeable in multilingual literacy they can apply to their practice.

This presentation will benefit students looking to publish their research by explaining the process of publishing, from the perspective of an undergraduate researcher. The study itself will benefit teachers looking to make their classroom more inclusive and become a pillar for immigrant families to rely on for language and literacy development in heritage languages in public schools.

Instructional Technology & Innovation

Students' Experience with Virtual Reality Technology in Middle School Science
Poster (Microsoft Teams)
Friday, April 18, 2:30pm - 2:45pm
Graduate Student(s): Lindsey Mason
Research Mentor(s): Jason Harron

Emerging technologies, such as virtual reality (VR), can allow students to interact with scientific concepts by manipulating models, carrying out multiple experimental trials quickly, and observing the motion of objects within a system. Students will interact with a simulation that was developed using the PhET simulation "My Solar System" that can be supported with either laptops or fully immersed with a VR headset. Through the theoretical lens of constructivism, this mixed-methods study will examine how the immersive experience of VR interacts with the collaborative nature of science education. Quantitative and qualitative methods will be used to examine differences in content acquisition, student experience with collaboration in immersive VR comparing the control and experimental groups, and affordances and constraints of VR while studying astronomy concepts. The goal is to receive parental permission for 75 participants for the quantitative phase and 16 participants for the qualitative semi-structured interviews. The problem this study seeks to address is filling the gap in the literature about how students experience immersive technology in a collaborative setting such as

a middle school science classroom and to inform pedagogical decisions. Becoming more informed about how students experience VR moves pedagogical decisions from focusing on the novelty of the technology to determine if the implementation of VR supports the desired learning objective. With a study start date in March 2025, the presentation will share preliminary quantitative results on content acquisition between the control and experimental groups, and emerging themes from quantitative analysis of interview transcripts.

Coles College of Business

Economics, Finance & Quantitative Analysis

Health Insurance Coverage for Implanted Cardiovascular and Diabetic Devices
Poster #22 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Lauren Lee & Skylar Colman
Research Mentor(s): Weiwei Chen

With increased rates of diabetes and cardiovascular disease in the United States there has been growing popularity in cardiac implanted and diabetic implanted monitoring devices. Incorporating these devices into a person's life can help with the quality of life for people who have experienced a cardiac or diabetic event. Medicare may cover implantable cardioverter defibrillators if the patient is diagnosed with heart failure, but coverage depends on whether the patient goes to an inpatient or outpatient facility. Continuous glucose monitors are also covered by Medicare for diabetic patients if the doctor says they meet all the requirements. This study aims to examine insurance coverage for implanted devices used in diabetic and cardiac patients, as these devices significantly enhance monitoring of both conditions. To address the question, we first review the U.S. Food and Drug Administration (FDA) approved devices list and summarize the quantity and category of relevant digital devices approved during a five-year period (2019-2024). We then review journals, articles, and websites to assess the extent to which these devices are covered by health insurance. We analyze the coverage by insurance type for each category of device and discuss how device attributes, in conjunction with the targeted conditions, influence the coverage. Our findings would help better understand insurance coverage policies and identify gaps in coverage for commonly used implanted devices.

Impact on Trump-Biden-Trump Administration Changes on Health Insurance Coverage
Poster #21 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Chasidy Moeun
Research Mentor(s): Weiwei Chen

Health insurance coverage in America has been significantly affected by health policy changes across different administrations. It is particularly true for Medicaid program, which covers about 20% of Americans and is jointly funded by federal and state governments. While the Affordable Care Act (ACA) was passed with the main goal of improving health insurance coverage, including expanding Medicaid, the first term of the Trump administration sought to reverse the effects. When Biden took office during the pandemic, he focused on building on ACA provisions

and expanding insurance coverage. As President Trump began his second term, uncertainties regarding Medicaid and other ACA policies have resurfaced. This study aims to compare the health policies during the Trump, Biden, and Trump administrations and examine their impacts on health insurance coverage. Journal articles, policy documents, government reports, and websites in the last 9 years (2016-2025) are reviewed to summarize changes in health policies. Trends in uninsured rates and insurance coverage by public and private insurance during the first Trump term and the Biden administration will be presented. We will also discuss anticipated changes in the second Trump term. The study is timely in providing insights into the evolving dynamics of health insurance coverage and informing future policy decisions.

Information Systems & Security

Future Directions for Brain-Computer Interfaces and Artificial Intelligence
Poster #29 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Graduate Student(s): Pravinya Mandalapu
Research Mentor(s): Adriane Randolph and Andrea Taylor

Brain-computer interfaces (BCIs) have revolutionized human-computer interaction by enabling direct communication between the brain and external devices. The integration of artificial intelligence (AI) has significantly improved BCI performance in decoding neural signals, enhancing accuracy, speed, and adaptability. This paper explores advancements in AI-powered BCIs, highlighting machine learning techniques, multimodal fusion, and healthcare applications. It also identifies challenges such as data limitations, ethical concerns, and computational constraints. A future research agenda emphasizes hybrid AI models, real-time processing, and explainable frameworks for the broader adoption of AI-driven BCIs. Introduction & Context: Brain-computer interfaces (BCIs) enable direct interaction between the human brain and external systems, offering applications in neuroprosthetics, cognitive enhancements, and assistive technologies. AI integration has significantly advanced BCI technology by improving neural signal decoding, reducing noise, and enabling real-time processing. BCIs leverage various neural recording techniques, including EEG, fMRI, and ECoG, which are augmented by AI-driven methods such as convolutional neural networks (CNNs), generative adversarial networks (GANs), and hybrid models. These advancements facilitate applications in neurorehabilitation and mental health interventions. However, challenges like data variability, ethical concerns, and computational constraints remain critical hurdles. Research Question: What are the advancements, challenges, and future directions in AI-powered BCIs for improving decoding accuracy and enhancing practical applications? Methodology: This study adopts a systematic literature review (2018–2025) using sources like IEEE and PubMed. Key dimensions analyzed include performance metrics (accuracy, latency, adaptability), challenges (data limitations,

computational complexity, ethics), and emerging trends (hybrid models, explainable AI). Conclusion: AI-powered BCIs are transforming neurorehabilitation and assistive technologies. Overcoming barriers like data scarcity, ethical challenges, and computational demands is essential. Future research should emphasize hybrid AI models, real-time capabilities, dataset standardization, and ethical frameworks to enhance trust and usability.

Understanding the Common Personally Identifiable Information Labels Patterns Based on Open-Source Intelligence: A Systematic Literature Review
Oral Presentation (Microsoft Teams)
Friday, April 18, 4:30pm – 4:45pm
Undergraduate Student(s): Laeyla Nelson & Sophia Bucaj
Research Mentor(s): May Bantan

Open-Source Intelligence (OSINT) involves collecting, processing, and correlating publicly available data from sources like social media and government records. Personally Identifiable Information (PII) can be exploited by threat actors to build detailed profiles. This research examines OSINT within Information Systems (IS) literature, reviewing its behavioral aspects and developing a theoretical framework on how hackers use open-source data to triangulate PII. It also aims to guide practitioners in creating effective countermeasures. To assess existing research, the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) method (Moher et al., 2009) was used, incorporating a structured search, selection criteria, data extraction, and analysis. A literature review conducted in July 2024 identified journal papers on OSINT-related privacy and cybersecurity concerns from 2014 onward. The search query targeted top IS journals, including Decision Support Systems, Information Systems Journal, and Journal of Management Information Systems. Articles were included if they met the following criteria: (1) published between January 2014 and July 2024; (2) appeared in an AIS journal; (3) examined OSINT use; (4) included specific research theories, experimental designs, or prototypes; and (5) were fully accessible. The search yielded five relevant journal articles, with only one (Dincelli et al., 2023) directly addressing OSINT in cybersecurity, highlighting PII labels and common entry points. However, IS literature lacks analysis of common PII identification label patterns found in OSINT. Future research should focus on ethical examination and simulation of PII triangulation, enabling a deeper understanding of exploitation patterns through OSINT techniques.

Management, Entrepreneurship & Hospitality

Drivers of Franchising Chain Performance: The Role of Franchising Experience, Public Firm Status, and Marketing Support

Poster #22 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Valerie Thomas, Avery Seiz, Dev Patel, Jayden Perdue, Kana Lewis, Lisbeth Gallardo, Morgan Lucas & Samuel Dunphy
Research Mentor(s): Melih Madanoglu

Franchising is an important business model, with an estimated 806,270 franchise outlets in 2024, employing approximately 8.9 million people in the United States. It is especially prominent in the restaurant industry, where 318,000 franchised restaurant outlets operate across the country. Research indicates that a higher degree of franchising, measured as the proportion of franchised units to total units, correlates positively with financial performance, meaning more franchising generally leads to better firm profitability (Madanoglu et al., 2011). However, limited studies explore factors influencing chain-level success. This study addresses that gap by examining how franchising experience, public firm status, and local marketing support impact the financial performance of franchising restaurant firms. By integrating Agency Theory and the Resource-Based View (RBV), this study investigates these relationships using a sample of 73 U.S. restaurant franchising chains provided by FRANDATA. The dataset spans 2016–2019, comprising 274 firm-year observations. Financial performance was measured as gross margin (gross profit/total sales). The three predictor variables were: franchising experience, public or private firm status, and local marketing support. The study controls for chain-level characteristics such as royalty rate, franchising fees, number of states with outlet locations, startup investment, and franchising proportion. Findings reveal that franchising experience positively impacts financial performance. However, public firm status negatively affects financial performance, as publicly traded firms tend to have lower profitability or gross margins. Chains that offer local marketing support have a higher gross margin. Among control variables, chains with higher royalty rates and franchise fees achieve higher financial performance.
By identifying key drivers of franchising success, this study enhances understanding of franchising dynamics. It offers actionable insights for franchising executives, highlighting how experience with franchising, public status, and local marketing support influence profitability, thereby aiding in optimizing growth and performance strategies for restaurant franchise chains.

Marketing & Professional Sales

Exploring the Impact of CEO Paranoia on Competitor Orientation and Digital Orientation

Poster #22 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Anya Vasylesvka & Kyle Crowe
Research Mentor(s): Prachi Gala

Purpose: This study investigates the connection between levels of CEO paranoia and a firm's digital orientation, examining how paranoid leadership influences competitor orientation resulting in digital landscape. Methods: The study gathered data on 1,243 companies sourced from Wharton Research Data Services. Paranoia scores were assigned to leadership based on a company's published literature including annual reports, SEC 10-K filings, and shareholder letters. CEO paranoia levels were assessed with dictionary-based text analysis techniques on these shareholder letters. Digital orientation was measured through investment in digital technologies and initiatives along with the text analyses on annual reports. Data processing and statistical analysis were conducted in Stata using regressions. Controls were implemented for firm age, size, and leadership structure, including CEO age and gender. Findings: Results indicate a significant positive correlation between CEO paranoia and the firm's digital orientation. This relationship is mediated by the competitor orientation of the firm. Findings suggest that paranoid CEOs are more likely to drive digital transformation efforts. Conclusion: This research contributes to the growing literature on executive psychology and strategic decision-making in the digital era. Practically, it highlights the need for boards to consider CEO psychological traits when evaluating digital strategies and provides insights for stakeholders to better understand the drivers behind a firm's digital initiatives.

The Impact of the CEO's Personality Traits on Digital Orientation in Firms
Oral Presentation (Prillaman Hall)
Wednesday, April 16, 3:00pm – 3:50pm
Graduate Student(s): Siva Charan Harimanikyam
Research Mentor(s): Prachi Gala

This study explores the impact of the CEO's Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism on firms' digital orientation. Using the Linguistic Inquiry and Word Count (LIWC) tool, we analyze shareholder letters to identify the predominant personality traits of key decision-makers within firms. These traits are then regressed with the firms' digital adoption strategies and overall technology orientation. We propose that higher levels of Openness and Extraversion among decision-makers will increase the digital orientation of the firm. Individuals are open to new experiences and those who are more outgoing and energetic tend to be more inclined toward adopting digital technologies. Conversely, higher levels of Neuroticism present barriers to digital adoption, as decision-makers exhibiting higher levels of Neuroticism are more resistant to change and less willing to embrace new technologies. We have collected data for 1250 firms and are in the process of analyzing this data. This analysis offers valuable insights for organizational leaders and policymakers aiming to enhance digital integration within firms. By understanding the psychological drivers behind digital orientation, the research provides a foundation for developing more effective and tailored strategies to foster a technology-driven business environment, supporting the advancement of the digital economy.

College of Architecture and Construction Management

Architecture

AI-Driven Technology for Energy Efficiency: An Overview of Developments in Residential Buildings
Oral Presentation (Microsoft Teams)
Friday, April 18, 2:30pm – 2:45pm
Undergraduate Student(s): Sally Nguyen & Abigail Sims
Research Mentor(s): Pegah Zamani

With the meteoric growth and development of artificial intelligence in a multitude of industries, new options for application arise in the improvement of smart residential homes for better energy efficiency. With the help of AI-driven technology, energy consumption within a home can be effectively optimized, reducing the impact of residential buildings on the environment and lowering homeowners' energy cost. According to the US Department of Energy, typical smart home energy-efficiency technology consists of installed technology created specifically with local climate and site data already in mind (e.g. previously selected materials, cool roofs, and inherent passive solar design). However, these pre-existing technologies are not sufficiently dynamic and responsive, and also require more inherent building qualities and materials planned well before the construction of the residential structure. For this research we will be using a qualitative methodology, allowing us to further understand AI's application within residential buildings through real-world examples. Essentially, we will utilize a case study based on current examples of AI and energy-efficiency within smart homes. Current trends in these AI applications indicate the potential in building or retrofitting homes with sensors and electric circuits integrated in the house or in appliances, to track energy consumption in the home in real-time. This would allow for prompt energy optimizations that are accurately adjusted by a localized AI model reducing smog, CO2, and hot air emissions. Additionally, these advancements promise lower energy bills and easier integration into AI-driven smart homes, offering significant benefits for residential buildings.

AI in Beginning Design Pedagogy
Poster #21 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Tuere Thomas
Research Mentor(s): Trace Gainey

This research investigates how Midjourney AI can be incorporated into the introductory pedagogy of first-year architecture students, a traditionally hands-on, analog phase of

architectural education. The central research question asks: How can AI, particularly Midjourney, be used to support or enhance the design process for beginning architecture students without replacing foundational craft and design thinking skills? The purpose of this research is to assess both the opportunities and limitations of using AI in the earliest stages of architectural education, with a focus on ideation, visual exploration, and creative complexity. As AI tools rapidly evolve and become increasingly embedded in professional architectural practice, understanding how students can engage with them early in their education is essential. This project aims to explore whether introducing AI at the foundational level can help students better understand contemporary design workflows, accelerate concept generation, and enhance their visual literacy—while avoiding overdependence on technology or loss of traditional design skills. The methodology involved translating existing first-year architecture assignments into AI prompts, using ChatGPT to refine those prompts, and then generating imagery with Midjourney. Additionally, student work was incorporated as visual reference inputs to evaluate how AI could remix or expand upon physical models and drawings. Preliminary findings indicate that while Midjourney struggles to accurately follow assignment sheets or reproduce specific craft-based outputs, it excels at generating unexpected visual complexity and assisting with ideation. AI proved particularly effective when prompts were fed incrementally and combined with student work. Importantly, the AI's inability to replicate polished student work alleviates concerns around academic integrity. This research highlights AI's potential as a creative partner in the design studio and anticipates further development of structured prompt strategies to better align AI capabilities with architectural pedagogy.

AI-Integrated BIM for Net-Zero Construction: Strategies for Efficiency, Waste Reduction, and Worker Safety
Oral Presentation (Microsoft Teams)
Friday, April 18, 1:45pm – 2:00pm
Undergraduate Student(s): Aydeen Kibria
Research Mentor(s): Pegah Zamani

This research aims to explore how AI technology in construction can advance net-zero buildings by improving efficiency, reducing waste, and ensuring ethical decision-making, including worker safety and secure construction management. BIM (Building Information Modeling) software that integrates AI technology can be used as an approach to understanding how construction zones for sustainable buildings maintain a safe workplace for workers and the environment. Because BIM is a foundation of different AI software, using the correct software for construction is also crucial for achieving this goal. This information on how AI technology balances the environment, and decision-making can be gathered through research papers that cover similar findings. These research papers include trends, case studies, and data-driven results that can be used to identify patterns, compare methodologies, and evaluate the effectiveness of AI technology solutions. Since AI technology hasn't been implemented in

construction until the early 2000s, we are also gathering information that can highlight the constructive and destructive effects of BIM's development. This research will mainly present the ethical decision-making of BIM technology and will provide feedback on how we can improve AI-driven project management software tools. The findings of this research are expected to inform future improvements in AI-driven project management tools for BIM technology to incorporate within its system, thereby improving any disruptions in the work area and creating a more sustainable future for the construction industry.

Innovative Strategies for Resilient Communities: Lessons from the California Wildfire Crisis for Effective Fire Mitigation
Oral Presentation (Microsoft Teams)
Friday, April 18, 1:45pm – 2:00pm
Undergraduate Student(s): Jaiden Rennie
Research Mentor(s): Pegah Zamani

Wildfires in California pose a growing challenge with far-reaching consequences for communities, ecosystems, and economies. Addressing this issue requires strategies that integrate resilience and sustainability to reduce fire severity and mitigate risks effectively.
Research shows that increasing wildfire severity results from climatic changes, ecological shifts, and human activities. Poor land management, prolonged drought, and rising temperatures frequently contribute to the conditions fueling large, destructive fires. These factors have a significant impact on communities, including loss of life, destruction of property, biodiversity reduction, and long-term economic and health effects. This study conducts a comprehensive literature review, analyzing peer-reviewed articles, reports, and case studies on resilience and sustainability in California wildfires. The review focuses on key themes such as community preparedness, land management, technological innovations, policy frameworks, and sustainable practices. By synthesizing existing research, the goal is to identify effective strategies and knowledge gaps to inform future wildfire resilience efforts in California. Findings reveal that community education programs, innovative land management approaches, and advancements in technology, such as AI-driven fire detection systems, demonstrate potential for mitigating risks. Policy reforms and inter-agency collaboration also contribute to addressing systemic barriers to effective wildfire management. The results illustrate actionable pathways for sustainable wildfire management practices that prioritize the needs of both human populations and natural ecosystems. This research contributes to the broader goal of building climate-resilient communities and protecting ecosystems from the escalating risks of wildfires. By emphasizing education, technological innovation, and policy reform, this work informs efforts to create a more resilient and adaptive future for California.

Crosswing Hall- A Biophilic Student Hub for Connection, Community, and Growth
Poster (Microsoft Teams)

Friday, April 18, 3:00pm – 3:15pm
Undergraduate Student(s): Marianna Sanchez
Research Mentor(s): Robin Puttock & M. Uddin

The Marietta campus of Kennesaw State University has long been perceived as disconnected and lacking vibrancy compared to its counterpart in Kennesaw. This project seeks to transform that narrative by creating Crosswing Hall, a dynamic student hub that fosters campus pride, interdisciplinary collaboration, and lasting connections. Grounded in biophilic design principles, Crosswing Hall utilizes natural materials and thoughtful spatial planning to reduce student stress, enhance well-being, and create a welcoming environment where students feel supported and engaged. Current student spaces on the Marietta campus prioritize capacity over adaptability, often leading to overcrowding and diminished effectiveness in fostering a sense of community. This project reimagines these spaces, ensuring they are intentionally designed to meet diverse student needs while promoting interaction among various disciplines. Inspired by the convergence of ideas and movement, Crosswing Hall's angular, wing-like architecture symbolizes its role as a central point of connection for students, faculty, and alumni. By integrating the 15 Patterns of Biophilic Design, this project strengthens students' connection to nature, enhances cognitive function, and improves overall campus experience. Ultimately, Crosswing Hall aims to redefine student engagement at KSU's Marietta campus, transforming it into a place of pride, energy, and identity. More than just a building, it is a lasting symbol of growth and belonging one that continues to draw students and alumni back, fostering a vibrant community that extends beyond graduation.

Designing for ADHD in the Workplace
Poster #6 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Nayeli Gonzalez
Research Mentor(s): Robin Puttock

The post-pandemic era has left the United States with nearly one billion square feet of vacant office space, creating significant economic and social challenges. Alongside this, many employees continue to work from home, often experiencing adverse effects on their physical and mental well-being due to environments that are not conducive to long-term productivity. Addressing these issues, this thesis explores how outdated and underutilized office spaces can be revived, reinvented, and renovated to not only attract employees back to the workplace but also to accommodate the unique needs of neurodivergent individuals. Neurodivergent people, representing millions globally, often encounter sensory overstimulation and heightened anxiety in traditional office environments, reducing their productivity and well-being. This study proposes that inclusive, adaptable design particularly through biophilic design principles, sensory-friendly environments, and ergonomic flexibility can transform office spaces into

welcoming, supportive places for all employees. By incorporating natural elements like plants, dynamic lighting, and varied workspaces such as quiet zones and open areas for collaboration, organizations can foster environments that enhance focus, reduce stress, and boost overall well-being. The thesis employs a mixed-methods approach, integrating literature reviews, case studies of companies with successful inclusive office designs, and qualitative research through interviews with neurodivergent employees. These insights will inform practical design guidelines aimed at creating workplaces that support neurodiversity while simultaneously revitalizing office space usage. Ultimately, this research seeks to demonstrate how a thoughtfully designed office environment can cater to diverse needs, helping organizations retain talent and improve productivity across the board.

EOS Wellness Center: Circadian Rhythm & Mental Health Facility Design
Poster #24 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Emily Simms
Research Mentor(s): Robin Puttock

The design of mental health facilities significantly impacts patient outcomes, especially for individuals with depression. Environmental factors such as lighting, thermal comfort, and access to nature influence mental health. This research explores how architectural design can reduce self-harm incidents and enhance recovery outcomes for patients with depression. The project hypothesizes that synchronizing light patterns and thermal comfort with patients' circadian rhythms will reduce self-harm incidents and improve recovery.
The problem established in the research is that disruptions to circadian rhythms increase the risk of depression, PTSD, and anxiety by 30% (Burns et al., 2022). Suicide is also the second leading cause of death for individuals aged 10-24 in Georgia (DBHDD). Despite the growing need, long-term inpatient facilities are scarce in Northwest Georgia. Along Martha Berry Boulevard in Rome, Georgia, a proposed Tax Allocation District (TAD) aims to redevelop blighted areas, including motels linked to criminal activity. A new long-term mental health facility within this district would address both urban revitalization and mental health care gaps. The location near hospitals and public spaces provides an optimal environment for patient-centered care.
The design approach is guided by the Well Building Standard and the 14 Patterns of Biophilic Design. This would include access to green spaces, which promotes psychological healing. Open nurse stations and communal therapy areas would be included to encourage positive interactions between patients and staff. Circadian rhythm-focused lighting will regulate daylight and artificial light to improve mood and reduce self-harm.
Existing mental health facilities lack holistic care. This project integrates circadian-based lighting strategies as a non-pharmacological intervention while revitalizing Rome's blighted corridor. The proposed facility will not only enhance recovery outcomes but also create a sustainable, community-integrated solution for mental health care.

Folklore (Folk-Art) as a Catalyst: Revitalizing Spaces in El Salvador
Oral Presentation (Prillaman Hall)
Wednesday, April 16, 2:00pm – 2:50pm
Undergraduate Student(s): Kevin Lopez
Research Mentor(s): Arief Setiawan

The focal point of this study is to explore the potential of folklore (mainly Folk-art) in revitalizing Salvadoran historical areas. The intent is to examine myths, legends, traditional dances, and paintings as cultural artifacts that represent the identity of Salvadoran and unfold their structures and patterns. This understanding of the form of these cultural expressions will serve as a basis for translations into architectural design. Ideas and experiences can be ephemeral, but through design, these concepts can be "illustrated" into a form of architectural "writing." Knoespel argued in "Diagrammatic Transformation of Architectural Space" that "diagrams embody architectural writing," suggesting that by analyzing an element, new information can be unveiled, revealing deeper meanings behind a design. Further, Knoespel proposes four forms of "writing," that is, figuring, prefiguring, defiguring, and refiguring. This project will follow this argument to understand Salvadoran folklore as forms of figuring, prefiguring, defiguring, and refiguring. The understanding of the structure of Salvadoran folklore will be translated to develop architectural language that will represent the "writings" extracted from the analysis. The research reviews literature on identity and architecture. It will analyze visual folklore and vernacular and contemporary Salvadoran architecture. It will also studies architectural precedents from other parts of the world that are relevant to this topic. Additionally, it will review external factors that have influenced architecture of the region, including climate, natural disasters, and economic and social contexts to provide a more comprehensive understanding of the Salvadoran context. The findings will serve as a basis for design explorations in designing public buildings in Salvadoran historical areas. The aim is to create a deep connection and greater exposure to Salvadoran heritage for both locals and visitors. The results will inform in communicating Salvadoran identity through architecture and preserving historical areas that can also benefit in the economic improvement for the inhabitants. The resulting architectural design could attract many people, stimulating local commerce and provide a favorable environment for economic improvement. This research aims to discover design techniques and strategies to integrate folklore into architectural design that represents identity of a society. Reference: Knoespel, K. J. (2002). Diagrammatic Transformation of Architectural Space.

Foster Grandparents
Poster (Microsoft Teams)
Friday, April 18, 2:45pm – 3:00pm
Undergraduate Student(s): Claire Bunnell
Research Mentor(s): Robin Puttock

Can designing a connection between independent living facilities and the foster care system increase companionship, physical and mental health for older adults and foster care children? While independent living communities are often ideal for older adults in generally good health, studies indicate that over one-third of older adults report feelings of loneliness and a lack of meaningful companionship. This sense of isolation has profound consequences, as research shows that socially isolated seniors are 59% more likely to experience physical and mental health decline. Furthermore, many seniors residing in nursing homes face a troubling paradox: while these facilities are intended to combat social isolation, they often fall short in providing adequate care, leaving individuals feeling vulnerable and emotionally neglected. Despite extensive research on loneliness and depression in older populations, a staggering 77% of adults between the ages of 50 and 80 report suffering from poor mental health, largely due to feelings of social isolation. By designing a spatial connection between independent living facilities and foster care homes, we can cultivate an environment that enhances both the mental and physical well-being of older adults, as well as the lives of children in the foster care system. Through integrating WELL Building Standards and Biophilic Patterns, this research seeks to encourage interactions between the two groups. Facilitating mentorship opportunities between older adults and these children offers dual benefits: older adults gain a renewed sense of purpose and connection, while foster children receive guidance and emotional support from trusted role models. This thesis seeks to explore how creating shared spaces and opportunities for interaction between older adults and foster children can significantly improve physical activity, provide social engagement, and promote healthier, more fulfilling lifestyles for both groups.

Integrating AI-Driven Adaptive Learning: Promoting Equity, Mental Health, and Innovation in Design Thinking
Oral Presentation (Microsoft Teams)
Friday, April 18, 2:00pm - 2:15pm
Undergraduate Student(s): Rinna Gacusan
Research Mentor(s): Pegah Zamani

In the past decade, the use of artificial intelligence (AI) in college classrooms has increased as the technology has become more accessible to the public. Professionals in design fields like architecture and urban design have turned to AI to perform data analysis, but these practices have not reached the classroom, less so outside of the studio curriculum. On top of that, many students have trouble managing the workload associated with majoring in design or are afflicted with a disability that hinders their workflow significantly. Ideally, an inclusive classroom environment would provide individualized support to all students so that each student is able to be successful regardless of their mental health. This research explores the possibility of using AI adaptive learning programs in design classes to provide students equal opportunities for success. This study uses comparative analysis of current American ethical guidelines surrounding AI,

current equity initiatives in American college settings, and current uses of AI in the architecture and urban design classrooms via literature review. This study will further explore ways that AI adaptive learning programs can be utilized in collegiate design programs by helping students with disabilities or mental health issues learn at their own pace. I hypothesize that this research will show how AI adaptive learning programs can improve a student's learning, innovation, and mental health while in a design program, hopefully leading to an increase in class retention rates. I hope that these findings will eventually inspire colleges to implement more equity-focused education in their design program classrooms, as well as develop equitable classroom environments that center a student's development of their design thinking. This will therefore contribute to the development of equitable design in the architecture and urban design fields as a whole.

Invisible Scholars
Poster #8 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Emmaline Payne
Research Mentor(s): Ameen Farooq

In the United States, every year there are approximately 1.3 million students who experience homelessness, an individual who lacks a fixed, regular, and adequate nighttime residence. Homelessness among students has a significant impact on their academic performance, mental health, and behavior. Factors like higher absenteeism, constant movement, and lack of support can all contribute to decreased academic achievement. Ultimately, this leads to students having to repeat grades or not graduating high school, compromising their abilities to succeed in the future. In addition to the decrease in academic achievement, behavioral and mental challenges exacerbated by the stress of housing instability also affect the student's development. In Macon, Georgia, there are currently five hundred students aged six to seventeen, who lack stable housing. These students have access to assistance through programs like the Mckinney Vento Homeless Assistance Act and Rapid Rehousing. Mckinney Vento Homeless Assistance Act helps students to have access to school and stay in school, while Rapid Rehousing aims to provide housing resources for students and their families. However, these programs have differing definitions of homelessness that lead to gaps in how many students are able to receive housing support. In downtown Macon, there is an urban renewal occurring aimed at bringing more life downtown. This, along with social and community services, influenced the decision to create a space for homeless students right in the heart of Macon. The aim of my thesis is to connect these students with resources and the community, as well as provide them with stability in their most developmental years.

Model for Analyzing Floorplate Morphology That Optimizes Daylighting and Cost
Oral Presentation (Prillaman Hall)

Wednesday, April 16, 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 well-being of buildings occupants. Daylight levels are directly linked to the building floorplate depth, whereas shallow floorplate and elongated buildings are usually related to higher daylight levels. However, creating buildings that have more natural light comes with a greater construction cost 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 considered best practice examples of architectural precedents. We 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 building 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 inform the design of buildings in the future with important implications for the sustainability of the built environment.

Pathways to Possibilities
Poster (Microsoft Teams)
Friday, April 18, 12:00pm – 12:15pm
Undergraduate Student(s): Melanie Nin
Research Mentor(s): Robin Puttock

Pathways to Possibilities explores the importance of establishing a Montessori Pre-K through 8th grade school for a large population of children, highlighting the unique challenges they face in accessing an education that meets their fundamental needs. By incorporating Montessori design principles and learning theories, the proposed school aims to create an inclusive, supporting environment that fosters self-directed learning, creativity, and social engagement. It advocates expanding the Montessori model to a larger school that fosters an inclusive environment that supports diverse students' needs.

Presence of the Past: The Expression of Igbo Cultural Identity in Contemporary Space

Oral Presentation (Microsoft Teams)
Friday, April 18, 12:00pm – 12:15pm
Undergraduate Student(s): Nelson Agalaba
Research Mentor(s): Arief Setiawan

Architecture serves as the physical embodiment of a group's cultural values, history, and social dynamics- or identity. The arrival of European colonialism and modernism brought about a paradigm shift, prioritizing a universal European aesthetic and "international style" leading to the erosion of the unique cultural identities of the world and the environments they existed in. The global south has experienced the brunt of this process, especially the African continent. For example, the Igbo peoples of southeastern Nigeria have lost nearly all examples of their building traditions and have been in a constant struggle to create an architecture that captures their rich culture while addressing their current challenges. My thesis will bridge this gap by translating traditional Igbo culture into contemporary Nigerian building practices, guided by the work of architects like Francis Kere and Toshiko Mori, as well as the writings of theorists in "Architectural Regionalism". The important field work of Zbigniew Dmochowski, who in the 20th century recorded over 60 existing Igbo traditional buildings as old as two centuries will be a base for understanding their nearly lost building traditions. This will be further supported by interviews with members of the Igbo village: Umukabia, to understand their current lives, struggles, and existing oral histories. In the design studio, the interviews will inform what project is needed in the community, the studies of traditional buildings will shape the form of this new project, and the work of contemporary African architects will be a guide for how tradition and modernity have been joined in other parts of the continent. The Igbo people, as well as the African continent are in a critical moment. One that seeks to heal colonial and environmental scars as well as remember their collective histories so that their identities may be celebrated and never lost again.

Reimagining Recovery: The Role of Architecture in Sobriety
Poster (Microsoft Teams)
Friday, April 18, 12:30pm – 12:45pm
Undergraduate Student(s): Teagan Littleton
Research Mentor(s): Robin Puttock

Alcoholism recovery housing often overlooks the profound impact that architecture has on the rehabilitation process. Many sober living houses fail to consider how design elements influence healing, leaving a gap between the physical and mental spaces necessary for recovery. This thesis explores the design of a sober living house in Atlanta that integrates biophilic principles, choice architecture, and WELL Building Standards to create a healing environment that fosters community integration, resilience, and well-being. Situated in an urban context, the project

addresses social and environmental challenges by providing therapeutic spaces that support recovery while acknowledging the financial and emotional realities of residents. A core component of this project is the use of water as a multisensory experience, engaging the five senses to evoke calmness, mindfulness, and renewal. Water features—such as reflective pools, soundscapes, and tactile interactions—serve as symbols of transformation, reinforcing self-reflection and personal growth. Biophilic strategies, including natural light, organic materials, indoor greenery, and access to outdoor spaces, help residents reconnect with nature and themselves. The AA 12-step program informs the spatial organization, ensuring the environment actively aids in habit formation, self-reflection, and social support. Guided by WELL Building Standards, the design prioritizes air quality, thermal comfort, lighting, and spatial layout to optimize health. Choice architecture is applied to influence positive behaviors by strategically organizing spaces, activities, and resources that promote healthy decision-making beyond the rehabilitation period. Through historical and case study research on rehabilitation spaces, biophilia, and WELL Building Standards, this thesis establishes a framework for designing recovery-oriented spaces. By merging architecture, nature, and psychology, this project demonstrates how sober living spaces can become catalysts for healing, empowerment, and long-term sobriety in an urban setting.

Reviving Humanity
Poster (Microsoft Teams)
Friday, April 18, 2:00pm – 2:15pm
Undergraduate Student(s): Sofia Gomez
Research Mentor(s): Robin Puttock

The surge in female incarceration rates in the United States has heightened concerns about the mental health challenges faced by women within correctional facilities. This thesis research explores the intersection of women's incarceration, mental health, and sustainable architectural design aimed at improving outcomes for female inmates. Factors contributing to the increase in female incarceration rates, including changes in sentencing policies, socioeconomic disparities, and the criminalization of mental illness and substance abuse, are critically examined. Research indicates a disproportionately high prevalence of mental health disorders among female inmates, often rooted in past trauma, domestic violence, and systemic inequalities. These issues are frequently exacerbated by the prison environment, where overcrowding, lack of privacy, inadequate healthcare, and limited access to rehabilitative programs contribute to worsening psychological conditions. Despite these challenges, the prison system often fails to provide sufficient mental health resources, reinforcing cycles of recidivism and societal marginalization. This thesis proposes that sustainable architectural design, incorporating biophilic principles, trauma-informed spatial planning, and rehabilitative programming, can play a crucial role in

addressing the mental health crisis in women's prisons. Design strategies such as access to natural light, green spaces, sensory-responsive environments, and flexible communal areas can help mitigate stress and promote emotional resilience. Additionally, creating spaces that balance privacy and social interaction is essential for fostering personal reflection, community support, and personal growth. By integrating these evidence-based design interventions, correctional facilities can shift from punitive environments to spaces that facilitate healing, skill development, and successful reintegration into society. This research highlights the urgent need for a human-centered approach in prison architecture—one that acknowledges the unique needs of incarcerated women and leverages sustainable design as a tool for restorative justice and long-term rehabilitation.

Safety Net: Hope Amongst the Housing Crisis in Lagos, Nigeria
Poster #9 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Mayowa Odunjo
Research Mentor(s): Ameen Farooq

Lagos, Nigeria, home to over 22 million people, stands as Africa's most populous city. The African Giant of Nigeria holds over 260 million people with the workforce falling on the backs of Millennials and Generation Z. On the surface, this could be seen as an advantage; a youthful, energetic labor force that any economy would benefit from. However, in Nigeria, this demographic reality also presents a unique set of challenges that has been exacerbated by inadequate housing, overpopulation, and rapid urbanization. The housing crisis in Lagos, fueled by failed government support and initiatives along with rapid population growth, leaves many young professionals with few living options. They often resort to staying at home with long commutes into the city for work if not already nearby, renting out a unit at a hostel, or renting apartments with prices beyond what they can afford. Many developments in the city will not provide resources necessary for these young Lagosians to thrive, rendering their attitudes toward progressing in the city as very negative. Safety Net aims to shift these attitudes by proposing an affordable mixed-use residential complex adjacent to the Oshodi Transportation Hub in the Mushin LGA, a critical nexus in Lagos' public transportation system. By offering affordable housing within easy reach of business districts, markets, and recreational spaces, it alleviates the burdens of traffic congestion and accessibility. The development integrates shared workspaces, business centers, and retail outlets, fostering a self-sustaining environment that supports entrepreneurship, community engagement, and mental well-being. By tackling the housing crisis and mitigating the "brain drain" of young talent, the program envisions a resilient, economically dynamic Lagos. "Safety Net" not only provides affordable living options, but also serves as a foundation for growth, supporting and nurturing the aspirations of its youth.

Shaping Sustainability: Investigating the Structural Efficiency of Fabric Formwork in Concrete Beam Production
Oral Presentation (Prillaman Hall)
Wednesday, April 16, 2:00pm – 2:50pm
Undergraduate Student(s): Evan Haller, Greg Sweat, Jesus Vielma, Dan Bululi Nyumpa, Zi Chow, Kassidy McClain, Shoga Oni, Hayaa Uddin, Alejandro Vega Cardona, Brody Daniels, & Estafany Gomes
Research Mentor(s): Giovanni Loreto

This paper explores an innovative approach to precast concrete beam fabrication using fabric formwork, diverging from traditional rigid formwork methods. Rigid formworks, while effective, often result in inefficient concrete use, leading to unnecessary material consumption and higher CO2 emissions. Recent literature on fabric formwork suggests its potential to create more organic and structurally efficient shapes, reducing both the amount of material used and the environmental impact. However, research on optimizing these methods for structural performance, ease of fabrication, and industrial applicability remains limited. Addressing this gap, our study employs form-finding techniques to optimize concrete volume in beam fabrication, ensuring ease of production while maintaining or surpassing the structural performance of traditional prismatic concrete beams. The hypothesis driving this research posits that fabric formwork can produce beams that not only match the structural strength of traditional beams but also offer material savings, potentially leading to a reduction in the overall carbon footprint of concrete construction. Results from testing are presented, indicating that fabric-formed beams exhibit comparable strengths relative to conventional prismatic beams. This finding suggests a potential paradigm shift in precast concrete production, where optimizing beam shapes through fabric formwork could become a standard practice. The implications of this research extend to the broader construction industry, offering a pathway to lower emissions and more sustainable building practices.

The Translucent Fortress
Poster #18 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Owen Phillips
Research Mentor(s): Robin Puttock

Domestic violence is a nationwide crisis affecting millions of women, with severity increasing since COVID-19. In Georgia, over a third of women report experiencing physical violence by an intimate partner, with rural victims facing even greater risks. They experience abuse more frequently, must travel farther for help, and are more likely to be turned away due to limited shelter capacity. Existing shelters often fall short due to poor design and security. Several factors complicate the issue, including geographic isolation, religious and familial pressures to stay with

an abuser, and financial barriers limiting transportation access. Addressing these challenges requires reimagining the women's shelter typology to meet modern needs. This thesis proposes a new shelter model based on qualitative research and site-specific testing in Homerville, Georgia. Key design considerations include secure architecture, social spaces for community support, medical assistance access, and accommodations for women and children. The project must be cost-effective yet secure enough to protect victims. Research includes surveys and interviews conducted in rural Georgia shelters during summer 2024, along with literature reviews to compare findings with past data. Mapping was used to identify a site with minimal access to domestic violence crisis centers. Finally, construction methods and architectural design will be studied through precedents that emphasize low-cost, remote, and secure solutions. By integrating research with innovative shelter design, this project aims to create a more effective, accessible, and protective space for rural domestic violence victims.

Construction Management

3D Printed Structural Elements
Poster #1 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Daphne Phan
Graduate Student(s): Yasmen Mansour
Research Mentor(s): Amaal Al Shenawa

In recent years, three-dimensional 3D printing technology has become widely used in the construction industry due to its numerous advantages over traditional construction methods. It is an innovative construction technology using large-scale 3D printers to create full-scale building components or entire structures. 3D printing is revolutionizing building construction, offering greater design flexibility, faster construction times, sustainability, reduced costs, and reduced safety risks. This technology allows construction companies to create complex structures and components with high accuracy, reducing waste and cost of materials. One of the most crucial factors in the success of 3D printing in construction is the development of suitable materials. This research explores the various materials used in 3D printing for structure, such as concrete, clay, and composite materials. In this study, two types of clay are used to print 3D structural elements. Also, the properties of these materials, including their strength, durability, and ability to withstand environmental factors, are discussed. And the challenges of 3D printing materials for construction and the potential impact of this technology on the construction industry in the coming years. The current work aims to explore and implement the use of clay in 3D printing for construction to revolutionize traditional building methods.

College of Computing and Software Engineering

Computer Science

AI-Driven Self-Optimizing Networks for Integrated LPWAN and 5G in Next-Generation IoT Systems
Poster #7 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Anthony Fuller, Gavin Kinyanjui, & Adir Pedro-Espinoza
Graduate Student(s): Mari Cabral
Research Mentor(s): Ahyoung Lee

The widespread adoption of smart connected devices over the past decade has significantly driven the growth of the Internet of Things (IoT). While 5G networks provide high-speed, low-latency connectivity, their high power consumption and limited range pose challenges for IoT applications requiring long-distance, energy-efficient data transmission. This study explores a hybrid networking approach that integrates 5G with low-power wide area network (LPWAN) technologies to enhance IoT performance. We analyze the challenges of merging these architectures, emphasizing network efficiency, scalability, and reliability. Specifically, we compare the performance of standalone LPWAN with integrated LPWAN-5G networks using existing solutions and essential network simulations, examine the complexity of network operations within the hybrid framework, and evaluate AI-driven optimization techniques for data packet transmission. Ultimately, our findings aim to demonstrate how AI-based self-optimizing network designs can improve data transmission efficiency, minimize failures, and support the next generation of IoT applications in diverse environments. Our study results will provide insights into how a self-optimizing network design can significantly benefit from AI algorithms to meet the demands of next-generation IoT applications.

Advances in Non-Invasive Glucose Sensing: A Comprehensive In Vitro Analysis
Poster #15 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Graduate Student(s): El Arbi Belfarsi & Henry Flores
Research Mentor(s): María Valero de Clemente

With over 800 million adults living with diabetes worldwide and nearly one in three adults in the United States diagnosed with prediabetes, there is an urgent need for accessible blood glucose monitoring solutions. Traditional glucose measurement methods are often invasive, painful, and costly, posing significant barriers to routine monitoring and early intervention. Non-invasive glucose sensing offers a promising alternative. This study presents a comprehensive in vitro

investigation combining voltage-based sensing and infrared (IR) imaging for glucose concentration estimation using synthetic blood samples beneath a skin-mimicking layer. Our system employs near-infrared (NIR) light emission at 1550 nm, with voltage signals captured via an InGaAs photodiode and digitized using an ADS1115 ADC. In parallel, an IR camera captures images of the light transmission through the medium. These images are then analyzed using deep learning models to predict glucose concentration. Glucose levels range from 70 to 300 mg/dL in 10 mg/dL increments. The dataset is systematically processed and modeled using both statistical regression and convolutional neural networks to compare performance. Clinical relevance is assessed using Zone A of the Clarke Error Grid Analysis. By evaluating and comparing both voltage-based and image-based predictions, this study contributes to the development of multi-modal, non-invasive glucose monitoring technologies that leverage optical sensing and AI-driven analysis.

AI-Powered Image to Recipe Generator
Oral Presentation (Prillaman Hall)
Wednesday, April 16, 12:00pm – 12:50pm
Graduate Student(s): Rohit Malik & Manisha Kumari
Research Mentor(s): Md Abdullah Al Hafiz Khan

In recent years, Artificial Intelligence (AI) has transformed various aspects of food technology, including automated recipe generation. This paper introduces an AI-powered Image-to-Recipe Generator, a system that extracts ingredient details from an image and generates a structured recipe with cooking instructions. Utilizing computer vision (CNNs, Vision Transformers) for ingredient detection and natural language processing (NLP) for recipe formulation, this system enhances the culinary experience by enabling users to derive recipes from food images effortlessly. The model integrates deep learning-based image recognition, NLP-driven text generation, and a recommendation engine to provide personalized recipes based on dietary preferences and nutritional constraints. This AI- powered solution bridges the gap between visual food identification and recipe creation, offering a seamless and interactive way to explore cooking possibilities.

Benchmarking Intelligent Agents for Visual Food Recognition Against Manual Logging
Poster #19 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Graduate Student(s): El Arbi Belfarsi & Henry Ekeocha
Research Mentor(s): Maria Valero

Accurate dietary tracking is crucial for nutrition management, but manual food logging can be time-consuming. This study benchmarks intelligent vision agents from Google, Anthropic, and OpenAI against MyFitnessPal user logs to assess their accuracy in food recognition and

macronutrient estimation. We evaluate performance based on precision, recall, and mean absolute error (MAE) for calories, protein, carbohydrates, and fats.
Beyond accuracy, we analyze usability concerns, including ease of use, error correction, and adaptability to complex meals. Our findings highlight the strengths and limitations of AI-driven tracking compared to manual logging, providing insights into the future of automated nutrition assessment.

Beyond Memorization: A Cognitive Psychology-Based Framework for AI Intelligence Assessment
Poster #33 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Luke Wharton & Sean Haque
Research Mentor(s): Razvan Voicu & Muhammad H. Tanveer

Traditional AI evaluation methods often fail to measure true intelligence due to their reliance on datasets easily incorporated into training regimes. As a result, many AI systems achieve inflated scores not by demonstrating genuine understanding but by recognizing patterns in previously encountered data. Recent research, including Apple's study introducing GSM-Symbolic, underscores this issue and highlights the need for more robust testing frameworks. This project proposes a novel AI assessment methodology based on cognitive psychology, designed to evaluate intelligence beyond memorization and pattern recognition. Instead of relying on static datasets, our framework will present AI systems with dynamic, open-ended problems that test critical thinking, creativity, and ingenuity. These tests will incorporate principles from human intelligence research, such as problem-solving under novel conditions, generating original ideas, and adapting strategies when faced with unexpected challenges. Unlike existing benchmarks, which often evaluate AI on deterministic tasks with predefined solutions, our approach will focus on qualitative and emergent problem-solving abilities. Key research objectives include designing test scenarios that effectively differentiate between statistical inference and genuine reasoning, developing metrics for evaluating AI performance on open-ended tasks and validating the framework across various AI models. The results of this study could provide a standardized methodology for assessing machine intelligence in a way that is resistant to data contamination and memorization-based inflation. By shifting the focus from recall-driven benchmarks to adaptive reasoning and creativity, this framework aims to establish a more accurate measure of artificial intelligence, contributing to both theoretical and practical advancements in AI evaluation.

Enhancing Alzheimer's Disease Staging through Multi-Modal Neuroimaging: Integrating MRI and PET for Improved Classification
Poster #4 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am

Undergraduate Student(s): Maya Castillo, Dina Xu Callaway, and Richard Haynes
Research Mentor(s): Chen Zhao

Alzheimer's disease (AD) is the prevalent neurodegenerative disease and the sixth leading cause of death in the US. Proper staging of AD is critical to enable early diagnosis and treatment. structural Magnetic Resonance Imaging (MRI) is employed intensively to detect brain atrophy in AD, while Positron Emission Tomography (PET) scans provide metabolic and amyloid deposition data, crucial for disease definition. Single-modality conventional techniques are plagued by misalignment and weak discriminatory power between Mild Cognitive Impairment (MCI) and Cognitively Normal (CN), and MCI and AD. Multi-modal learning promises improved predictive performance but is plagued by feature heterogeneity and modality misalignment. In this work, AD classification is attempted to be enhanced by using multi-modal data, i.e., from the OASIS-3 database. We employ novel feature integration algorithms to address feature space misalignment and enhance the process of fusion in this research. The freesurfer is employed to extract the brain anatomy features from structured MRI and the PET unified pipeline is employed to extract the features from PET images. We performed supervised learning using the concatenated features from MRI and PET images. The performance will be done using classification metrics such as accuracy, precision, recall, and F1-score to establish the effectiveness of the proposed method. Through the use of multi-modal neuroimaging data, we can envision a significant improvement in the accuracy of AD staging predictions. This study contributes to the development of efficient diagnostic tools that assist clinicians in early diagnosis and tracking of the disease. The findings from this study will assist in providing valuable insights into the synergistic benefits of integrating MRI and PET imaging, ultimately enriching research in neurodegenerative diseases and patient outcomes.

Evaluating Transferability of Adversarial Attacks Between Models of Different Architectures
Poster #10 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Serena Noboudem
Graduate Student(s): Ravi Kumar Rogannagari & Md Jahirul Islam
Research Mentor(s): Kazi Aminul Islam

This study investigates the transferability of adversarial attacks across neural network architectures, focusing on a comparative analysis between the Momentum Iterative Fast Gradient Sign Method (MI-FGSM) and the Fast Gradient Sign Method (FGSM). Recent scholarly research has underscored the vulnerability of neural networks to adversarial perturbations; however, the impact of model architectural differences on the transferability of such attacks remains insufficiently explored. This study aims to make a unique contribution by systematically comparing the inter-model attack success rates of MI-FGSM and FGSM, while

also extending the analysis to additional architectures such as MobileNet and AlexNet. The research methodology involves generating adversarial examples on a ResNet50 model trained on the MNIST dataset using both MIFGSM and FGSM. These adversarial examples are then transferred to VGG19, MobileNet, and AlexNet to evaluate the effectiveness of each attack method, measured by attack success rate and computational overhead. By applying both MI-FGSM and FGSM under similar conditions, we aim to reveal how momentum-based iterative methods compare with FGSM in terms of transferring attack across neural network architectures. These findings will be discussed in the context of current challenges in neural network robustness and the development of resilient machine learning systems.

FutureFit Guidance System
Oral Presentation (Microsoft Teams)
Friday, April 18, 4:45pm – 5:00pm
Graduate Student(s): Pragya Mishra & Bindusri Manne
Research Mentor(s): Md Abdullah Al Hafiz Khan

The fields of education and career counselling have been completely transformed by the quick development of artificial intelligence (AI) technologies. The objective of this project is to develop an AI-powered career advising system that leverages cutting-edge technology to provide personalized job recommendations aligned with the user's skills, interests, and career goals. The system provides a user-friendly and interactive platform for career exploration by using Natural Language Processing (NLP) models with web application developed with Flask (backend) and React (frontend). The main goal of this project is to overcome the shortcomings of conventional career guidance approaches, which frequently do not offer personalized solutions and do not cater to individual preferences, abilities, and goals. By utilizing AI algorithms, natural language processing techniques, and machine learning models, our application seeks to deliver precise assessments of interests, match skills effectively, and create customized educational pathways. The project will involve the design, development, and implementation of AI-powered features, including interest evaluation, skill analysis, and personalized recommendations. The approach includes gathering data via user contributions, preparing the data for analysis, and developing a comprehensive system architecture that consists of frontend interfaces, backend servers, and database management.

GastroGenie: Revolutionizing Culinary Choices Using NLP and Computer Vision
Oral Presentation (Microsoft Teams)
Friday, April 18, 1:30pm – 1:45pm
Graduate Student(s): Francis Madu
Research Mentor(s): Md Abdullah al Hafiz Khan

As dietary awareness and personalized nutrition become increasingly important, artificial intelligence (AI) has the potential to transform how individuals select and prepare meals. GastroGenie, an AI-powered recipe generator, leverages Natural Language Processing (NLP) and Machine Learning (ML) to provide dynamic, personalized recipe recommendations based on user-provided ingredients, dietary preferences, and nutritional goals. The system integrates deep learning models trained on the Recipe1M+ and Food-101 datasets to generate high-quality, diverse, and contextually appropriate recipes. Additionally, YOLO and EfficientNet models are implemented for real-time ingredient detection, allowing users to receive accurate recipe suggestions based on visual inputs. A key component of GastroGenie is its Flask-based backend, which powers an interactive React.js frontend, while a PostgreSQL database stores user preferences, dietary history, and meal tracking data. To enhance nutritional guidance, the system is integrated with the USDA FoodData Central API, enabling real-time analysis of calorie counts, macronutrient composition, and dietary recommendations. The methodology involves data preprocessing, model training using transformer-based NLP architectures (such as GPT or BERT), and evaluation metrics such as BLEU and ROUGE scores to assess recipe generation accuracy. Beyond simple meal suggestions, GastroGenie incorporates interactive features like AI-powered meal planning, adaptive calorie tracking, and user-generated recipe sharing, offering a comprehensive dietary management system. The anticipated outcome of this research is an AI-driven culinary assistant that enhances user engagement, improves meal planning efficiency, and supports healthy eating habits. By bridging advanced AI with real-world dietary needs, GastroGenie seeks to revolutionize food recommendations, making personalized meal planning more accessible, accurate, and user-friendly.

Human-AI Teaming for Academic Performance Analysis
Poster #34 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Kendarius Ward, Elise Hernandez, & Tom Antony
Graduate Student(s): Abm Adnan Azmee & Francis Nweke
Research Mentor(s): Md Abdullah Al Hafiz Khan & Kazi Aminul Islam

Educators today often work with students who are struggling academically, but limited time and resources make it difficult to uncover the root causes and provide timely assistance. Artificial intelligence (AI) is a growing, viable tool for analyzing large datasets and solving problems in different domains; however, human expertise is required to enhance the AI model's performance. This study will utilize human-AI teaming to assess student performance based on factors such as their academic involvement, hours spent studying, and grade-point-average, among others. These findings will help instructors better grasp each student's academic needs. By incorporating humans into the AI pipeline, we aim to build trust and also mitigate bias. Moreover, this study aims to provide a system that can bridge the gap between student struggles

and instructional methods, ultimately fostering a more adaptive and supportive learning environment.

Impact of Social Determinants on Informal Caregivers of Alzheimer's: A Community-Driven App Study
Poster #29 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Divya Iyer, Benjamin Mo, Mohammed Yusufi, Chaathurya Nakkana, Lota Iwuagwu, Dawson White, & Mercy Olaniran
Graduate Student(s): Alex Willis, Venkata Palagundla, & Aaron Cummings
Research Mentor(s): Xinyue Zhang & Modupe Akintomide

Background: With more than 80% of people with Alzheimer's disease and related dementias (Pw-ADRD) living in their own homes, informal caregivers serve as mediators for symptoms, sources of information, and emotional support. However, many informal dementia caregivers continue to lack the knowledge and skills to manage behavioral symptoms effectively. Therefore, significant differences persist in the quality and accessibility of Alzheimer's care. These differences are mostly because of the social determinants of health (SDOH) such as income, education, and healthcare access, which have a significant impact on the care patients receive and their health outcomes. Design: Triangulated Community-Driven Research Purpose: To evaluate how SDOH affects the burden of informal caregivers of Pw-ADRD. Methods: This study is part of a larger ongoing triangulated designed study that investigates the impact of determinants of health and the adoption of a developed SmartCare mobile app by informal dementia caregivers living in rural areas. We are recruiting participants through flyers and presentations at community events. Quantitative data is being collected via a survey of 40 participants that includes a socio-demographic questionnaire and the Dementia Caregiving Assessment Scale. Qualitative data is being collected via individual semi-structured interview sessions. We extract relevant quantitative data from the survey and qualitative data from interviews to analyze descriptive statistics and thematic analyses. Conclusion: The findings from this project can provide invaluable insights into common caregiving challenges, which will be a foundation for the development of the SmartCare mobile app to provide accessible, targeted resources and support to informal dementia caregivers, especially in rural areas.

Improved Recommendation System Based on Play Time
Poster (Microsoft Teams)
Friday, April 18, 1:00pm – 1:15pm
Graduate Student(s): Clarence Barron III
Research Mentor(s): Md Abdullah Al Hafiz Khan

The recommendation system has been utilized for many years with many companies and studied across the machine learning field. Many have used this algorithm to try and give the user suggestions based on what they have watched, played, and read across the internet. From YouTube, X (Formally Twitter), Google, and many other companies, this system has been used to the very limit. However, there is always one problem when it comes to this sort of system. It is the way that it has been implemented and the way it understands what the user is into at the current moment and tries to recommend something that ultimately does not fall in line with what the user's current interests are at that moment. This project that is still in the works is to help improve the accuracy of these recommendations so that users using this system can be recommended things that align with their current interests. The platform this will be based on will be with the Steam PC Market platform. Steam is one of the largest PC Marketplaces in the world. From games to even business software like Blender and PowerDirector, it has all kinds of software and even hardware that users will be interested in looking at and potentially buying as well. This project will be using a Neural Network to train based off a user's time with an application with the use of Steam's API, because Steam actively tracks a user's time inside an application and keeps a log of that in their system. This will help improve the recommendation system greatly as it will continuously train on the time spent on an application but also learn what the user likes and does not like.

Large Language Model Enabled Mental Health App Recommendations Using Structured Datasets

Poster #11 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Kris Prasad
Research Mentor(s): Md Abdullah Al Hafiz Khan

The increasing use of large language models (LLMs) in mental health support necessitates detailed evaluation of their recommendation capabilities. This study compares four modern LLMs—GPT-4o, Claude 3.5 Sonnet, and dataset-enhanced Gemma 2 and GPT-3.5-Turbo—in recommending mental health applications. We constructed a structured dataset of 55 mental health apps using RoBERTa-based sentiment analysis and keyword similarity scoring, focusing on depression, anxiety, ADHD, and insomnia. Standard LLMs demonstrated inconsistent accuracy and often relied on outdated or generic information. In contrast, our retrieval-augmented generation (RAG) pipeline enabled lower-cost models to achieve up to 55% higher accuracy than baseline models while recommending apps with significantly better user ratings. Dataset-enhanced models maintained perfect accuracy while preserving recommendation diversity and quality. These findings demonstrate that strategically enhanced, cost-effective LLMs can outperform expensive proprietary models in domain-specific applications like mental health resource recommendations, potentially improving accessibility to quality mental health support tools.

Leveraging a Large Language Model to Alleviate Caregiver Mental Burden in Dementia Care
Poster #28 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Mercy Olaniran
Research Mentor(s): Xinyue Zhang & Modupe Akintomide

Providing care for individuals who suffer from Alzheimer's Disease and Related Dementia (ADRD) can cause significant emotional and psychological strain on informal caregivers, causing chronic stress, anxiety, and burnout. Facing these ongoing mental health struggles can interfere with decision-making and ultimately compromise the quality of care they provide for their patients. This project proposes to utilize a large language model (LLM) to assess caregiver mental health with a patient behavior grading system. The system will use behavioral symptoms of the patient, who is being taken care of by the caregiver, such as agitation, wandering, or confusion, as an input. It will assess the stress level based on how distressing it is for the caregiver. This metric, along with information about behavior frequency, will be used to prompt the LLM, providing critical context about both the caregiver's environment and their likely emotional state. Through this prompting, the LLM will generate responses that acknowledge the caregiver's stress and offer tailored mental health support. This includes self-care reminders, suggestions to manage stress, and encouragement for caregivers to seek external support when needed. This mental health detecting module can offer tailored mental health support to help caregivers manage their stress, prevent burnout, and continue providing quality care to their loved ones with dementia.

Multi-Modal Imaging in Brain Research: The Impact of Freesurfer and PETsurfer on Alzheimer's Studies
Poster #12 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Richard Haynes, Maya Castillo, & Dina Callaway
Research Mentor(s): Chen Zhao

Alzheimer's disease (AD) is the most prevalent neurodegenerative disorder and the 6th leading cause of death in the United States. This project seeks to enhance AD staging prediction by integrating structural magnetic resonance imaging (MRI), genomics, cerebrospinal fluid (CSF) biomarkers, and electronic health records (EHR). Structural MRI is commonly used to observe brain changes associated with AD. Genetic studies have identified single nucleotide polymorphisms (SNPs) linked to brain structural alterations in AD patients. Abnormal levels of

amyloid beta (A-beta) and tau proteins in CSF are also indicative of AD. EHR data categorizes individuals into cognitively normal (CN), mild cognitive impairment (MCI), and AD stages. However, SNPs cannot differentiate between MCI and AD, and MRI data shows similarities between early MCI and CN, as well as late MCI and AD. Thus, combining these four data modalities can improve the accuracy of AD staging. Multi-modal learning, which integrates multiple data sources, is expected to outperform single-modal approaches. However, aligning these heterogeneous data features remains a challenge, often leading to poor model fusion performance. This project uses the Alzheimer's Disease Neuroimaging Initiative (ADNI) dataset and employs FreeSurfer and PETSurfer software to process MRI and positron emission tomography (PET) images for structural and functional analyses. FreeSurfer is used to extract anatomical information from MRI scans, including cortical thickness and volume, while PETSurfer processes PET images to quantify brain metabolism and protein deposition. These tools, along with genomic and CSF biomarkers, provide a comprehensive understanding of AD pathology. We anticipate that integrating these multi-modal data will significantly enhance the accuracy of AD staging predictions. This project will contribute to better diagnostic and prognostic tools, improving patient outcomes and advancing research on neurodegenerative diseases.

Multimodal Neuroimaging Meets AI: Enhancing Alzheimer's Diagnosis with PyRadiomics

Poster #3 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Dina Xu Callaway
Research Mentor(s): Chen Zhao

Alzheimer's disease (AD) is a progressive neurodegenerative disorder that requires early and accurate diagnosis for effective intervention. This research explores how multi-modal data integration can enhance Alzheimer's disease staging prediction by developing an AI model that classifies patients into normal, mild cognitive impairment (MCI), or AD stages. Unlike traditional methods that rely on clinical assessment to make diagnoses, this study develops an AI-driven approach that integrates clinical and imaging data to improve classification accuracy. The research utilizes the Australian Imaging, Biomarkers & Lifestyle (AIBL) dataset, importing patient clinical data along with PET and MRI scans. First, image features were extracted from 1,312 MRI scans (705 patients) and 1,566 PET scans (829 patients) using PyRadiomics. Each scan yielded 112 features. Then, these extracted features were combined with 46 clinical variables to create a multi-modal dataset. To ensure consistency, data selection was performed by including only patients with both MRI and PET scans and a recorded CDR score, while non-numerical features were removed. This resulted in 270 multi-modal features used to train a machine learning model on 681 patients (1,448 scans). The model demonstrated strong performance, with an overall accuracy of 94% in distinguishing between normal control (NC),

mild cognitive impairment (MCI), and Alzheimer's disease (AD). Binary classification models further highlight the model's effectiveness, achieving 100% accuracy (AUC = 1.000) in AD vs. NC classification, 93% accuracy (AUC = 0.972) in AD vs. MCI, and 97% accuracy (AUC = 0.949) in MCI vs. NC. This research contributes to the field by proposing a data-driven AI framework for precise AD diagnosis, potentially aiding clinicians in early intervention decisions and improving patient outcomes. Future work will validate the model on larger, diverse cohorts to ensure generalizability.

Quantum Machine Learning for Cybersecurity and Science & Engineering Data
Oral Presentation (Prillaman Hall)
Wednesday, April 16, 12:00pm – 12:50pm
Undergraduate Student(s): Sara Waymen, Jordan Iseghohi,, & Triston Gibson
Research Mentor(s): Yong Shi

Classical Machine Learning (CML) involves training software models to make predictions or generative content utilizing datasets. In contrast, quantum computing involves the utilization of computers that consist of quantum bits which process more information than standard computers. Due to their performance, they can produce enhanced solutions to complex problems. Quantum Machine Learning (QML) combines the power of quantum computers alongside CML to address problems more efficiently and effectively than CML. This study will be examining various datasets from cybersecurity and engineering fields, where having quicker and more efficient solutions can lead to improved accuracy and performance. This was conducted by implementing the datasets into different models of QML and comparing the results to CML. The models of QML include the Quantum Neural Network model, the Quantum Random Forest Classifier model, and the Quantum Support Vector Machine Learning model. This study aims to evaluate the effectiveness of the QML in providing more accurate and faster solutions compared to the traditional CML method.

Real Time Object Detection using YOLO
Oral Presentation (Microsoft Teams)
Friday, April 18, 12:30pm – 12:45pm
Graduate Student(s): Rohit Malik & Manisha Kumari
Research Mentor(s): Sanghoon Lee

This project explores the implementation of real-time object detection using the You Only Look Once (YOLO) architecture. Leveraging its speed and accuracy, we developed a system capable of identifying and localizing multiple objects within live video streams. Our implementation focused on optimizing YOLO's performance for real-time applications, specifically addressing the trade-off between speed and accuracy. We employed a pre-trained YOLO model and fine-tuned it on a custom dataset tailored to specific object classes. This fine-tuning process aimed to

enhance the model's ability to recognize objects in our target environment. The system was implemented using Python and the OpenCV library, enabling seamless integration with camera input and real-time video processing. Performance was evaluated based on frames per second (FPS), mean Average Precision (mAP), and detection latency. Results demonstrate the system's capability to achieve high FPS, facilitating real-time object detection, while maintaining acceptable mAP for accurate object recognition. This project showcases the practicality of YOLO for applications requiring fast and reliable object detection, such as surveillance, autonomous driving, and robotics.

The Role of Artificial Intelligence in Mental Health: Opportunities, Challenges, and Ethical Considerations
Poster (Microsoft Teams)
Friday, April 18, 1:15pm – 1:30pm
Undergraduate Student(s): Olajuwon Atunnise
Research Mentor(s): Md Abdullah Al Hafiz Khan

Mental health issues are becoming more common worldwide, especially after the COVID-19 pandemic and the ongoing shortage of mental health professionals. AI has the potential to help bridge this gap by offering scalable, affordable, and accessible mental health support. This research examines how AI-driven tools like chatbots and natural language processing systems are being used in mental health care and evaluates their effectiveness and limitations. Case studies like Wysa and HAILEY demonstrate that AI can be useful for people with mild to moderate anxiety and depression. This study analyzes case studies and existing literature to assess how AI supports mental health care while identifying potential risks and ethical concerns. However, AI tools have major limitations, including a lack of human empathy, privacy concerns, and potential biases in their models. While AI is valuable for diagnostic support, therapist training, and crisis intervention, it cannot replace human clinicians—especially for individuals dealing with severe mental health conditions. Findings suggest that AI should complement, rather than replace, human professionals to maximize effectiveness. This paper also highlights the ethical concerns and policies needed to make AI integration safe and effective. Future research should focus on enhancing AI's emotional intelligence, reducing bias, and ensuring responsible use in mental health care.

Towards Bounding the Behavior of Neural Networks
Poster #2 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Graduate Student(s): Aidan Boyce
Research Mentor(s): Arthur Choi

Recent advances in Artificial Intelligence (AI) have unlocked many new possibilities but have also brought with it many new challenges. While modern AI systems have been continuously exceeding expectations, our ability to interpret and understand their behavior lags behind. For example, an AI model trained to detect pneumonia from X-rays may fail in new hospitals because it learned to recognize hospital logos instead of medical patterns. Why do some succeed while others fail? Do they truly understand their tasks, or are they relying on patterns that may not always hold?
To enumerate the most informative explanations of a neuron's behavior, we developed an improved approach to bounding the behavior of individual neurons within artificial neural networks. In this paper we demonstrate, both theoretically and empirically, the utility of our approach.

Unsupervised Music Genre Clustering Using Contrastive Learning
Poster #19 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Graduate Student(s): Robel Mamo
Research Mentor(s): Md Abdullah Al Hafiz Khan

Music genre classification is a challenging task, especially in the absence of labeled data. In this project, we leverage unsupervised contrastive learning to cluster music tracks based on their underlying audio features. By applying SimCLR-based feature extraction on the GTZAN dataset, we demonstrate that contrastive learning can capture meaningful representations of different genres. Our approach does not require labeled training data and provides genre similarity clustering based on learned embeddings. Results indicate that the model effectively groups tracks into clusters that align well with traditional genre labels, suggesting contrastive learning as a powerful tool for unsupervised audio analysis.

Data Science & Analytics

Analysis of Car Accident Trend Changes Due to Covid-19
Poster #18 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am - 9:45am
Graduate Student(s): Liz Ragsdale
Research Mentor(s): Joseph DeMaio

Millions of car accidents occur every year in the USA resulting in injuries, deaths and increased traffic congestion. Did the Covid-19 pandemic impact the frequency and/or severity of traffic accidents? Leveraging a dataset documenting vehicle accident details from the past ten years in

New York City, this project investigates the changes observed in car crash frequencies and variance before and after March 2020. We conducted a geospatial analysis of the data to identify location-based trends and determine if those trends were consistent across the entire timeframe. By identifying the patterns or trends in the NYC accident data, perhaps more targeted and effective solutions can be created to widely reduce the number of accidents occurring nationwide due to necessary changes in behavior dictated by Covid-19.

Breaking the System: Tricking Generative AI/LLMs
Poster #35 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Madison Weeks & Iyanu Dabiri
Research Mentor(s): Kevin Gittner & Lauren Matheny

This research examines various ways to "trick" generative artificial intelligence (AI) and large language models (LLMs) into revealing that they are AI/LLMs rather than humans responding. The goal is to develop methods for detecting AI-generated content in human-requested tasks and interactions with webpage elements through techniques known as "red teaming" and "adversarial prompting." Red teaming is defined as "a way of interactively testing AI models to protect against...toxic, biased, or factually inaccurate generation. Adversarial prompting is defined as inputting prompts to "exploit weaknesses in LLMs, leading them to produce harmful, misleading, or unintended outputs," (Martineau 2025; Kumar, 2024). Across multiple LLMs such as ChatGPT, Grok, LLaMA, Claude, and Microsoft Copilot, we tested this by presenting identical prompts to analyze similarities and differences in response patterns. To do so, we familiarized ourselves with the various platforms to determine successful methods. We piloted prompts with various languages such as Pig Latin, Telugu, and German. We then experimented with different fonts and punctuation such as Wingding's, Morse Code, and Ascii Code. Emojis placed within a string of randomized characters were used to test response times of the LLMs in identifying the specified emoji given in the prompt. Minor adjustments made to an image resulted in incorrect categorization of the cropped or inverted image in ChatGPT, LLaMA and Microsoft Copilot. We found that when prompted with indefinite text prompts, every model produced different amounts of string repetitions. Findings suggest that red teaming and adversarial prompting can generate differences in AI/LLM responses that may lead to successful detection. However, due to rapid advancements of this technology, these approaches will need to continuously be refined and tested. Through further research, we plan to explore additional specific and targetable prompting methods that could potentially elicit LLM responses and patterns.

Graph-based Deep Chess Matchmaking

Poster #15 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Graduate Student(s): Charles Fanning, Faruk Muritala, & Promi Roy
Research Mentor(s): Joseph DeMaio

The goal of a rating system in zero sum games such as chess is to quickly and accurately assign skill ratings to individual players. In chess, this is most often done with ELO rating, which iteratively updates player ratings based solely on the result of the game as well as the rating of the other player. When it comes to new players, these methods rely random pairings in order to collect initial estimates. Efforts have been made, including the integration of Glicko-1 and Glicko-2 scores as opposed to standard ELO ratings, but none of these methods take into account the content of the games themselves when predicting ratings of new players. We implemented a hybrid graph-representation and deep learning based framework based on the lichess.org open database which maximizes both the accuracy and rate of convergence of rating assignments for new players by considering the context of actual prior game states as opposed to solely focusing on game outcome and prior ratings. Roughly, we constructed a graph representation of prior player pools along with their game histories and performed regression analysis based on moves in their previous games using an LSTM model in order to predict their true rating. We then assigned players to play either black or white in their next game, mapped our existing history graph into a bipartite graph (bi-partitioned by color in the next game), weighted edges by difference in predicted rating, and used the Hungarian algorithm in order to evaluate which pairings will result in the least predicted rating difference. This allows for a hybrid rating and matchmaking framework that takes into account the context from moves in previous games as opposed to the more limited priors of player ratings and game outcomes.

Matching Algorithm for More Effective Faculty-Class Schedule Pairings
Poster #17 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Graduate Student(s): Liz Ragsdale & Ramya Madhuri Narapureddy
Research Mentor(s): Joseph DeMaio

Assigning faculty to courses is a crucial part of academic planning, as both parts are needed to run a class. However, many factors limit the pairings which makes forming a cohesive schedule more difficult and different from semester to semester. This project aimed to use graph theory to create a scheduling solution using past schedule data to algorithmically assign faculty to courses. We built a bipartite graph with weights being assigned based on prior experiences teaching and use maximal weight matching to distribute course load evenly across faculty. This method improves scheduling efficiency and adapts dynamically, making the process more flexible and effective.

Mobile Signal Coverage Optimization in Atlanta
Poster #19 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Graduate Student(s): Qiuyuan Zhang & Sharanya Dambe Vasudeva
Research Mentor(s): Joseph DeMaio

This project applies graph theory and data analysis to mobile signal coverage optimization in Atlanta. From web-scraped AntennaSearch data, we construct a graph model of the signal towers and their coverage areas. We utilize graph coloring algorithms to assign frequencies and visualize coverage distribution optimally. The project integrates population density data to identify low-coverage regions and generates a Signal Strength Heatmap using inverse distance weighting. We use K-means clustering suggests ideal locations for new towers in poor-signal, densely populated areas. Implemented in Python, the solution combines graph theory, geospatial analysis, and machine learning to provide a comprehensive solution to mobile network infrastructure optimization. The outcomes offer valuable intelligence for telecommunications planning with the potential to improve service quality and streamline resources.

The Nodefather: Power & Influence in the Film Industry Graph
Poster #16 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Graduate Student(s): Mohsin Md Abdul Karim & Joseph Richardson
Research Mentor(s): Joseph DeMaio

The movie industry operates as a complex, interconnected network of directors, actors, studios, and thematic elements. In this study, we construct a large-scale movie industry graph using IMDb data, where nodes represent entities such as films, directors, actors, and studios, and edges capture relationships such as collaborations and shared themes. We apply community detection algorithms to identify clusters of industry influence, revealing how tightly connected subgraphs correspond to distinct genres and financial success patterns. Additionally, we employ PageRank and centrality measures to rank influential contributors, highlighting key directors and studios that drive industry trends. By analyzing the network's structural properties, we uncover hidden dynamics in how movies succeed or fail within the industry's landscape. This graph-based approach provides novel insights into the power structures and genre-specific collaboration patterns shaping Hollywood's creative and financial ecosystem.

Sabrina vs Steph: The Battle Between the WNBA and NBA
Poster #22 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am

Undergraduate Student(s): Naysha McGriff
Research Mentor(s): Lauren Matheny

*The average salary of a Women's National Basketball Association (WNBA) player is 110 times less than a National Basketball Association (NBA) player's. Despite growing WNBA viewership, gender inequality in sports remains high, with critics claiming female athletes are less skilled. Gender bias in sports is severely understudied, making direct comparisons to men's leagues unfair due to long-term lack of investment in women's sports. This study investigates whether the perceived disparity in skill levels between WNBA and NBA players' is genuine or influenced more by external factors by developing an unbiased measure of player efficiency to compare athletic performance. This dataset was sourced from Basketball-reference.com and cleaned to remove duplicates and observations with missing values, resulting in 555 players (166 WNBA, 389 NBA). Extreme outliers were assessed. An unbiased measure for comparing player efficiency (dependent variable) was developed: Efficiency=(Points+Rebounds+Assists+Steals+Blocks)–(Missed Shots+Turnovers)/100 Team Possessions. A multiple linear regression model was conducted. Independent variables included games played, games started, personal fouls, organization and the interaction between games started and organization. Average efficiency of WNBA players was 24.2 (SD=8.1) points and 26.5 (SD=8.2) for NBA players. Multiple linear regression revealed that 23.6% of the variation in efficiency was explained by games started, games played, personal fouls, organization, and games started*organization, (R^2=0.236, F(5)=33.54, p<0.001). Number of games started had a stronger effect on NBA players' efficiency than WNBA players. Specifically for every additional game started by an NBA player, efficiency decreased by .200 units on average, compared WNBA players (t=-4.63, p<0.001). Findings indicate that WNBA players are not less skilled than NBA players, but games started significantly impacts NBA players differently than WNBA players. These results emphasize the need for greater investment in female sports' data collection and research to create a more equitable comparison of performance between genders.*

Information Technology

AI-Driven mHealth Solutions for Regulating Screen Time in Young Children: A Systematic Review of Parental Interventions, Digital Well-Being, and HCI Approaches
Poster #37 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Aldair Palma Peralta & Ysmael Sandoval Gomez
Research Mentor(s): Nazmus Sakib & Syeda Umme Salma

The increasing prevalence of screen timing among people, especially young children, has become a concerning issue as this may impact directly or indirectly on children's cognitive, emotional and physical development. To address this challenge, it is important to find out the underlying

causes of this increasing screen timing and therefore, our research is focused on performing a systematic review of the available literature on screen time regulation, parental intervention strategies and HCI. In the review, our goal is to pinpoint significant research gaps concerning the personal and socioeconomic influences on digital consumption in young children by dissecting current research findings. Besides, we are going through the prior research to find the parental obstacles, digital well-being interventions and AI based solutions to regulate a healthy screen timing routine. Through this examination, we are focusing on the emerging need of adaptive, personalized and data-driven interventions which will help parents to manage their children's unregulated screen timing. By using the gained insights, we aim to build a smartphone based mHealth solution which will leverage AI and Machine Learning algorithms. This tool will offer real time monitoring and personalized advice based on the digital patterns and the socio economic status of the parent child dyad. Thus, our initiative is aimed at closing the gap between the theoretical research and the practical application to support the optimal cognitive and emotional development of young children and, therefore, ensure the correct approach to the digital interaction.

AI-Driven Predictive Modeling of Alzheimer's Disease Progression Using Deep Learning and Clinical Data

Oral Presentation (Prillaman Hall)
Wednesday, April 16, 12:00pm – 12:50pm
Undergraduate Student(s): Zakaria Elghazzali, Kevin Sery, & Tania Menchaca
Research Mentor(s): Chloe Yixin Xie

Alzheimer's disease is one of the most important public health problems of our time, affecting millions of individuals worldwide. As a chronic neurodegenerative disorder, Alzheimer's leads to cognitive decline, memory loss, and, ultimately, loss of autonomy. Our research aims to employ artificial intelligence, through a Dense Neural Network (DNN) model, to analyze the progression of Alzheimer's based on an individual's exercise, diet, lifestyle, and current condition. Our data was obtained from WashU Medicine's Open Access Series of Imaging Studies (OASIS) database of cross-sectional MRI scans from patients that ranged in age from young to older adulthood. The two datasets that were used focused on showing the progression of Alzheimer's (cognitively normal, uncertain dementia, and AD dementia) over time in a variety of patients. They were first merged via their SessionIDs to ensure the model's ability to track a patient's cognitive progression in case their OASISID had multiple SessionIDs attached to them. The data was then preprocessed to ensure data integrity through scaling, encoding, and handling NaN (null) data values. A Dense Neural Network model with two hidden layers was implemented using TensorFlow and Keras, optimizing for both accuracy and generalizability. The model was trained with a categorical cross-entropy loss function, adaptive learning rate optimization via the Adam Optimizer, and class weight balancing to mitigate bias against important, yet underrepresented classes, for the sake of generalization. The model achieved a

classification accuracy of 96% ± 2% after 50 epochs, demonstrating its potential for accurate predictive analytics in biomedical applications. By identifying patterns and correlating disease progression, we aim to generate predictive insight that can be used to support early intervention and customized treatment methods.

Defending Against DDoS: Simulating Attacks, Securing Networks
Poster #15 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Rocco Leimbach, Aditya Chauhan, Edna Miranda Lopez, & Bradley Crasto
Research Mentor(s): Liang Zhao

The internet plays a crucial role in modern life, providing convenience and connectivity across various sectors, but its accessibility also introduces security vulnerabilities. Many of these vulnerabilities have been made abundant by human error and cyberattacks which have led to expensive and timely repairs that have cost businesses millions of dollars. As organizations increasingly rely on digital infrastructures, understanding and mitigating such threats is essential. One major threat is the Distributed Denial of Service (DDoS) attack, which overwhelms a network with excessive traffic, causing operational disruptions and financial losses. In our research project, using the Common Open Research Emulator (CORE), we simulate DDoS attacks on a network. By analyzing network traffic patterns, response time, and mitigation effectiveness we can identify vulnerabilities and evaluate defensive strategies. A key focus of our project is to educate students by demonstrating how a DDoS attack can be prevented by incorporating software-based and hardware-based security measures to further fortify a network. Additional security features such as firewalls, intrusion detection systems, and traffic filters can all help protect against DDoS attacks. Furthermore, by highlighting the financial impact of a DDoS attack, we aim to raise awareness on the risks associated with weak network security. Through visual examples, real world comparisons, and a step-by-step approach, we simplify cybersecurity concepts to reach a greater audience and successfully convey our research findings. Ultimately, this project informs students on how to make a safer digital environment while also preparing them to implement effective cybersecurity practices in their academic and professional careers.

Empowering Mental Wellness: A Mobile App for Early Intervention Using Biomarker Analysis
Poster #14 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Anh Duong
Research Mentor(s): Maria Valero de Clemente

Mental health is an essential part of living a balanced and fulfilling life, but it is often overlooked compared to physical health. While physical health is important for performing daily activities, mental health plays a crucial role in how we manage stress, build connections, and make decisions. Previous research studies have shown that nearly 60 million Americans experienced a mental illness in 2024, yet there were only 340 people for every one mental health provider in the U.S. Furthermore, young adults aged 18–25—who are the most digitally connected generation—suffer from the highest rates of severe mental illness yet are the least likely to seek or receive treatment. These findings highlight a growing crisis where more people are struggling with mental health issues, but the resources available to help them remain insufficient. Given this gap, there is a need for innovative technological solutions that empower young adults with self-awareness and early intervention tools to manage their mental well-being. This research investigates the use of behavioral and physiological biomarkers to predict mental health conditions and provide timely interventions. We analyze heart rate variability, blood pressure, and sleep patterns as physiological data and frequency of digital device usage and social interaction data for behavioral data. Using machine learning and statistical models, we examine correlations between these biomarkers and mental health conditions to develop predictive algorithms. The mobile application integrates these insights to offer real-time monitoring, early warnings, and personalized recommendations. Preliminary findings indicate that behavioral and physiological markers can provide meaningful insights into mental health trends. By combining data-driven analysis with user-centered design, this platform offers a practical and accessible solution for mental health self-management. This study bridges the gap in mental health care by offering a proactive and accessible solution that encourages self-awareness and early intervention.

VR Farming: An Immersive Approach to Engaging the Next Generation in Agri-food Careers

Poster #28 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Aaron Gamino
Research Mentor(s): Taeyeong Choi & Sungchul Jung

As the global population reaches 9.7 billion by 2050, global food demand will increase by up to 56% [1]. However, the percentage of US farms undergoing significant labor shortages increased from 14% in 2014 to 41% in 2018 and 53% in 2022 [2], implying the urgent need to attract younger generations to the agrifood industry and encourage them to choose relevant careers in the future. To tackle this challenge, in this project, we propose VR Farming—an educational virtual reality environment (VR) for providing the younger audience—typically feeling comfortable in using new digital tools—with an immersive, engaging, and interactive learning experience, performing simplified yet realistic agricultural processes. Specifically, the simulated environment presents a virtual farm with multiple rows of tomatoes at various growth levels,

allowing the user to freely navigate around in and observe them from different viewpoints. In addition, the user can interact with the crops and trigger a game with the mission to correctly identify ripe and unripe tomatoes, harvest and place only those that are ready for sale in crates for packaging. Future development will expand the environment further to include all different stages of food production, such as farming, postharvesting, retail, and cooking. Our ultimate goal in this project is to develop an innovative VR environment that enables the younger generation to learn and enjoy food production processes through immersive, hands-on experiences and help them become interested in and explore career opportunities in the agrifood industry. [1] Michiel van Dijk, Tom Morley, Marie Luise Rau, and Yashar Saghai, A meta-analysis of projected global food demand and population at risk of hunger for the period 2010–2050, Nature Food, 2022. [2] Zachariah Rutledge, Farm Labor Shortages, Their Implications, and Policy Options to Help Promote the Domestic Fresh Produce Industry, 2024.

Next-Gen Donors: Designing a Virtual Reality Blood Donation App for Young Donors
Poster #16 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Aaliyah Uchendu, Meghan Malange, & Kazi Hossain
Research Mentor(s): María Valero de Clemente

Blood donation is a fundamental procedure in healthcare. Donors can donate blood to help those in need, but sometimes, the process may be timely and uneasy to understand. This results in a shortage of blood donations. In addition to this factor, most donors are over the age of 45 and the percentage of young adult donors ages 17 to 24 have fallen from 13.07% to 7.2% in 2022-2023 according to NHS Blood and Transplant. To encourage young adults to donate blood and establish a simple donation process, we created a blood donation app called, "The VR Blood Donation Company". The goal of our app is to increase donor engagement, specifically in young adults, improve blood donor management, and facilitate the connection between donors. The app includes features such as virtual reality, scheduling appointments, and communication with clinics. By using frontend programming, HTML and CSS, we made the app visually appealing to the eye and through backend programming, JavaScript, the app is able to store user information and enhance the navigation of the app. Our objective is to make a positive impact on the healthcare industry and promote blood donations. The VR Blood Donation Company makes this objective possible by encouraging young adults through virtual reality and aesthetic designs, simplifying the donation process with straightforward navigation, and ultimately saving those in need.

Privacy-Preserving Multimodal Sentiment Analysis
Poster #6 (Siegel Student Recreation and Activities Center)

Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Tristan Thomas & Lily Cheng
Research Mentor(s): Honghui Xu

With the world's future changing and the use of technology constantly increasing, cybersecurity professionals need to understand that it is not just the passwords or cards of their clients that are at stake anymore. With AI becoming a mainstay in the tech scene, the security risk it could pose to regular people through acts like deepfakes, or more advanced voice copying technology, is immeasurable. This is what our lab aims to fix. The Privacy Preserving Model Lab plans to use an AI model, created and trained, to encrypt picture, video, and voice sample data to increase the security of both companies and the average citizen. Today, a cybercriminal can steal your pictures and voice and use them to become you, taking full control over your online life and accounts. We focus on training our AI model to become quicker in the encryption of the data, as well as more secure. As even though the use of these sophisticated models has proven to be effective, if something slips, data we gather could unintentionally reveal personal information such as someone's identity or location Thanks to the use of technology like the Raspberry Pi and the AI Hat+ attachment, we'd be able to test our model more rigorously, allowing for more data and stress to go into it and allowing us to see and share our progress more effectively. In today's day and age, people gain access to their devices through technology like facial recognition, and people use vocal passwords for their bank. We believe that it's better to stay ahead of any possible threat that could arise in the future, preferably making adjustments to our model when needed, than to fear not being prepared when these new types of cyber attacks eventually come.

SANDRApp: A Digital Intervention to Enhance Social Connectivity and Emotional Support Among Older Adults
Poster #34 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Pavan Chowdary Chilukuri & Purna Chandu Anukula
Research Mentor(s): Maria Valero de Clemente & Paola Spoletini

Social isolation and loneliness are significant challenges affecting the well-being of older adults, often leading to adverse mental and physical health outcomes. Prolonged isolation has been linked to increased risks of depression, anxiety, cognitive decline, and chronic illnesses such as hypertension and cardiovascular diseases. As digital technology continues to evolve, innovative solutions have emerged to address these issues and foster meaningful social interactions for older adults. SANDRApp is a user-friendly digital platform designed to reduce loneliness and enhance social connectivity among older adults. The platform caters to three primary user groups: (1) families with elderly loved ones living far away, (2) older adults who may not have family

support, and (3) volunteers who offer companionship and assistance. By providing an intuitive and accessible interface, SANDRApp ensures that older adults can easily engage with their social circles and support networks. Key features of SANDRApp include video calls, instant messaging, virtual community groups, and scheduled reminders for social interactions, helping older adults maintain regular communication with loved ones. Additionally, the platform connects seniors with volunteers who provide companionship and emotional support, fostering intergenerational relationships and community engagement. Interest-based forums, wellness check-ins, and event notifications further encourage social participation and cognitive stimulation. By leveraging technology to simplify communication and encourage social interaction, SANDRApp empowers older adults to maintain active and fulfilling social lives. The platform is designed with accessibility in mind, ensuring ease of use for seniors with varying levels of digital literacy. Through its comprehensive approach, SANDRApp helps mitigate the negative effects of social isolation, ultimately improving the mental and emotional well-being of older adults and enhancing their overall quality of life.

Software Engineering and Game Development

Analyzing the Impact of Note-Taking Motor Skills on Retention and Learning Outcomes through a VR Classroom
Poster #26 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Sawyer Strickland
Research Mentor(s): Sungchul Jung

Immersive learning experiences have been proposed to offer rich immersion and interaction, effectively addressing the distractions and low engagement commonly found in typical online learning environments. To further enhance these immersive experiences, we explore the use of VR note-taking techniques in the VR classroom, as research in neuroscience and psychology suggests that motor skills, such as note-taking, help students improve their learning by enhancing cognitive abilities and decision-making, ultimately leading to better performance. This research aims to investigate the impact of motor skills, specifically note-taking with a physical VR stylus, on learning experiences, outcomes, and retention in our VR classroom environment. We designed our study using a 2 x 1 between-subjects design. Participants will be assigned to one of two conditions: learning with a VR stylus (Stylus) and learning without a VR stylus (no-Stylus). All participants will study a short lecture video in the VR classroom using a head-mounted display (HMD). In the Stylus condition, participants will use a notetaking system with a physical stylus. The no-Stylus group will study in the VR classroom without the support of a notetaking system. At the end of the study, both groups will take a quiz to test their knowledge,

followed by subjective questionnaires. Throughout the Stylus group's notetaking process, variables such as the number of stylus strokes, the average speed of strokes, and the average amount of time spent erasing will be measured to test the correlation between motor skills and quiz performance. Through this study, we hypothesize that the Stylus group will score higher on average in the quiz and report better learning experiences compared to the no-Stylus group. Additionally, we anticipate that the Stylus group's use of the VR note-taking system will have a positive impact on retention.

Collaborative Learning of Complex Microbiology Concepts with a Multi-user Virtual Reality Storytelling Experience
Oral Presentation (Prillaman Hall)
Wednesday, April 16, 12:00pm – 12:50pm
Undergraduate Student(s): Devon Haynes, Kalynn McCoy, Sonaj Sanders & Grey Gibson
Research Mentor(s): Lei Zhang & Chloe Yixin Xie

Complex molecular biology concepts such as DNA damage and repair mechanisms involve intriguing interactive processes among different types of proteins and present a learning challenge to students at all levels with traditional instructional approaches. Studies on using a narrative-driven immersive virtual reality (IVR) educational experience to promote learning of complex science concepts indicate that it is a promising novel pedagogical tool to supplement textbook instructions. Building upon our previous research, which has shown that a single-user VR storytelling experience learning experience can increase engagement and motivation in learning target science concepts, this current study investigates how a multi-user VR environment can further improve learning outcomes through shared narratives and role-playing of different protein characters. This project utilizes the latest mixed reality devices (Meta Quest 3) and game engine Unity to develop a multi-user 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 and user role-playing. Our project will contribute to the growing body of evidence that role-playing, collaboration, and scenario-based learning in a multi-user VR setup may promote greater engagement and conceptual understanding compared to a single user learning environment.

Designing a Game-Based Simulation of a Pressurized Water Reactor for Education and Nuclear Energy Awareness
Poster #30 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Caitlin Tigani, Ben Scholl, & Adam Palmer

Research Mentor(s): Joy Li & Eduardo Farfan

Nuclear engineering is one of the most misunderstood fields of study in the US general population. Despite the public perception that nuclear reactors are harmful to the environment, in fact, they are far more renewable and cleaner than fossil fuels. Nuclear power provides approximately 20% of the electricity generated by 94 reactor units of the nation's electricity. This research aims to enhance public awareness and understanding of nuclear power by developing a simulation game that simplifies the complexities of nuclear reactor operations for a general audience. A simulation game was created as part of this study to demonstrate the functionality of a nuclear reactor, modeled after a Pressurized Water Reactor. The game models the general operations of a plant by allowing the player to control a few selected parameters of the reactor, including the insertion depth of control rods, the functionality of reactor pumps, and the rate of steam output. This level of interaction allows the users to understand more in-depth the mechanics of the reactor. To keep players engaged, three mini-games were implemented based on possible reactor failure scenarios. If the player fails these mini-games, there will be a dramatized "Meltdown" of the reactor accompanied by a disclaimer explaining the real-world safety measures that prevent such incidents in actual reactors. The game will be play-tested by high school and college freshmen to assess its effectiveness in improving comprehension and sparking interest in nuclear energy. Beyond educating players on PWR operations, this project aims to inspire curiosity about nuclear power production and introduce emerging technologies, such as Small Modular Reactors.

Illusion of Weight: Use of Multi-sensory Immersive Experiences for Indoor Exercise
Poster #27 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Fareedah Ashiru
Research Mentor(s): Sungchul Jung

This research aims to investigate the impact of weight perception in muscle exercise experiences using virtual reality (VR) technology with tactile feedback to support innovative at-home workout experiences, particularly for elders, with cost-effective and injury risk-minimized. During the study participants were put into a VR gym as we manipulated the size of the VR dumbbell per condition, while they held a real lightweight dumbbell throughout. We aim to investigate whether we can measure weight perception through physiological signals and hand position to see if a multisensory immersive muscle exercise experience impacts weight perception. In this study, participants engaged in VR exercise experiences with an isometric contraction task, holding a dumbbell in a place with a stretching arm without movement while varying the size of the virtual dumbbell or providing tactile feedback. Before we conducted the study, we calibrated their hand positions and tracked their position during the task with their

initial rate of perceived exertion (RPE) to avoid bias from muscle fatigue. In addition, we collected heart rate (HR) and galvanic skin response (GSR) data. Following that, the participants performed the isometric contraction for 30 seconds for 4 conditions: small dumbbell without tactile feedback, small dumbbell with tactile feedback, large dumbbell without tactile feedback, and large dumbbell with tactile feedback, followed by a questionnaire and a break. We found a significant effect from physiology signals in HR and GSR, and y-hand position but with a small effect size. The results from the study were mixed findings and supported with only minimal evidence. Further research will be required to understand the correlation and clear observation.

Prototyping a User-Centered Verbal Harassment Reporting System for Social and Workplace Virtual Reality Experiences

Poster #8 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Lisbeth Martinez, Sanae Breann Demeritte & Alvaro Sebastian Estiche
Research Mentor(s): Lei Zhang

As social VR platforms become more prevalent in daily life, they create opportunities for harmful behaviors. Studies show that users, particularly women and marginalized groups, frequently experience verbal abuse and other forms of harassment in virtual spaces, often with limited tools to report these incidents. Additionally, With more and more multi-user social VR platforms being adopted into the workplace, mitigating potential risks in a digital realm becomes a priority. This project aims to design and implement a user-centered reporting system prototype for multi-user VR applications and verify its feasibility. The VR reporting system will empower users to safely and effectively report verbal sexual harassment while preserving the immersive quality of the VR experience. Our design utilizes the game engine Unity to develop multiple scenes that allow for the testing of multiple harassment reporting UI options with the goal of understanding a bystander's reaction and intervention to the incidents in the virtual space. Key features of the prototype include discreet reporting options, contextual guidance, and feedback mechanisms to keep users informed about the status of their reports. An informal user study will be conducted using the system prototype to collect initial user feedback to the reporting system design. Our work contributes to the broader conversation on ethical design in emerging technologies and provides practical recommendations for developers and policymakers to combat harassment in virtual space. Insights gained from the user feedback can be applied to the design of future workspace VR applications and promote positive multi-user experiences in immersive environments.

Radow College of Humanities and Social Sciences

English

Crafting Appeal: An Analysis of Harper & Brothers' 19th-Century Publishers' Bindings
Poster #8 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Alyssa Casey
Research Mentor(s): JoyEllen Williams

The United States is well known as a dominant force in the global publishing industry. The long trajectory of this success began during the early nineteenth century when the production and publication of printed books entered a new era. Prior to the nineteenth century, all elements of printed books were crafted by hand and were expensive to acquire. During the late eighteenth and early nineteenth centuries, the domino effect of industrial advances revolutionized and economized book printing and publishing, providing common people access not only to books, but attractive ones. At the forefront of this advancement was the Harper & Brothers Establishment, today known as Harper or HarperCollins Publishers. Harper & Brothers was one of the first publishers to incorporate an in-house bindery, jet setting them miles ahead of their competitors. This bindery produced their famous monthly publication, Harper's Monthly, and their weekly publication, Harper's Weekly or Harper's Bazaar, which provided invaluable marketing for their published books and novels. But what put Harper & Brothers on top was their use of handsome book bindings, particularly the use of "library sets" during the Golden Age of Book Collecting to attract and retain a consistent market of book buyers during the nineteenth century. This study analyzes a collection of the Bentley Rare Book Museum's Harper Establishment bindings from 1833 to 1900 to understand how Harper used decorative and highly curated sets of bindings to attract book buyers during a competitive moment in book history. This study is significant because it demonstrates the historical importance of publishers' bindings during the nineteenth century and sheds light on twenty-first century book production practices that continue these traditions.

Empathy Through Play: Exploring the Prosocial Potential of Video Games
Oral Presentation (Microsoft Teams)
Friday, April 18, 2:30pm – 2:45pm
Undergraduate Student(s): Nicole Prudchenko, Kyle Surajh, Jessica McDonald, Kayla Benthall & Jordan Carvalho
Research Mentor(s): Victoria Lagrange

As video games continue to evolve, so do discussions about their psychological impact on players. While much attention has been given to the debate over whether video games incite violent tendencies, far less research has explored the opposite possibility: that games can foster empathy. The Game Narrative Lab seeks to address this gap by designing and studying games that promote prosocial behavior. Our work centers on creating innovative, narrative-driven games that inspire empathy and kindness in players. This process involves collaboration across disciplines, with writers, artists, developers, and researchers crafting experiences that challenge dominant narratives about games and their societal effects. The art, narrative, and development teams are currently working on a game project called Alley Cat, where players play as a cat who has to help other animals in unfortunate situations. To inform our designs, we are conducting a study using Corporation Incorporated, a game developed in our lab and published by the KSU Game Studio, that explores the challenges faced by an immigrant adjusting to life in America. Our research challenges persistent misconceptions about video games by demonstrating their potential as tools for empathy-building rather than sources of aggression. Through this work, we aim to recontextualize games as an interactive medium capable of fostering meaningful social change—one that not only entertains but also deepens players' understanding of others.

It's Not Enough to Just Remember: Using Generative AI to Scale the Atlanta Student Movement Archives for Public Use
Oral Presentation (Prillaman Hall)
Wednesday, April 16, 11:00am – 11:50am
Undergraduate Student(s): Hiba Hussain & Collins Puckett
Research Mentor(s): Jeanne Law

This presentation examines a pioneering collaboration between first-year student scholars and the KSU Atlanta Student Movement Project, focusing on their work as "red team" trainers for a custom GPT-based archival tool. Tasked with augmenting the digital repository of the Atlanta Student Movement—a pivotal, local chapter in the struggle for Civil Rights—these student-scholars tested and refined a transformative model that allows users to explore historical records in an immersive, interactive manner. During this presentation, attendees will gain insights into the research and training process, from initial data curation to iterative testing and user interface design. The discussion will illustrate how first-year scholars transformed an academic archive, underscoring the potential of digital archives to amplify underrepresented voices and encourage ethical engagement with the past. First-year scholars will demonstrate red-teaming and discuss surprises/challenges of working with oral histories. This project exemplifies the power of cross-disciplinary teamwork, empowering students to carry forward the Movement's legacy into the digital age. The "red team" methodology involved systematically challenging the model's outputs, enhancing its accuracy, mitigating biases, and ensuring historically faithful responses. By scrutinizing how the GPT model interpreted primary sources—such as protest documents, personal correspondence, photographs, and news clippings—the students identified

gaps in context and potential misrepresentations of the Movement's goals. This iterative process nurtured critical thinking and introduced these scholars to best practices in digital humanities and ethical AI development. The custom GPT harnesses the Movement archive to reveal the lived experiences of activists who courageously confronted segregation at lunch counters, in schools, and other public facilities. Audiences can engage with this history as both an academic tool and a public platform for civic learning, forging new understandings of how collective action reshaped the trajectory of civil rights in Atlanta and beyond.

A Page from Our Archives: Understanding Queer History in Georgia at Kennesaw State
Oral Presentation (Microsoft Teams)
Friday, April 18, 3:00pm – 3:15pm
Undergraduate Student(s): Nicky Melendez & Monique McLaren
Research Mentor(s): Kurt Milberger

In 1993, the play "Lips Together, Teeth Apart" was performed in Cobb County's Marietta Theatre in the Square. The play contained themes of homosexuality, prejudice, and the fear of the HIV virus. The play became highly contentious, and it became the center of a countywide debate on whether the arts should continue to be funded. Eventually, on August 10, 1993, the Board of Commissioners decided to cut all funding for the arts in Cobb County. Our research aims to make a cohesive timeline leading to the eventual defunding of the arts, while also trying to find key people within this major debate. By finding these important people and understanding how each event transpired we can consider how censorship of the arts happens and how it effects local art communities and the LGBT community. With this information we can have a stronger awareness of the censorship of art today. The research strategies we have used are an investigative approach and thorough analysis. All data has been collected through archival newspaper clippings, broadcast reports, and the theatre's archives. Our goal as undergraduates is to strengthen our understanding of research projects, while learning more about the history of the county we study in. The research provides us with new context over the censorship of art and will allow us to better combat this suppression of artistic freedoms.

World Languages and Cultures

The Role of Neapolitan Women in the Italian WWII Resistance
Poster #4 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Livia Funkhouser
Research Mentor(s): Federica Santini

This research focuses on the role of Neapolitan women in the Resistance, highlighting their participation in armed conflict, intelligence operations, and acts of civil defiance. The

contributions of women to the Italian Resistance during World War II have often been overshadowed by the dominant narratives centered on male partisans. Using a qualitative approach that combines historical analysis, archival research, and testimonials (including letters from former partisans) this study aims to provide a more comprehensive understanding of their impact. My panel presentation will focus primarily on the Quattro Giornate di Napoli (Four Days of Naples), a pivotal event in 1943 where civilians, including women, successfully expelled German forces before Allied troops arrived. Women played essential roles as couriers, strategists, and caregivers, often defying societal norms and risking their lives. Through my collaboration with Italian organizations and institutions, this study seeks to recover and analyze overlooked narratives that highlight their resilience and sacrifice. This research contributes to a broader understanding of gender and resistance movements by addressing historical omissions and reassessing the role of women in Italy's fight against fascism. Findings will be used to promote a more inclusive historical record and inform discussions on the legacy of women's resistance in contemporary social and political contexts. Through archival discoveries and historical reevaluations, this study underscores the necessity of acknowledging women's action in shaping Italy's path to liberation.

Weaponizing Motherhood to Further Fascism: The Nazi Party and the AfD in Germany
Oral Presentation (Microsoft Teams)
Friday, April 18, 3:00pm – 3:15pm
Undergraduate Student(s): Elizabeth Tillman
Research Mentor(s): Sabine Smith

This essay and presentation will analyze visual propaganda from the National Socialist German Workers party (NSDAP or Nazi party) and the modern far-right Alternative für Deutschland (AfD). Thirty sources including articles and propaganda were studied. Propaganda published by the Nazi party was taken by magazine illustrations. Propaganda published by the AfD was taken from national campaign posters. The goal of this research is to compare how the propaganda from both parties depict motherhood. To do these three sets of propaganda will be compared. The first set shows how both parties use a white mothers' body in their propaganda. The second set shows how both parties believe that mothers should use their children as a reason to fight for Germany. The third set shows how both parties use the idea of protecting children to further fascist beliefs. To demonstrate that the propaganda is not that far from the United States, the American company Harris Media creating propaganda for the AfD will also be examined. The definition of fascism will also be brought up to show how the word is being used in this research. The reason of this research is to show how these depictions harm women and are antifeminist. The women who believe in this propaganda further the white supremist fascism of these parties. The women most harmed are women of color who are not in high numbers in these parties because of the white supremist beliefs and anti-immigrant beliefs of the parties.

Geography and Anthropology

3D Printing Waterproof Geocache Containers
Poster #24 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Zoe Gleason & Jonas Freck
Research Mentor(s): Uli Ingram

Since the Covid-19 pandemic, universities have struggled with achieving strong student engagement; this has had a number of detrimental effects on the students. One solution which has shown strong results in helping increase student engagement, as well as a wide range of other benefits, is geocaching. In practice, it would work as a system of scavenger hunts around campus. A limiting factor to the number of campuses that can adopt this technology is longevity of the containers designed to be found in the scavenger hunts. Often, they are flooded due to poor waterproofing and their contents ruined, leading many to abandon trying to use them entirely. Our research question focuses on determining how we can design waterproof 3D-printed containers and determining which qualities, such as print settings, shape, and material contribute most to waterproofness. One method used to test waterproofness was found by weighing the containers before and after being submerged in water for a week. The containers were submerged in a bucket and rocks were put in the containers to keep them under water. Another method used was filling the containers with dyed water to see where the water was leaking out. Our results indicate that there are methods we can follow to make PLA printed containers waterproof or at least water-resistant, so that these containers can be used for geocaching purposes. These results are based on different materials, models, settings, and slicing parameters.

Airtable's Usefulness for Osteological Work
Poster #20 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Kyle Costello
Research Mentor(s): Susan Smith

Airtable is an application that is used for individual or collaborative data entry. It allows you to easily name and add categories that you can use to sort data. The tag feature gives you the ability to have more specified data points, in which you can assign to the data being entered. Through Airtable, a resource called STARC OSTEOARCH was created for researchers to share data on archaeological human skeletal remains. I will answer the question of whether STARC OSTEOARCH through Airtable is a useful data entry application for Osteological research. I categorized data of individuals from three different archeological sites in Irapetra on the

southeast coast of Crete, Greece. This data was categorized by demographics, presence of pathologies, and dentition analyses from each site. Using the filtering features of Airtable, I was able to determine how easy or difficult it was to parse out this data based on additional parameters. Airtable offers a free version as well as a paid version. The version that I used for this study was the free version. I hypothesized that Airtable would be a good application for scientific data entry, and that STARC OSTEOARCH would be a sufficient application for Osteological research. I found that Airtable is largely a good application with easy-to-use features such as the filter and tag systems. A minor issue I found is that only the original commenter can delete a comment on a data entry. I also found that the major difference between the free and paid version is that the free version limits the number of collaborators you can have on one database, and the paid version does not. From this, I found that Airtable is a good application for scientific data entry, and that STARC OSTEOARCH is a useful tool for Osteological research.

Assessing Student Engagement through 3D Printed Geocache Containers and Geocaching Events
Poster #32 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): David Kirkley & Christian Sousa
Research Mentor(s): Uli Ingram & Jason Rhodes

Geocaching is a recreational activity that combines technology with exploration and outdoor adventure. This research project will assess whether geocaching is a valuable and effective tool for increasing student engagement on university campuses. In addition, we will test whether custom 3D printed geocache containers that reflect the local environment are more appealing to the geocaching community than storebought containers. The theoretical framework of this project is grounded in experiential learning theory which posits that students learn best through active participation and hands-on experiences. Previous research has shown that integrating GPS and geocaching activities can significantly improve student engagement and critical thinking skills. We anticipate an increase in student engagement through higher participation numbers in the Geography Club meetings and positive feedback from the surveys. In addition, we anticipate that the custom geocache containers will be more appealing than generic, storebought containers.

Beyond Copper: Ceramic Earspools and Cultural Markers at the Cummings Site
Poster #28 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Natalie Mason, Sam Kemp, & Dani Hopkins
Research Mentor(s): Terry Powis

This study examines ceramic pulley-style ear spool fragments recovered at the Cummings site located in Cartersville, Georgia. This archaeological site is situated near the Etowah Mounds and the Leake site. Occupied during the Middle Woodland (300 BC-AD 600) and Middle Mississippian (1260-1300 CE) periods, the site presents an unusual context for ear spool deposition. This particular set of ear spools is interesting due to their material composition, the archaeological context in which they were found, their size, and their geographic location. In contrast to the more prevalent copper ear spools of the Hopewellian tradition of the Middle Woodland, the Cummings Site ear spools are crafted meticulously from clay. This material choice is rarely documented in the region. Furthermore, unlike typical mortuary contexts in which ear spools are often recovered, these fragments were discarded in a refuse pit, with no associated human remains. This study situates the Cummings Site ear spools within a broader archaeological and stylistic framework by comparing them to similar artifacts from other sites and contemporary examples. Through an analysis of form, material composition, and depositional context, this study explores their cultural significance, contributing to a deeper understanding of artifact distribution, craftspersonship, and social practices in the region.

Ecology in Art: A Photographic Analysis of the North, West, and Lower Eastside Atlanta Beltline Trails and Other Related Projects
Poster #17 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Sophia Donovan
Research Mentor(s): Ranbir Kang

The Atlanta Beltline is a 22-mile-long system of trails and green space that stretches across Atlanta, Georgia, and provides a slice of the outdoors in an actively urbanizing city. This project compared a portion of the Atlanta Beltline to various other case studies both nationally and internationally, these being HafenCity in Hamberg, Germany, the Bayou Greenways in Houston, Texas, and the Railway in Philadelphia, Pennsylvania. Similarities were found in relation to the effects on gentrification, mental and physical well-being, implementation of greenspace, and the environment despite being different projects in terms of size, developmental progress, and location. What makes the Atlanta Beltline distinctive, however, is the artwork across the trails. In this research project, I analyzed the artwork according to a variety of different categories and subcategories and studied what this information could suggest. My focus was on the North, lower Eastside, West, and Westside Connector trails. In terms of data, my primary interest was artwork that possessed organic elements. I hypothesized that, since the Atlanta Beltline was a project designed to incorporate nature in a big city, the artwork would reflect this idea, and close to half of the artwork would include natural elements. I walked along

my chosen segments of the Beltline clockwise and collected and analyzed data using Microsoft Excel. In terms of the North, Northwest, and Northeast Beltline trails, 60% of the collected data possessed organic traits, defined as natural and/or living elements. 59% of artwork in the West and West Connector trails were organic. However, in my assigned sector of the lower Eastside trail, approximately 13% of the artwork was organic. This suggested that the environmental focus of artwork varied by location. It is also worth noting that the data sample from the North Beltline was significantly smaller than the data sample from the lower Eastside, Westside, and West Connector trails, which could explain the difference in data. For more cohesive and accurate results, I calculated the percentage of organic depictions in artwork across all my studied segments, which was 26%. This research project breaks down the artwork beyond just organic versus inorganic, as well, and dives deeply into the subtle details of each piece. Analyzing the artwork along the Beltline can tell us a lot about the primary focus and interests of the residents of Atlanta, and about the community surrounding the Beltline trails.

Mapping Homes of Georgia's Governors and Their Westward Shift (1776–2024)
Poster #19 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Andrew J. Bramlett
Research Mentor(s): Qihang Qiu

Since the start of the American Revolution, seventy-seven men have served as Governor of Georgia. Over time, the state expanded westward from the coast to become the largest state east of the Mississippi River. Although individual governors have been studied extensively (particularly in James F. Cook's The Governors of Georgia*), their residences remain underexplored as indicators of electoral power shifts. Based on the information of seventy-seven governors collected from Cook, the* New Georgia Encyclopedia*, and* Georgia Historical Quarterly*, this research visualizes the residences of governors at the time of their election by using ArcGIS and reveals the state's electoral power over almost 250 years of Georgia's history. They are divided into five distinct periods using key dates in the state's political history: 1776, the start of the American Revolution; 1825, the first gubernatorial election held by popular vote; 1865, the end of the Civil War; 1917, the start of Georgia's county unit system; and 1962, the last election held under the county unit system. While early governors primarily resided along the coast, those elected after 1962 predominantly hail from North Georgia. The county unit system, active from 1917 to 1962, visibly shaped electoral outcomes, heavily favoring rural counties. Notably, no governor from an urban county was elected under the county unit system. Mapping Georgia's governors illustrates the state's westward growth and the shift in its electoral base from the coast to Middle and North Georgia, along with the important effects of the county unit system.*

Shell Bead Production and the Middle Preclassic Maya
Poster #29 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Jenna Barnes
Research Mentor(s): Terry Powis

The ancient Maya are well known as one of the major complex societies in the New World. Within their society, they were known for making many different artisan goods, one of which was the shell bead. It is hypothesized that these beads were not only used for jewelry and personal adornment but also as a form of early currency. The first examples of early shell bead production are found during the Middle Preclassic period (1000-300 BC), these beads are more rudimentary, they lack much sanding, and have rough shapes. As time progressed, they started making these beads all the same size and shape which likely means they had some way to grind all of the shells at the same time to keep them uniform. My research focuses on the shell beads found at Pacbitun, located in west central Belize, where 5,670 beads, 516 chert drills, and large amounts of detritus have been found, indicating that this site likely specialized in creating shell beads. This project uses experimental archaeology to identify the tools and techniques used to create these large quantities of shell beads.

An Urban Ecological Analysis of the Eastside Beltline Trail in Comparison to Similar Projects
Poster #14 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Finn Daniel
Research Mentor(s): Ranbir Kang

In this project, I analyzed environmental artwork on the Eastside Atlanta Beltline, a walking trail, and compared the Beltline as a whole to similar "Rail Trail" projects. These existing projects included the Cheongyecheon in Seoul, South Korea, the Charlotte Rail Trail in Charlotte, North Carolina, and the Northside Line in Poughkeepsie, New York. I researched the costs, impacts, and methods of these projects and compared them to the Eastside Atlanta Beltline. From there, I organized an existing database of over 800 artwork images, using a common methodology to organize these works on a variety of factors. I then visually analyzed the artwork, recording details such as environmental elements and the demographics of the humans depicted. I then used the results I had produced to create several figures and charts. From there, I reached several conclusions based on the data I collected. Similar projects were undertaken by others working for my Primary Investigator, which used other sections of the Beltline and different case studies. Yet, we used a common dataset and collaborated on a common research paper.

Government & International Affairs

How Does One's Party Identification Affect One's Views on the Legalization of Marijuana?
Oral Presentation (Microsoft Teams)
Friday, April 18, 12:15pm – 12:30pm
Undergraduate Student(s): Addison Stephens
Research Mentor(s): Ben Taylor

How does one's party identification affect their views on marijuana legalization? This topic deserves further research because there has been a significant shift in attitudes toward the legalization of marijuana over the last decade. Opinions on marijuana have become less polarized, and more Republicans are beginning to show support for its legalization (Felson, Adamczyk, & Thomas, 2019). Understanding how one's party identification influences attitudes on marijuana legalization can provide broader insights into political polarization in our country and our citizens' perspectives on drug policy. I use the General Social Survey Cumulative Datafile dataset, focusing specifically on 2018 and 2022 for my research. My theory is that respondents who identify as Democrats are more likely to support the legalization of marijuana because the Democratic Party often advocates for drug law reform and highlights the economic benefits of legalization. Conversely, the Republican Party is more conservative and tends to promote stricter drug laws, so respondents who identify as Republicans are less likely to support the legalization of marijuana. Thus, I hypothesize that party identification will be strongly associated with views on marijuana legalization. However, as the debate around marijuana has become less divisive and Republicans have grown more open to legalization, I anticipate that this relationship will weaken between 2018 and 2022, so I compare the relationship between party identification and marijuana attitudes in these survey years. Using a Chi-square test, I find that marijuana attitudes are significantly related to partisan identification, but the relationship has weakened over time, specifically from 2018 to 2022. I conclude my project with directions for future research.

How Does Partisanship Influence Attitudes on Improving the Environment and Environmental Protection?
Oral Presentation (Microsoft Teams)
Friday, April 18, 1:00pm – 1:15pm
Undergraduate Student(s): Isabella Ramirez
Research Mentor(s): Benjamin Taylor

How does partisanship influence attitudes on improving the environment and environmental protection? Although partisanship is not the only defining factor that shapes environmental sentiments, it has become a significant indicator as rising temperatures and frequent climate disasters increasingly impact the United States. I theorized that liberals tend to prioritize environmentalism, whereas conservatives exhibit less concern for the environment. Based on these considerations, I formulated two hypotheses. In my first analysis, I hypothesized (H1) that conservatives believe we spend too much on environmental protection, while liberals believe we do not spend enough. Additionally, age serves as an important variable, as generational effects may influence the relationship between partisanship and attitudes toward environmental protection; therefore, I controlled for this factor. I used the GSS Cumulative Datafile dataset from the years 1972 to 2022 while filtering for the years 2006 and 2016. These years represent pivotal moments in the rhetoric surrounding climate action, which may further influence the relationship between these variables. In my second analysis, I hypothesized (H2) that in 2016, liberals and conservatives, controlling for age, are less likely to support government funding for environmental protection compared to 2006. The results for H1 suggested that the relationship is less meaningful with a Gamma coefficient of 0.26, but it is statistically significant with a P-value of 0. The findings for H2 were particularly interesting. In 2006, the relationship is meaningful with a Gamma coefficient of 0.31, and it is statistically significant with a P-value of 0. While looking at 2016, the relationship was meaningful with a Gamma coefficient of 0.47 and a P-value of 0, demonstrating that this is a strong, statistically significant relationship. Overall, this research deepens our understanding of how partisanship shapes American attitudes toward environmental improvement and protection and the role of age and year in mediating these relationships.

History & Philosophy

Abolition of British Slavery: A Comprehensive Look into the Clarkson-Ramsay Philosophy

Oral Presentation (Microsoft Teams)
Friday, April 18, 12:45pm – 1:00pm
Undergraduate Student(s): Thais Russo Goncalves
Research Mentor(s): Amy Dunagin

This paper explores the effectiveness of the Clarkson-Ramsay economic philosophy regarding antislavery sentiment among the British Public. The paper examines the factors that led to the Clarkson-Ramsay philosophy and how did their narrative influence the public and contributed to the abolitionist movement in eighteenth-century Britain. The paper acknowledges four schools of thought: moral, enlightenment, mercantile, and labor, to analyze the arguments made by the

Clarkson-Ramsay philosophy and its effectiveness if moving the public towards antislavery sentiment. The moral school of thought highlights the main argument of abolitionists which revolved around the morality of the institution of slavery, while the enlightenment school reflects on the effects of the enlightenment era on the spread of the abolitionist movement to the middle-class and the public in general. The mercantile school emphasizes the discussion around the profitability of the slave trade, and the labor school argues about the discussion surrounding industrialization and the switch from enslaved labor to free labor used in the abolitionism argument. Key arguments show the mix of both moral and mercantile arguments in order to push the free labor argument as a better alternative to enslaved labor. This paper concludes that the Clarkson-Ramsay economic philosophy was effective in recruiting the public to the abolitionist movement because of multiple factors relating to the rise in literary knowledge because of enlightenment, as well as mercantile ambitions and the power free labor would bring to the masses.

The Boundless Lives of Black Britons: An Examination of Eighteenth Century Black British Citizens
Oral Presentation (Microsoft Teams)
Friday, April 18, 12:15pm – 12:30pm
Undergraduate Student(s): Jaelynn Bural
Research Mentor(s): Amy Dunagin

Why were African and British African citizens living in England able to be free during a time of heightened slavery throughout the rest of the world, i.e., the colonies, the Caribbean, etc? How does their relationship with England and freedom compare to those living elsewhere? What can we learn about the status of Black people through media such as books and paintings during the eighteenth century? My topic discusses the free African/Black people who lived in England during the eighteenth century. The eighteenth and nineteenth centuries are arguably the height of slavery worldwide, but free people did exist and lived during this period. England specifically had more of a progressive view of race in the eighteenth century and therefore did not support slavery within its country. I want to learn about the status of Black people in England, how they lived, and what their views and thoughts were. By learning about their status I can examine their multi-faceted relationship with England, considering race, racism, class, and gender. We already have a few examples from during this time, such as Dido Elizabeth Belle and Ignatius Sancho; we even see the base of this idea during the Tudor period in the 16th century. I will use these examples to answer my questions above by using their experiences to gain insight.

Cataclysm within the Court: The Bosnian Genocide Case and its Implications on Historical Understanding of Calamity
Poster #28 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am

Undergraduate Student(s): Alexandria Currier
Research Mentor(s): Ryan Ronnenberg

The Bosnian Genocide remains one of the most challenging cases within the comprehension of modern conflict and calamity. As the first occurrence in which the International Court of Justice applied the Convention on the Prevention and Punishment of the Crime of Genocide to a state, the International Court of Justice's legal proceedings on the Bosnian Genocide set a new standard for the obligations of the international community to act in the occurrence of genocide. This research aims to clarify the nature of the 1992-1995 conflict between the nations of Serbia-Montenegro and Bosnia-Herzegovina using primary source documentation, modern commentary, and the codification of genocide prevention under the United Nations arbitration between Bosnia and Serbia. It also serves to identify how the understanding of the Bosnian Genocide has changed over time within both the legal discipline and the historicization of violence as a whole.

Changing Attitudes Toward Infanticide in 18th Century London
Oral Presentation (Microsoft Teams)
Friday, April 18, 1:15pm – 1:30pm
Undergraduate Student(s): Sydney Sims
Research Mentor(s): Amy Dunagin

In 1623, the statute to "prevent the destroying and murthering of bastard children" was passed in England under James I. This act called for the death penalty on any woman tried and found guilty of infanticide of a child born out of wedlock. Through the study of infanticide cases in the Old Bailey Proceedings, it appears that magistrates and the court system typically abided to the guidelines set forth by this act throughout the seventeenth century. However, by the early to mid-eighteenth century and onward, increasingly more women were being acquitted for this crime rather than being condemned to death, despite presenting similar evidence to that of the women executed in the past. This research essay seeks to answer why those involved in the justice system during this time period became increasingly lenient to mothers accused of this crime, regardless of the aforementioned statute still being in place. Additionally, the research will attempt to answer whether this change was initiated due to general societal and cultural attitudes or from an authoritative influence. One argument that suggests a legal influence is the introduction of the 1733 Bastardy Act enacted under George II. This statute placed responsibility on the fathers of bastard children to provide financial support or repay the parish that had been supporting the child and mother. This law lifted some burden off of the mothers, but it lifted even more burden off of the parishes whose responsibility was to provide for the sick and poor. While this act was put in place around the time attitudes toward these women changed, it still does not fully explain the cause behind the change but rather may be a reaction

to it. This research will consist of those statutes, the Old Bailey Court Proceedings, parliamentary debates, and newspapers in order to answer this question.

Clandestine Marriage in Eighteenth-Century England
Oral Presentation (Microsoft Teams)
Friday, April 18, 12:00pm – 12:15pm
Undergraduate Student(s): Ingrid Baker
Research Mentor(s): Amy Dunagin

In this paper I will investigate the link between the concerns of the elite over the preservation of their material and political capital as it relates to the institution of marriage in eighteenth-century England. My initial research has yielded the term "clandestine" in reference to marriages performed outside the bounds of the Church of England. The Clandestine Marriage Act of 1753 will be the legislative grounding for my central question. Henry Gally, a priest in the Anglican tradition, intones the position of the Church in his 1750 publication titled: Some Considerations upon Clandestine Marriages. Gally favors a law that would suppress such marriages. The "Clandestine Marriages Act of 1753" followed shortly after Gally's publication. This Act has formed the basis for historiography which both emphasizes and deemphasizes the impact of this legal intervention on the relationship between spouses (and between spouses of different socioeconomic backgrounds). Furthermore, I would like to explore how this subject played out in popular discourse. The London Magazine: Or, Gentleman's Monthly Intelligencer touches on the subject of clandestine marriage and the means by which it ought to be suppressed. The magazine describes clandestine marriages in no uncertain terms: it was, in the eyes of the author, an evil worthy of legislative attention. Clandestine marriage also appears in popular fiction media. The ways in which plays and books make use of the concept may provide further insight into how the average citizen viewed relationships and marriage. Ultimately, this research question is important for what it may reveal about the relationship between classes, and between the public and the state.

'Diabolical Lies' and 'Pervasiveness of Disorder:' Women's Education and Protofeminist Literature in Late Seventeenth- and Early Eighteenth-Century England
Oral Presentation (Microsoft Teams)
Friday, April 18, 1:30pm – 1:45pm
Undergraduate Student(s): Alyssa Finch
Research Mentor(s): Amy Dunagin

England in the Early Modern period produced a surge of protofeminist literature in amounts never seen before in the country's history. Protofeminist authors adamantly argued that access to

pursue education would improve the lives of women and those around them, but their motivations for this argument remains largely unexplored. Current historiography has focused on broader themes of expanded literacy and education in England during this period but falls short in exploring the connection between arguments for female education and the slow evolution of female agency. This project will attempt to fill that historiographical gap by examining the works of late seventeenth- and early eighteenth-century English protofeminist authors, such as Mary Astell, Judith Drake, Lady Mary Chudleigh, and Bathsua Makin, as well as contemporary Lockean philosophy on education, to better understand the motivations behind their arguments and to determine the desired effect of these publications.

Division in Resistance: Georgia and Massachusetts After the Intolerable Acts
Oral Presentation (Microsoft Teams)
Friday, April 18, 2:15pm – 2:30pm
Undergraduate Student(s): Molly Weaver
Research Mentor(s): Amy Dunagin

This project discusses the colonists' reaction to the Intolerable Acts and how the differences across New England and Southern colonies reflect their colonial identity. Previous scholarship discusses the resistance to the Intolerable Acts through perspective focused on economics, grassroots, or ideological discourse. I plan to break away from this by focusing solely on how colonial identity shaped their resistance strategies. Throughout New England, there was a long history of political activism, so they were quick to respond and organize resistance movements. In the Southern colonies however, there was a reliance on Britain within their economy, so they were much more hesitant to organize resistance movements. By analyzing arguments from authors such as Bernard Bailyn, T.H. Breen, Pauline Maier, and others, this project places the records of the colonial reactions to the Intolerable Acts in a broader perspective of what we can tell about the regional political differences. This project also contributes to the debate on how popular the resistance movements were, as though the resistance movements were widespread throughout the colonies, they were not a cohesive unit. These regional differences would come to play a significant role in the development of the Republic in the early years as well, and are also reflected in modern politics. By using primary sources, such as colonial newspapers, town meeting records, and petitions, this paper breaks down the regional differences between New England and the South during the late 18th century.

Does Political Affiliation Have Effect on Confidence in Educational Institutions?
Poster #5 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Joana Pruitt

Research Mentor(s): Benjamin Taylor

How does political party affiliation impact trust in education institutions? It is unclear which political party has issue ownership over educational institutions, as both parties have put forth their own visions for the future of education policy. As both liberal and conservative politicians stake their claim on education policy it is worth studying how trust in educational institutions has changed over time according to one's party affiliation. I hypothesize that when the affiliated party is out of power then those who affiliate with said "out" party will have less trust in educational institutions. I will use the General Social Survey (GSS) Cumulative Datafile 1972-2022 to test my hypothesis. Overall, the findings of my research aim to enhance the understanding American trust in education institution and if party affiliation is responsible for fluctuating trust in education institutions.

Empire and Charity: Ideological Foundations of the London Foundling Hospital
Oral Presentation (Microsoft Teams)
Friday, April 18, 12:00pm – 12:15pm
Undergraduate Student(s): Mary Dorsey Hill Piper
Research Mentor(s): Amy Dunagin

The London Foundling Hospital received its charter in 1739 after seventeen years of diligent work on the part of its founder, Thomas Coram. Why did Thomas Coram find success in this unprecedented endeavor? Itself a home for children of impoverished women, the hospital was meant as an ameliorative measure to address the increasingly visible poverty in the heart of Britain's Empire. The outpouring of humanitarian spirit that occurred during the mid to late 18th century has often been linked with the surge in commercialism and developing culture of sentimentality. This paper will argue that the London Foundling Hospital represented an expression of ever-increasing anxieties regarding the unfamiliar pressures of Britain's rapidly expanding Empire. These anxieties were threefold. Socially, the Foundling Hospital addressed the obvious symptoms of growing class divides brought on by commercialism and provided some semblance of progress towards a civil society. Politically, the institution aligned with Patriot subversives' intent on exposing the corruption of the Walpole regime. And culturally, it concretized the plight of the poor who had been thrust into the cultural consciousness by the engravings of William Hogarth. This research examines the London Foundling Hospital archives, a popular satirical publication known as the Foundling Hospital for Wit, and the public response to this new charity to create a narrative explaining why the London Foundling Hospital developed in the context of mid-18th century Great Britain.

The End of Patriot Georgia: How British Parliamentary Politics Led to the Dissolution of the Georgia Trust
Oral Presentation (Microsoft Teams)
Friday, April 18, 1:15pm – 1:30pm
Undergraduate Student(s): Lillie Rolader
Research Mentor(s): Amy Dunagin

In 1732, James Oglethorpe was granted the charter for Georgia, the last of the thirteen original colonies, where he intended to create an idyllic society governed by a board of Trustees. Oglethorpe belonged to a political party known as the Patriot Whigs, who rallied together against Whig Prime Minister Robert Walpole, and the Georgia colony was intended to be the ideal patriot colony. Slavery, hard liquor, and extensive land ownership were all banned, hoping that these strict regulations would encourage the settlers to live virtuous, self-sufficient lives that disavowed commerce and luxury. However, by 1752, after long campaigns by colonial citizens against Trustee governance and lessening interest in the colony's success by the Trustees, the charter was surrendered to Parliament, and Georgia officially became a Royal Colony of Great Britain. The colonists of Georgia had seemingly turned away from Oglethorpe's "virtuous" society and slowly turned into a new-world aristocracy under the plantation elite. Why did this metropole-colony relationship between the Georgia colonists and the Trustees deteriorate during the mid-eighteenth century? Was this relationship inherently unstable or did this relationship worsen due to external forces in Great Britain and America? Most scholarship of colonial Georgia focuses on the changes within the colony politically, economically, and socially. However, this research looks at the papers, pamphlets, and speeches created by the Trustees and the residents of Georgia, analyzing the changes in policy from the British perspective whilst keeping in mind the coinciding changes occurring within Georgia. It argues that the changes in British imperial policy during and after the era of Robert Walpole impacted the eventual end of the Georgia Trust, as after the fall of Walpole, the failing Georgia colony was no longer a priority to prove patriot ideology.

Faith and Rebellion: How Hartford's Clergy Shaped Revolutionary Ideology
Oral Presentation (Microsoft Teams)
Friday, April 18, 2:45pm – 3:00pm
Undergraduate Student(s): Ethan Spagnoli
Research Mentor(s): Amy Dunagin

This research will explore the role of religious rhetoric in how revolutionary thought was formed among British-American colonists, and specifically the influence of clergymen in Hartford, Connecticut. With this, the American Revolution has been based on the concept of freedom, with slogans such as "Give me liberty, or give me death!" reflecting the revolution's ideological core.

This study seeks to examine how the theological interpretations of freedom, as preached by colonial clergymen, contributed to justifying rebellion against British rule. This will be done through the examination of sermons and other documents from Hartford's clergymen. This will highlight the intersection of religion, politics, and resistance in the revolutionary era in the British-American Colonies. This paper and work argues that Hartford's clergymen played a crucial role in shaping colonial resistance through their religious rhetoric. Their sermons framed freedom as a theological principle that justified revolution when threatened. This study will contribute to the broader historiography of the American Revolution by showing how religion was not a background factor but a pivotal aspect to the shape in colonial resistance. This will be done through the examination of Hartford's clergy, and connecting them to the larger ideological motivations for independence in the British-American Colonies.

Lord Chesterfield and the Licensing Act of 1737
Oral Presentation (Microsoft Teams)
Friday, April 18, 1:00pm – 1:15pm
Undergraduate Student(s): Magdaline Marks
Research Mentor(s): Amy Dunagin

The history of theatrical censorship in Britain is extensive and encompasses nearly 400 years of imperial, political, social, and cultural evolution. The shifting attitudes of authority toward artistic expression have shaped the development of theater, and at the center of this scholarship lies Robert Walpole. As Britain's first Prime Minister, Walpole played a pivotal role in institutionalizing theatrical censorship, using his political influence to suppress satirical and oppositional works that directly criticized his government. Using the Licensing Act of 1737 to censor theater and curb the growing influence of political discourse in the theatrical arena, Walpole forced playwrights and theater managers to submit their works for approval before public performance. Philip D. Stanhope, the 4th Earl of Chesterfield, stood against the Act as the sole prominent Parliamentary opponent, denouncing it as a dangerous encroachment on civil liberties. My research explores why Lord Chesterfield (Philip Dormer Stanhope, 4th Earl of Chesterfield) was the only major opponent of the Licensing Act of 1737. Through analysis of primary sources such as pamphlets, newspapers, legislation, Chesterfield's literary works, speeches, and periodical essays from the period, my research seeks to uncover the political, ideological, and personal motivations behind Chesterfield's opposition. Secondary scholarship on the topic will also help bolster my argument, and by examining the works of individuals such as Vincent Liesenfeld, Leonard W. Connolly, P.J. Crean, and Julia Swindells, I aim to contextualize the reasons behind Chesterfield's opposition to the Licensing Act of 1737 within the broader framework of eighteenth-century British politics and society.

Marriage Selection in the 18th Century

Poster (Microsoft Teams)
Friday, April 18, 3:15pm – 3:30pm
Undergraduate Student(s): Bryan Brewer
Research Mentor(s): Amy Dunagin

Historians have long debated over what collective reasons influenced the selection of marriage in the long 18th century. The reasons that motivated individuals consist of affective, economic, political, cultural, and social motivation which varied in specification amongst the elite to middle class. The stumbling block that many historians face is if these reasons remained stagnant in continuity over developed over the duration of the 18th century. Finding legible and credible primary and secondary sources that accurately depict the construct of marriage from multiple angles has been a challenge for historians. In this paper, it will use comparative analysis to assess the continuities and changes of historians and personal accounts of individuals who lived in the 18th century. This paper's use of comparative analysis will include qualitative and quantitative evidence that is found in newspapers and government articles. The quantitative evidence that is gathered consists of 18th century advertisements that market domestic items such as lamp shades to newly married couples seeking to buy homes. Companies aimed to generate wealth by using the construct of marriage as a vehicle to advance their own agendas. This evidence will and to the credibility of the project's thesis pertaining to marriage choice being a primary socioeconomic decision. The cultural and social historical aspects of this paper will be found in diaries and other personal accounts to provide the affective point of view in the selection of marriage. The sources that have been used for this project have been gathered from the Gale database and the JSTOR database. This research project meets the definitive requirements of research by examining primary sources from the 18th century consisting of letters, diaries, and news articles as well as reviewing historiographical scholarly journal articles written about the 18th century.

Oh Destructive Gin! Oh Infatuated Human Kind!: Gin Reformers' Battle for Virtue in 18th Century London
Oral Presentation (Prillaman Hall)
Wednesday, April 16, 11:00am – 11:50am
Undergraduate Student(s): Madison Houser
Research Mentor(s): Amy Dunagin

During the early to mid-eighteenth century in London, the issues of overpopulation and increased consumerism coalesced to form a crisis over alcohol consumption known in today's society as the Gin Craze. Londoners, predominantly those on the lower side of the class system, were confronted with the mass production and promotion of gin, which they met with a resounding acceptance. Soon, gin became the most consumed drink in London. As a result, death and crime rates increased in the city, and a moral panic over liquor consumption arose. Reformers reached out to their fellow citizens via newspaper articles, books, and magazines to

promote a sense of change in society's perception of gin which was commonly ignored. While several legislative movements were put in place to regulate gin's production and distribution, these acts were typically repealed after interest groups, such as distillers, corn producers, and elites, pressured legislators. In this research, I aim to shine a light on those who acknowledged the corruption that gin cast upon society and publicly sought an early end to the craze afflicting London, and to describe the measures of these previously overlooked reformists in their struggle to be heard over the voices of the many. These people held onto their beliefs in virtue as the country around them sunk into disarray and sought out legislators to regulate overconsumption. This research aims to answer why these reformers' concerns were cast aside by both legislators and citizens in London and how this impacted the reform movement as a whole. This research uses analysis of newspapers, books, and images from the period to argue that reformers continued to fight for these regulations because they wished to return London to its previous virtuousness.

Philosophy, Religion, and The Trolley Problem
Poster #11 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Kelsey Morgan
Research Mentor(s): Kenneth White

Theories of ethics bring a sense of comfort and security to their holders due to their universal nature; they are meant to be practiced and applied to ethical scenarios one might encounter, providing a definitive "right answer" to moral questions. A famous ethical scenario, the Trolley Problem, was created as a philosophical test that challenges conventional tenants of morality, i.e., do not commit murder. The Trolley Problem begins by posing a question: What should a person do when presented with a situation where they must choose between doing nothing, resulting in the deaths of five innocent persons, or spare the five murdering one innocent person instead? This question stands to help the problem-solver think through their own personal philosophy of ethics. The beauty of the Trolley Problem lies in its various iterations or circumstances. In this research, I will examine how different theories of ethics and some religions view the Trolley Problem. The goal of this research is to find a moral overlap amongst a handful of prominent philosophies in American culture; the goal is to articulate a view of morality that synthesizes different theories of ethics and religious viewpoints. Relying on utilitarianism, Christianity, Buddhism, and even AI approaches to ethics, this research finds a universal solution to the Trolley Problem that references different theories and approaches to ethics.

Rational Loyalty: Why the American Revolution Became a Civil War
Oral Presentation (Microsoft Teams)
Friday, April 18, 4:45pm – 5:00pm

Undergraduate Student(s): Benjamin Howard
Research Mentor(s): Amy Dunagin

The American Revolution was a rebellion against Britain, but also a civil war amongst the colonists, often pitting colonists against colleagues, neighbors, and family. Though American students learn about the Revolution, emphasis is rarely placed on the motivations, beliefs, and rationale of those that remained loyal to Britain. Thorough analysis of the Loyalists was sparse prior to the 1990s, with most accounts writing the Loyalists off as simple, cowardly, or greedy. In this project I will compile arguments made against the Revolutionary War and how these arguments to the contrary differed from the common arguments in favor of conflict. My early assessment of the secondary sources has yielded a variety of reasons a person may have remained loyal to the British Empire during this time. A commonly held assertion in many works is that many Loyalists agreed with the Patriots in their anger against the lack of representation, and some even agreed that the Colonies should seek independence from British rule. However, these Loyalists believed a war against the British Empire, the most powerful force in the world, was unwinnable and would bring death and retribution in the aftermath. Some Loyalists also held moral objections. A group of Christian clergymen made doctrinal and legalistic arguments against rebellion and many people morally opposed war against those they considered kinsmen. I have located primary sources including correspondence from Reverend Samuel Seabury, available in microform at the Sturgis Library, and "The True Interest of America Impartially Stated" by Charles Inglis, available through GALILEO. In addition, "Letters of Papinian", written under pseudonym by Charles Inglis and "Plain Truth" by Candidus (also Charles Inglis), a pamphlet written in direct response to "Common Sense" by Thomas Paine, and "A friendly Address to All Reasonable Americans" by Thomas Chandler are available on the Internet Archive.

Regional Variations in Colonial Resistance to British Taxation: A Comparative Analysis of New England and Georgia
Oral Presentation (Microsoft Teams)
Friday, April 18, 4:15pm – 4:30pm
Undergraduate Student(s): Reilly Black
Research Mentor(s): Amy Dunagin

The American Revolution was not a singular, unified movement but rather a collection of regional responses to British imperial policies. This research examines why British taxation policies, particularly the Stamp Act (1765) and Townshend Acts (1767), provoked stronger opposition in New England than in Georgia, despite their uniform implementation across the colonies. Through an analysis of historiographical debates, this study integrates three main perspectives: the Economic Determinist School, the Ideological and Constitutional School, and

the Social and Regional School. Economic historians argue that New England's trade-based economy was more directly impacted by British restrictions than Georgia's plantation economy, leading to heightened discontent. Meanwhile, ideological scholars emphasize the influence of Enlightenment ideals and self-governance traditions in shaping resistance, particularly among New England colonists who viewed taxation as a direct violation of their rights. Social historians, on the other hand, highlight class divisions, political structures, and militia preparedness as crucial factors in the differing responses to taxation. This paper argues that while economic hardship contributed to colonial resistance, New England's stronger political traditions, social structures, and ideological foundations made opposition to British taxation more immediate and widespread compared to Georgia. Understanding these regional variations provides insight into the broader complexities of revolutionary sentiment and resistance in colonial America. This research contributes to ongoing discussions in colonial historiography by emphasizing the interplay between economic, ideological, and social factors in shaping revolutionary movements.

Class and "Molly" Culture in Eighteenth-Century London
Oral Presentation (Microsoft Teams)
Friday, April 18, 12:30pm – 12:45pm
Undergraduate Student(s): Lily Mays
Research Mentor(s): Amy Dunagin

This research focuses on the connections between eighteenth century "molly" culture and the burgeoning working class. In the eighteenth century, "molly" houses were a haven for men who would be considered homosexual or queer today. Throughout the many primary sources I found that mention molly houses, I have noted that most if not all the men in these houses were laborers, common people, and small business owners. This is despite men in the upper echelons also seeking homosexual interactions. The research process includes an extensive review of primary sources including trials that are about molly culture. The process also includes a historiography of molly culture and how it connects to the class culture of eighteenth-century London. The expected results are likely to be that their working class "mollies" of London found acceptance of their queer culture in "molly" houses, in contrast to a place where upper class men with the same feelings would attend.

Psychological Science

Adoptonomics
Poster #23 (Siegel Student Recreation and Activities Center)

Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Kayla Felton, Amelia Bennett, Stella Steinman, Nikki Wendt, Courtney Everett & Aubrey Cook
Research Mentor(s): Nicole G. Martin

This research presents an analysis aimed at understanding the financial aspects of the adoption process. Our goal was to investigate how families prepare financially for adoption, focusing on the various financial requirements and contributions across different adoption methods, and to explore the sociocultural connection between adopting individuals' attitudes and preferences towards various adoption funding methods. A sample of 125 U.S. families participated in this investigation. Parental participants averaged 45.94 years (s = 8.651). Most parents identified as female (91.43, Caucasian (88.57%), held a bachelor's or graduate degree (62.85%), and identified either as Christian (28.57%) and agnostic (14.29). Most families spent money on agency fees, home study expenses, and paperwork/dossier expenses. Two types of fundraising were presented to families: 1) receiving money from others in exchange for giving goods in return, and 2) receiving money from others without offering goods in return. Most participants did not fundraise to pay for their adoption. Families who cashed in their 401k felt more comfortable with fundraising, X^2 (6, N = 11) = 15.01, p = 0.02. Those who endorsed fundraising without offering something in exchange were more likely to take and accepted state and federal subsidies to fund their adoption, X^2 (24, N = 35) = 45.87, p = 0.005. People who did not endorse fundraising were more likely to receive subsidies (free money) from outside sources, X^2 (80, N = 31) = 103.70, p = 0.039. The presented data utilized a sociocultural perspective; we investigated which families were more or less likely to utilize various adoption and funding methods and how comfortable they felt with the process, acknowledging that their choices may have been influenced by their motivations or attitudes towards seeking additional assistance (Tybejee, 2003).

Bridging the Gap: Understanding Student and Faculty Perceptions of Course-based Undergraduate Research Experiences (CUREs) at Kennesaw State University
Poster #10 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Kiara O'Neal & Jonathan Velasquez
Recent Graduate(s): Diya Patel
Research Mentor(s): Amy Buddie

Undergraduate research is a crucial component for academic and professional development for students. Research allows students to gain exposure in developing critical thinking, problem-solving skills, and collaboration. Unfortunately, many students, including those from underrepresented backgrounds, face difficulty having access to these opportunities. One factor of this is limited availability of research projects. Course-based Undergraduate Research Experiences (CUREs) however, provide an alternative pathway by combining research into

coursework, allowing students to get that valuable experience while completing required courses. In this study, we examined perceptions of CUREs in STEM fields at Kennesaw State University (KSU). The objective was to analyze the perceptions towards CUREs and team dynamics among faculty and students. A survey was completed by 185 STEM students and 58 STEM faculty. The results showed a disconnect between the faculty and students' perceptions and experiences. Faculty were more familiar with what CUREs are and felt more accountable for student engagement, whereas students found CUREs easier to participate in and felt their team experiences being more diverse. Despite these differences, both groups recognized the benefits of CUREs and expressed strong interest. This research seeks to contribute to existing literature on CUREs and inform future initiatives to enhance undergraduate research experiences at KSU.

Student Success as a Function of Marital and Parental Status
Poster #23 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Daelin Fife, Daniel Cotnoir, & Dorien Lee
Research Mentor(s): Lauren Taglialatela

With over 19 million students enrolled in higher education in the United States and with increasing complexity as to what makes the "typical" student, it is important for colleges to pay close attention to student success rates across characteristic groups to ensure that appropriate resources are being allocated where most needed. Harackiewicz and Priniski (2018) found that targeted academic interventions can be cost-efficient and beneficial for improving student outcomes providing valuable support to at-risk students. For our study we sampled students from a variety of backgrounds at Kennesaw State University with an in-depth survey that will provide various individual characteristics. Marital status and parental status were isolated for further analysis and compared to student success metrics such as grade point average, classes withdrawn from and classes failed. The data analyzed from this study can be used to better student success rates within Kennesaw State University and provide further information about student characteristics.

Comparison of College Staff's Knowledge and Confidence in Supporting Students with Eating Concerns: Analysis and Future Directions
Oral Presentation (Microsoft Teams)
Friday, April 18, 12:45pm – 1:00pm
Undergraduate Student(s): Abigail Dingess
Research Mentor(s): Amy Buddie & Meghan Bankhead

There is a rising need for individuals who are in high contact with college students to be well informed of eating disorder symptoms and risk factors. This study assesses administrative staff and teaching faculty's knowledge of eating disorders and referral procedures on the campus of a large, public university. A database of almost 2,500 faculty meeting research criteria was developed, and an email with recruitment material was distributed. A sample of more than 200 staff completed the subsequent survey. The survey assessed four knowledge areas: signs and symptoms, risk, prevalence, and most at-risk populations. The second half of the survey addressed referrals inside and outside of Kennesaw State University. The final stage examined recognition of eating disorders and intervention in the participant's professional role. It was hypothesized that confidence ratings across knowledge, referrals, and intervention would be low. Intervention scores were expected to be the lowest of the three. Results reflect this, with participants also identifying the largest barriers to intervention being perceived lack of knowledge and need for training. Qualitative analysis reviewed additional barriers and needs reported by participants that did not fit into pre-set categories. Further analysis compared results across positions, but the overall finding is clear- participants convey a need for education and training on internal processes at KSU as well as intervention-specific training. Discussion about the impact of these findings on campus will be held, with discussion on existing resources and potential resources to be sought out. Future research in this area should examine how additional training and resources impact administrative and teaching faculty's confidence in knowledge across the four identified knowledge areas, as well as their understanding and use of referral services on campus.

Do Americans Want Companies to Get Involved in Social Movements?
Poster #38 (Siegel Student Recreation and Activities Center)
Thurs Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Victoria Tirino & Indira Robotham
Research Mentor(s): Danica Kulibert

Social justice movements have occurred in the U.S. as methods for social groups to bring awareness to and address inequities in the country. Psychological research has spent a lot of time understanding how social justice movements impact society and its members. In the US, the Black Lives Matter movement focuses on racial injustice and forces Americans to consider how they view and approach prejudice toward racial minorities. Industrial and Organizational Psychology has also examined how identities outside of a company (e.g., race, gender) impact people's behaviors towards and within a company. Little research has specifically focused on how people respond to companies when they respond to social justice movements or current events. The goal of this research is to assess factors that impact perceptions of diversity statements from companies and how these perceptions may impact people's engagement with the companies and

social movements themselves. We predict that people will view companies differently based on their own opinions and social groups. Specifically, people who are already active in social justice and who have friends and family who engage in social justice will like companies that support social justice more than people who are not active in social justice. The effect will also be present when participants are asked how comfortable they are with interacting with said company. Overall, the current research will help researchers understand the role companies have in social justice movements.

Does the Association between Young Adults' Neighborhood Place Attachment and Parental Relationship Satisfaction Differ by Gender?
Poster #2 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Natilee Talvan & Alanna James
Research Mentor(s): Chanler Hilley

Although previous research has investigated adolescents' perceptions of neighborhood boundaries, defining neighborhoods as an ecological idea and not a geographical location, research is limited on how young adults conceptualize their neighborhoods. Adolescents with low place attachment report more negative views of their neighborhoods (Colbourn et al., 2019). Among college students, negative family environments are linked to lower place attachment (Chevrier et al., 2022). Supportive family networks, in contrast, increase the likelihood of staying in one's neighborhood, highlighting the role of parental relationships (Clark et al., 2015). There has also been limited research on the role of gender in this relationship. This study investigates whether the association between young adults' neighborhood place attachment and parental relationship satisfaction differed between men and women. Participants (n = 1,303) were recruited through survey panels, a university participant pool, and extra credit opportunities and completed an online survey. The overall correlation between place attachment and parental satisfaction was moderate, r = .25, with similar results for men (r = .27) and women (r = .23). This study suggests no differences in the correlation between parental relationship quality and place attachment. This differs from prior research that found gender differences primarily in neighborhood violence/safety and parental harshness (Leventhal & Brooks-Gunn, 2002).

Evaluating Dual Identities and Somatic Stress During Veteran Reintegration
Poster #33 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Tola Adeboye & Birdie Berie
Research Mentor(s): Tyler Collette & Thomas Hodges

Veterans who have previously deployed while serving often must navigate a complex relationship between psychological and physical challenges. This bidirectional relationship often manifests as an iterative process where psychological symptoms exacerbate physical symptoms and vice versa. One of the most prominent challenges being moral injury, which is emotional distress that comes from actions or inactions perceived as morally wrong. Moral injury is characterized by feelings of guilt, shame, and betrayal and can significantly affect a veteran's mental health and well-being. As veterans try to adjust to civilian life and start their recovery, the role of stress becomes increasingly apparent, influencing not only their psychological state but also their somatic experiences. Research has shown that stress can trigger a range of somatic and psychological symptoms, such as regular feelings of pain, fatigue, and other physical conditions. For veterans struggling with moral injury, these somatic experiences may heighten feelings of despair, creating a vicious cycle that could halt recovery and impact healthy transitioning. This investigation examines the relationship between somatic stress manifestations and transition outcomes moderated by military and civilian identity constructs. Using a cross-sectional design, data were collected from 200 veterans recruited through Prolific ($7 compensation) who completed standardized military and civilian identity measures, cognitive health indicators, self-concept clarity, social support resources, somatic stress manifestations, and cultural orientation factors. Multiple linear regression analyses evaluate how identity variables moderate the impact of physiological stress responses on psychological adjustment metrics during the military-to-civilian transition process. We anticipate somatic stress levels will negatively predict transition outcomes, with this relationship moderated by military-civilian identity integration. Veterans maintaining strong military identity without civilian identity development will show stronger somatic-psychological distress associations, while those with balanced dual identities may experience buffering effects. These findings would support identity-focused clinical interventions that simultaneously address somatic symptoms and identity integration.

Evaluating Left Vs. Right Turning Decisions of Drivers in Simulated T-Intersection Crash Scenarios

Oral Presentation (Microsoft Teams)
Friday, April 18, 4:00pm – 4:15pm
Undergraduate Student(s): Gloria Di Girolamo, Bridget Murphy, Salman Adesegun Adeboye, Jacob Andrew Izzo, Matthew Apac, & Rongie Gordon
Research Mentor(s): Kyung Hun Jung

This study investigates the influence of handedness and the side of the road on which individuals drive on their turning decisions during a simulated silent takeover scenario. We hypothesized that both factors would significantly shape maneuvering strategies to avoid potential collisions. Specifically, we predicted that participants would preferentially turn in the direction

corresponding to the side of the road they were accustomed to driving on; for example, drivers accustomed to the right side of the road would be more inclined to turn right at a T-intersection. To test this hypothesis, participants engaged in a driving simulation where they were required to execute crash-avoidance maneuvers using only their left hand positioned at 12 o'clock on the steering wheel. We are currently collecting the data.

Evaluation of Compassion Fatigue and Perceived Organizational Support in Georgia Animal Rescues
Poster #1 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Elisabeth Moreau
Research Mentor(s): Allison Martin

Animal rescue volunteers often face emotionally demanding situations, making them vulnerable to compassion fatigue. Compassion fatigue (CF) combines elements of burnout with secondary traumatic stress and can impact an individual's physical and mental health. We examined the relationship between animal rescue volunteers' levels of CF and the degree to which they felt valued and supported by the organizations for which they volunteered (Perceived Organizational Support (POS)). We distributed surveys to 104 animal rescue organizations in Georgia, yielding 259 valid responses. Our sample was majority female (88.4%) and White (91.5%), primarily volunteering with dogs (65.3%) and cats (34.0%). The survey combined a Professional Quality of Life Scale (assessing compassion fatigue through subscales of compassion satisfaction, burnout, and secondary traumatic stress) and a shortened and modified POS scale. Our data violated normality assumptions, so we used Kendall's tau correlation coefficient to analyze the data. Preliminary analysis revealed that POS was partially related to CF, correlating negatively with burnout ($\tau b = -.230$, $p < .001$) and positively with compassion satisfaction ($\tau b = .323$, $p < .001$). However, the analysis also found that POS did not correlate significantly with secondary traumatic stress, ($\tau b = -.041$, $p = .353$). This study is the first to compare levels of CF and POS in animal rescue volunteers. Organizations can use this information to better support their volunteers, leading to increased volunteer retention over time.

Evasive Steering: Left vs. Right Directional Preference in Automated Vehicles
Oral Presentation (Microsoft Teams)
Friday, April 18, 3:45pm – 4:00pm
Undergraduate Student(s): Madison Danielle Foley, Trinity Vuu, Amari Santiago, Janiya Reed & Summer Galloway
Research Mentor(s): Kyung Hun Jung

Since its first debut in the 20th century, self-driving technology has seen an increase in demand. Accessibility to control has proven to be a principal influence on driver's comfortability in self-driving vehicles. In response to this need for control, our study focused on the steering direction exhibited by drivers during takeover for self-driving vehicles approaching a potential risk of crashing. More specifically, we investigated which direction—left or right—people are greater likely to steer when they do not have their hands on the wheel prior to taking control. We expected that more people will steer the vehicle right than left when approaching an obstacle, due to driving rules and regulations in the United States, such as right–side driving of the road and the stability of the right–hand turn. To test this hypothesis, participants watched a series of prerecorded driving simulation videos that portrayed various instances in which the driver would need to take over control to avoid a collision. We are currently collecting the data.

Examining The Relationship Between C-Reactive Proteins, Executive Function, and Self Reported Mood Disturbances

Poster #27 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Laura Wilkinson
Research Mentor(s): Sharon Pearcey, Cody Mashburn, & Erica Holiday

Over 20 million individuals in America have had at least one major depressive episode and 18.6% are young adults (SAMHSA, 2023). Depression is just one of the mental health disorders that is leading to the estimated 5 trillion USD associated with the global mental health burden (Arias et al., 2022). C-reactive protein (CRP), a measure of systemic and neuroinflammation, is an emerging biomarker for mood disorders. Higher CRP levels have been associated with bipolar disorder (Chang et al., 2017), manic symptoms in individuals who have major depressive disorder (Becking et al., 2013), and may predict stress disorders like PTSD (Friend et al., 2022). Along with mood disorders, CRP is also a potential predictor for diminished executive functions like burnout (Toker et al., 2005) and impaired memory (Noble et al., 2010). This study investigates the relationship among CRP levels, executive functioning, and self-reported mood disturbances (i.e., depression and stress). Participants completed a series of questionnaires including demographics, the adverse childhood events checklist (ACES), the alcohol use disorders identification test (AUDIT), and the Depression, Anxiety, and Stress Scale (DASS). Saliva samples were collected and will be measured to quantify CRP using enzyme-linked immunosorbent assays (ELISAs; Salimetrics, State College, PA). Participants also completed a series of computerized tasks, including a number-letter switching task (NLT), to measure cognitive flexibility (millisecond.com). We anticipate that neural inflammation, as indicated by CRP levels, will moderate the effects of adverse childhood experiences and substance use on cognitive flexibility. Our hope is that integrating self-report, cognitive, and biological perspectives will yield insights into the psychological basis of various mental health

disturbances. If so, CRP may offer a useful biomarker for monitoring and evaluating treatment progress in mood disorders by helping to link inflammation with symptom changes.

Exploring College Students' Death Anxiety, Knowledge and Behavioral Intention Toward Advance Care Planning
Poster #12 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Hannah Hadley & Quinn Agans
Research Mentor(s): Anisah Bagasra

Death anxiety and end-of-life planning are important yet often overlooked topics among college students. Previous research has found 40% of college students have experienced the death of a loved one (Tan, 2021) and that death education plays a significant role in shaping and preparing students' understanding and emotional response to death (Wallace, Cohen, and Jenkins, 2019). This study explores the relationship between death anxiety, knowledge of end-of-life planning and the behavioral intentions towards advanced care planning among undergraduate students enrolled in a Death & Dying class at Kennesaw State University. A survey consisting of demographic questions, Templer's death anxiety scale (DAS) and two sets of questions on knowledge and behavioral intention related to end of life (questions about knowledge of wills and advance care planning and 2) behavioral intention toward advance care planning and death communication) were distributed. Forty-six students completed an online anonymous survey on Qualtrics that was embedded in D2L who were enrolled in the Fall 2023 or Fall 2024 Death & Dying course. Findings suggest students have limited knowledge of end-of-life planning and low behavioral intention to engage in end-of-life planning conversations or complete an advance directive. Death Anxiety levels are moderate in this sample (M=7.8, SD 3.1), but higher than mean death anxiety scale scores for hospice workers (M=7.08, SD=2.2) and funeral home workers (M=7.45, SD =3.1). These results emphasize the need for improved death education and accessible resources to improve college students' preparedness for making end-of life decisions. Addressing this may help to continuously promote students to be more proactive in decision-making and reduce their anxiety surrounding mortality. Future research will involve a post-test of students' knowledge, behavioral intention, and death anxiety following the completion of the Death & Dying course.

Exploring Sharing of Task Representations Among Human-AI Teams
Poster #12 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Akshaya Sharma, Avery Sims, & Saida Nemrouch
Research Mentor(s): Hansol Rheem

Research increasingly suggests that Artificial Intelligence (AI) should be considered a teammate rather than a mere tool. However, questions remain as to whether humans perceive AIs as social beings and form bonds with them. Most studies on this topic rely on self-reports and interview responses, which are subject to biases and social desirability effects, as participants can control what they say. This study aimed to provide objective evidence on whether humans perceive AI and robots as teammates by analyzing attentional responses that are not easily controlled voluntarily. Participants performed a simulated surgical tool handoff task in a virtual environment. Each trial began with a text bubble over a surgeon's shoulder, displaying a surgical tool in green or blue. At the same time, four differently colored tools appeared on the table. Participants were instructed to identify and hand off a surgical tool only when the tool mentioned in the text bubble was green, and to withhold their response when it was blue. A surgical technician robot performed the task alongside the participants, responding to blue tools displayed in the text bubble. Participants were informed that they were collaborating with the robot in one block and competing against it in the other. We hypothesized that if humans genuinely perceive AI as a teammate, as they report, participants would allocate more attention to blue-colored tools when collaborating with the robot than when competing against it. Comparisons between participants' response time data and subjective reports provide deeper insight into the true nature of human–AI relationships, beyond what self-reports alone can reveal.

Hand Dominance Study
Oral Presentation (Microsoft Teams)
Friday, April 18, 3:15pm – 3:30pm
Undergraduate Student(s): Abigail Carter, Emilia Coba, Brayden Dutremble, Victoria Brown, Kaelyn King, & Chris Tosh
Research Mentor(s): Kyung Hun Jung

When an automated vehicle (AV) has a silent failure and is about to crash in a T intersection and human drivers only have their right hand on the steering wheel, which direction are they most likely to turn? A previous study suggested that right-handed people who also drive on the right side of the road tend to turn right at a T intersection (Scharine, 2002). To test this hypothesis, we made participants monitor video clips from the simulation of a self–driving vehicle with their right hand at the 12 o'clock position on an imaginary steering wheel while we monitor their take-over performance. We are currently collecting the data.

Human Tendency: Driving Simulation Method in Measuring Human Reaction
Poster (Microsoft Teams)
Friday, April 18, 4:45pm – 5:00pm

Undergraduate Student(s): Marcelo Calva, Bri S. Carson, Jaden S. Limes, Joshua J. Patten, Megan C. Dollar-Pabon, & Michael W. McCorvey
Research Mentor(s): Kyung Jung

If a self-driving car is heading toward a collision, would having hands on the wheel affect what direction the driver will swerve to avoid the collision? With the recent development of self-driving cars, many people are concerned about the safety of drivers and passengers everywhere. If we are able to learn some of the habits or tendencies in accidents, there may be ways to improve the safety of self-driving cars. When an automated vehicle (AV) is unable to figure out a safe method of driving, it normally will require the driver to take control of the vehicle. Silent failure is when control is unexpectedly handed back to the driver without a clear warning, and take-over performance is the driver's regain control during such transitions. Knowing what direction most people will turn in this situation can provide safety for manual take over features and help self-driving cars avoid collisions. We expect more right turns since drivers in the United States often having incoming traffic to the right of their cars. Drivers might be more likely to turn to the right to avoid obstacles, even if there are no cars on the other side of the road since they are used to the incoming traffic (Scharine & McBeath, 2002). We are currently still collecting the data for the proposed study which was started January 2025.

Impulsivity Regulation Through COMT Val158Met Gene Expression in Relation to Substance Abuse, Mental Health, and Risk for Adverse Life Events
Oral Presentation (Prillaman Hall)
Wednesday, April 16, 11:00am – 11:50am
Undergraduate Student(s): Emily Clarke
Research Mentor(s): Sharon Pearcey, Erica Holliday & Cody Mashburn

This study examines the relationship between impulsivity and mental wellbeing. Previous studies have shown that high impulsivity can have drastic social and economic consequences (Schutte et al., 2023). Poor impulse control could enable negative outcomes regarding substance use, financial well-being, and social activities. Additionally, impulsivity is associated with increased levels of stress, anxiety, and depression (Du et al., 2023). Thus, high impulsivity can increase the likelihood of drug use and traumatic adverse life experiences which in turn would increase rates of stress, anxiety, and depression. Dopamine is a key neurotransmitter involved in impulse control and other important neural functions (Bondrescu et al., 2024). Dopamine reuptake rates may be regulated by the COMT Val158Met rs4680 genotypes (Bondrescu et al., 2024). Given that the COMT genotype may affect a person's dopamine reuptake rates and impulsivity levels, the COMT genotype is predicted to have a relationship with impulsive decision making and propensity for engaging in high-risk behaviors. Faster dopamine reuptake may leave the brain with lower dopamine levels which may lead some participants to artificially raise dopamine levels through substance use or other negative sensation-seeking behaviors.

Participants were given surveys to assess previous adverse life experiences (Life Events Checklist; LEC), substance use (Alcohol, Smoking, and Substance Involvement Screening Test; ASSIST), depression, anxiety, and stress (Depression, Anxiety, and Stress Scale; DASS-21). A delay discounting task (millisecond.com) was used to measure impulsive decision making. Participants also provided a saliva sample for DNA extraction, allowing the determination of COMT Val158Met rs4680 genotype expression. Our preliminary analyses (N = 88) show a positive relationship between the number of negative life events (LEC) and substance use as measured by the ASSIST, ($r(83) = .35$, $p = .001$). Additionally, a greater number of negative life events (LEC) also suggests higher levels of stress ($r(87) = .26$, $p < .05$) and anxiety ($r(86) = .26$, $p < .05$) as measured by the DASS-21. We did not find a similar relationship with depression. Although data collection is ongoing and genotypes have not yet been analyzed, we hypothesize that impulsivity will be regulated by COMT gene expressions, and that increased impulsivity would affect participants' substance abuse rates, mental health, and risk for adverse life events.

Is That Cheating? Students' and Instructors' Perceptions of Groupchats
Poster #26 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Cadence Hall & Mia Rodriguez-Alvarado
Research Mentor(s): Jennifer Willard & Adrienne Williamson

Academic misconduct has long been a concern in academia (McCabe et al., 2012) and appeared to worsen during COVID (Newton et al., 2024). Groupchat applications like GroupMe allow instant communication among many students, which may facilitate cheating. The extent to which students recognize cheating via groupchats as such is unclear. To address this gap, we compared students' and instructors' perceptions of what constituted cheating in GroupMe chats. Undergraduate students ($n = 312$) and instructors ($n = 63$) at the same university were randomly assigned to read one of four groupchats with one control (meeting up to study) and three cheating conditions (sharing exam questions, sharing exam answers, and taking the exam together). All participants reported the extent to which they perceived the groupchat as including academic violations. Additionally, students indicated how they would respond to the groupchat, and instructors indicated how they expected students would respond (cheating-supportive or cheating-resistant). We found that instructors perceived greater academic violations across the conditions in comparison to students, apart from the control condition (meeting to study). Participants rated meeting up to study as low in perceived violations and the three cheating conditions as being similarly high in perceived violations. Overall, instructors perceived greater violations across conditions than students did. Additionally, instructors tended to believe students were more likely to engage in cheating-supportive responses than students reported, and less likely to engage in cheating-resistant responses than students reported. Because perceptions of cheating predict actual cheating, some students may benefit from guidance

regarding inappropriate use of GroupMe. Additionally, given that inaccurate beliefs, particularly those held by multiple individuals, can impact both subsequent perceptions and reality (Madon et al., 2011), making instructors aware of their potential biases may also be useful.

Lagged Functional Connectivity Reflects the Cognitive Impairment of MCI
Poster #33 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Shanhua Bao
Research Mentor(s): Tim Martin & Voyko Kavcic

The dorsolateral prefrontal cortex is an important part of the frontal cortex in mild cognitive impairment and Alzheimer's disease. In our study, we measured the electroencephalogram and neuropsychological tests in 60 older adults with mild cognitive impairment and 63 age-matched controls. Functional connectivity was then estimated between Brodmann areas 9 and 46 and several other brain regions using Low Resolution Electromagnetic Tomography (LORETA). Functional connectivity was estimated between 10 brain regions, including hippocampus and dorsolateral prefrontal cortex. We then identified the 10 most promising measures of MCI status based on differences between groups and entered them into a logistic regression. Five of 10 were statistically significant predictors, with the strongest predictors being the lagged phase coherence between left and right hippocampus and the lagged connectivity between left visual area MT and right Brodmann Area 9, a region of the dorsolateral prefrontal cortex. The classification accuracy of the model was 75.6%.

Limits in Attention: Investigating Change Blindness in Visual Perception
Poster #2 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Audrey Beilharz & Alondra Aguilar-Rodriguez
Research Mentor(s): Chloe West-Jacobs

Change blindness, the inability to detect changes in a visual scene, reveals critical limitations in human visual perception. Research into change blindness contributes to our understanding of how attention is selectively allocated and how certain visual stimuli may escape detection, even in plain sight. It's unclear whether certain types of stimuli, like stimuli that hold value, are differentially resistant to change blindness. The present study investigates this using a flicker paradigm, a well-established method in change blindness research, to examine reaction time differences between changes in neutral stimuli (e.g., a color shift) and value-driven stimuli (e.g., the appearance of money), each presented 50% of the time within various visual scenes. Participants will view a series of flickering scenes alternating between an original image and a

modified version, separated by a blank black screen. Reaction times will be recorded upon change detection, categorized by stimulus type. In investigating whether change blindness is affected by value-driving stimuli we aim to better understand how learned associations and reward-driven attention influence visual processing. Reward-based learning strengthens associations between stimuli and their perceived importance, this leads us to expect that value-driven stimuli will be more likely to capture attention, be processed more efficiently than neutral changes, resulting in faster reaction times. If reaction times do not differ significantly between stimulus types, this would suggest the robustness of change blindness, indicating that even highly salient stimuli may go unnoticed in dynamic environments. This study contributes to broader discussions on the limits of human visual perception, cognitive efficiency in high-stakes environments, and potential applications of reward-based learning in enhancing focus and awareness.

Magnitude of Gratitude Pilot Study: Observing an Effective Anxiety Induction and Measuring Gratitude's Self-Perceived Impact on Anxiety Levels
Poster #22 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Demarese Crosby
Research Mentor(s): Tyler Collette

Anxiety disorders are among the most prevalent mental health conditions worldwide (World Health Organization [WHO], 2023), impacting various aspects of well-being. Because of this prevalence, understanding how to safely induce anxiety and explore potential interventions are crucial areas of psychological research. This study aims to evaluate the effectiveness of a safe, short-term anxiety induction technique proposed by Almazrouei et al. (2022), where participants answer general knowledge questions under conditions that inspire social evaluative threats and a sense of loss of control. Additionally, given recent research suggesting that gratitude has positive effects on well-being and stress levels (Atad & Russo-Netzer, 2021; Hamka, 2023), this study also investigates gratitude's role in reducing immediate anxiety through gratitude journaling. Participants will first complete a timed assessment adapted from Almazrouei et al. (2022), followed by a randomized 5-minute journaling task. Participants will be assigned to one of three journaling conditions: gratitude journaling, complaining, or childhood story detailing (serving as the control group). After the journaling task, participants will complete the PANAS-SF scale and additional opinion-based questions to assess the effectiveness of the anxiety induction and the perceived impact of their journaling task. At the end of the study, all participants will be debriefed. We hypothesize that the anxiety induction task will successfully elevate participants' anxiety levels, that the gratitude journaling group will report a more positive affect compared to the complaining and control groups, and that the gratitude journaling group will provide more positive feedback about their journaling assignment than the other two groups.

Measuring Academic Success-Investigating the Gap Between Traditional Faculty Metrics and Student Attributions
Poster #24 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Juan Tole, Hana Machhour, & Aaliyah Sargeant
Research Mentor(s): Lauren Taglialatela

This study will evaluate student success from two perspectives. First, we will assay traditional success factors including GPA and matriculation. Second, we will evaluate what students view as "success" including interest level in classes, career-preparedness, making friends, and networking with faculty. Based on recent research, we hypothesize that there is a disconnect between traditional measures of success and student perceptions of success. There are 19 million Americans enrolled in higher-education, and 20% of those drop-out annually. For those who stay enrolled, it takes an average of 6 years to complete a BA/BS degree. Therefore, understanding factors related to traditional metrics of academic progress, especially those that are reflective of contemporary student needs and expectations, is critically important. Based on existing assessments, we created a survey that has been approved by the IRB and distributed through SONA. Data collection is underway and data analysis will be completed by the end of March, and the project will be presented at GURP prior to the Symposium. Findings may be valuable in bridging the gap between university and student expectations, and provide guidance to enhance support systems, retention, and career success. This research provides strategies to better align university support with student needs, creating a more effective approach to measuring and supporting student achievement.

Memorable Messages about the Transition to Adulthood
Poster #11 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Kaitlynne North
Research Mentor(s): Chanler Hilley

Memorable messages theory suggests that certain messages can guide behaviors, shape perceptions, and facilitate meaning-making (Knapp et al., 1981) through reflection and behavior regulation (i.e., control theory; Carver & Scheier, 2008). Memorable messages can be impactful in domains including academics (Nazione et al., 2011) and work. For example, Scarduzio and colleagues (2018) found that young adults recalled parents' messages about work in the context of self-determination theory (competence, autonomy, relatedness). In this study, 792 young adults who were recruited through online survey panels, a university participant pool, and extra credit opportunities described a memorable message about the transition to adulthood, and the source, valence, and certainty about that message. Messages were mostly positive and came from

family members. Close family members, family members, friends, and colleagues were highest in positive valence. Significant others, other sources, and bosses were the highest in negative valence. Understanding the content and valence of memorable messages about the transition to adulthood may help to inform efforts to support youth as they navigate this normative transition. For example, programs for parents of adolescents and young adults may include education regarding the staying power of messages and their impact on supporting (or not) youths' autonomy and achievement of adult roles.

Military-Civilian Identity as a Moderator: Social Support and Moral Injury During Veteran Transition

Poster #34 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Birdie Berie & Tola Adeboye
Research Mentor(s): Tyler Collette & Thomas Hodges

No one leaves service the same person they were when they separated. Military service often cultivates positive outcomes such as general resilience, a disciplined work ethic, the ability to create strong social connections, and leadership capabilities, all beneficial qualities upon separation from the military. For veterans, leaving the military isn't just a career change; it's a full identity shift. The support they receive during this transition can be the difference between feeling isolated or feeling understood. But does military identity change how veterans experience and use this support, especially for those carrying the weight of moral injury (i.e., psychological trauma resulting from perpetuating, witnessing, or failing to prevent actions that transgress against their moral beliefs)? Our study looks at how military identity shapes the power of social support in helping veterans adjust to civilian life. The methodology employed a cross-sectional survey design with 200 veterans recruited via Prolific who received $7 for completing measures assessing military identity, civilian identity, healthy cognitions, self-concept clarity, social support, somatic stress, and cultural orientation. Linear regression analyses will examine relationships between identity factors and psychological outcomes. We expect Veterans with strong social support systems after leaving the military will adjust to civilian life more smoothly and experience fewer difficulties related to moral injury. In contrast, veterans who lack consistent social support will struggle more with the transition and face more significant challenges tied to moral injury. If results support the hypothesized relationships, this research will provide valuable insights into how military identity influences the efficacy of social support as a protective factor during the civilian transition, particularly for veterans experiencing a moral injury. These findings could inform the development of targeted intervention programs that strengthen identity integration while simultaneously enhancing support networks,

potentially improving psychological outcomes and reducing transition-related distress among the veteran population.

Missing the Mark: How Inadequate Sex Education Policies Leave U.S. Youth Vulnerable
Poster #4 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Brittney Pope & Richa Lokhande
Research Mentor(s): Dorothy Marsil

In the U.S., most schools require some form of sex education, but it is rarely comprehensive even though it needs to be. Young adults aged 15 – 24 account for half of all new STI cases each year, despite making up only a fourth of the population. Teen birth rates remain a significant problem. This can lead to a myriad of challenges, including health issues, educational setbacks, and financial instabilities. They frequently exclude crucial topics, such as contraception, teen pregnancy, dating violence, consent, and sex trafficking. Lack of federal mandates leaves decisions up to the state based on community values. This often results in delivering limited sex education. The purpose of this research was to examine state policies on sex education in relation to political affiliation, teen birth rates, sexually transmitted infection rates, contraception use, consent, and dating violence. Sex education policies, state statutes, state board of education policies, and state department of education or curriculum standards were obtained and analyzed for all 50 states. The policies for each state were coded using a binary coding scheme for the presence or absence of the following content: state-mandated sexual education, sex trafficking education, consent, HIV/AIDS, abstinence-only, parental review option, parental opt-in, and parental opt-out. Results showed that comprehensive sex education is limited in the U.S., especially in conservative states. Most states had some form of mandated sexual education (54%), HIV/AIDS (86%) prevention, abstinence-only (76%), and offered parental review (52%), and parental opt-out (74%). Few states addressed consent (26%) or sex trafficking education (34%); most did not require parents to opt-in for their child to participate. Mandated sex education, rates of teen births, gonorrhea, and chlamydia differed significantly based on political affiliation by state. Failure to provide comprehensive sex education in all states can increase vulnerability among youth.

Perspectives on ASD+ADHD Comorbity in Pre-K–12 Education: Prevalence and Teaching Preparedness
Poster #21 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Emily Pogue & Victoria Simanovich
Research Mentor(s): Sidni Justus

Given the growing number of students with Autism Spectrum Disorder (ASD) and Attention Deficit Hyperactivity Disorder (ADHD), it is increasingly important to understand how teachers perceive and support students with these co-occurring conditions. ASD and ADHD share traits that often result in a comorbid diagnosis of ASD+ADHD. However, teachers' awareness and preparedness to support students with both conditions are not well understood. A total of 199 Pre-K–12 teachers participated, completing demographic surveys and measures assessing ASD- and ADHD-specific knowledge, neurodiversity attitudes, and overall teaching self-efficacy. Teachers were asked to estimate the prevalence of ASD+ADHD comorbidity and rate their preparedness to teach students with ASD-only, ADHD-only, and ASD+ADHD. Regression analyses explored predictors of these outcomes, including prior experience with neurodivergent students, sources of training (e.g., academic, workplace, personal), and disorder-specific knowledge. Results indicated that teachers underestimated the lifetime prevalence of ASD+ADHD, though their current estimates were more aligned with meta-analytic findings. Direct experience teaching comorbid students was positively associated with higher prevalence estimates, while greater ASD knowledge was linked to lower estimates. Teachers reported feeling less prepared to teach students with ASD+ADHD compared to those with ASD-only or ADHD-only. Preparedness was predicted by self-efficacy, neurodiversity attitudes, and professional training, but disorder-specific knowledge did not consistently predict preparedness across all conditions. These findings suggest that while personal experience and professional training enhance both awareness and preparedness, disorder-specific knowledge alone does not always translate to confidence in supporting students with co-occurring diagnoses. Implications for teacher training and the need for comorbidity-focused professional development are discussed.

Perspectives of Black and Latino Students on Mindfulness and Mindfulness-Based Interventions to Support Mental Health
Oral Presentation (Prillaman Hall)
Wednesday, April 16, 11:00am – 11:50am
Undergraduate Student(s): Katimah Grogan, Isabelle Wilkens & Mia Loarca- Rodriguez
Research Mentor(s): Shadi Beshai

Depression and anxiety are prevalent and distressing mental health conditions that disproportionately affect Black and Latino populations in the U.S. Mindfulness-Based Interventions (MBIs) reduce symptoms of these conditions but were developed within a Western biomedical framework. Their cultural appropriateness for Black and Latino people remains largely unexamined. This two-study investigation explored perceptions of MBIs and their adaptation for Black and Latino university students. Study 1 examined whether income—a proxy for race and ethnicity in the U.S.—is associated with MBI acceptability (willingness to engage) and credibility (perceived effectiveness). Black and Latino households earn about half as much as White households and own only 15-20% of their net worth. A total of 341 community

adults (43.9% cisgender women) were recruited online via TurkPrime. Participants completed demographic questions and read a vetted MBI description, then rated its acceptability and credibility. We collapsed income into high and low-income categories (n= 43) were disproportionately overrepresented in the low-income group. A one-way MANOVA found that low-income participants rated MBIs as significantly less acceptable and credible compared to high-income participants. These findings suggest financial barriers and structural inequities shape MBI perceptions. Study 2 will build on these findings by qualitatively exploring Black and Latino university students' perspectives on MBIs, their cultural appropriateness, and potential adaptations. This research highlights the need for culturally adapted MBIs that address financial and cultural barriers, informing efforts to refine MBIs for Black and Latino student populations.

Political Polarization: An International Comparison
Poster #10 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Devyn Woodard
Graduate Student(s): Kadidja Diaby
Research Mentor(s): Danica Kulibert

Political polarization has increased in the United States (Finkel et al., 2020). Furthermore, research on political party perceptions has demonstrated that both Democrats and Republicans believe that political parties approve of extreme group members more than moderate members (Kulibert et al., 2024). The goal of the current research was to expand on U.S. research and understand perceptions of political parties in Germany and Nigeria. For the Germany sample, participants read about either a moderate member or an extreme member of a political party and were asked if the party would approve of the member. Unlike in the United States, people did not think German political parties would approve of extreme members more than moderate members ($p > .05$). Similar methods were deployed for the Nigeria sample, with participants reading about either a moderate or extreme political member. Again, unlike in the United States, people did not think Nigerian political parties would approve of extreme members more than moderate members ($p > .05$). Overall, these results suggest that political polarization may not impact perceptions of political groups outside of the United States in the same way that it does within the United States.

The Power of Perception in Shaping CSA Prevention Beliefs
Poster #11 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Sophia Pope
Research Mentor(s): Ginny Zhan

This study examines perceptions of capacity to prevent child sexual abuse (CSA) and how attitudes toward adults attracted to children influence beliefs in the effectiveness of CSA prevention strategies and interventions. While much existing research addresses CSA and pedophilia independently, limited attention has been given to how these attitudes impact perceptions of professional intervention efforts. This study aims to provide insights into how educational programs may reduce stigmatization and enhance confidence in CSA prevention strategies. Participants will complete an adapted Attitudes Toward Sexual Offenders (ATS) scale, respond to CSA prevention vignettes, and answer Big Five personality questions, alongside demographic items. The vignettes will assess participants' thoughts, feelings, and behaviors toward different CSA prevention approaches, while the Big Five questions will help identify personality traits that may influence attitudes toward CSA prevention. Results will also explore whether personal responsibility, beliefs, and attitudes toward prevention strategies impact willingness to support CSA interventions. Participants are recruited through SONA and social media, with all responses captured in Qualtrics. Data collection is underway, with results still pending. The aim of this study is to help inform educational strategies and policies aimed at improving young adults' understanding and support for CSA prevention interventions.

The Relationship Among Interleukin-6 during, Childhood Trauma, and Alcohol Intake, and Cognitive Behavior Changes

Poster #32 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Shanhua Bao
Research Mentor(s): Erica Holliday, Sharon Pearcey & Cody Mashburn

My study is to explore the relationship among IL-6, childhood trauma, and alcohol use and cognitive behavior changes. Childhood trauma is prevalent in U.S. with the Centers for Disease Control (CDC) reporting that about two-thirds of adults have at least one adverse childhood experience (ACE) and one-sixth of them have four or more ACEs (CDC, 2023). Elevated IL-6 levels are one possible mechanism by which childhood trauma could influence adult physical and psychological well-being (Carpenter et al., 2010). Childhood trauma and elevated IL-6 levels have each been shown to predict adult health outcomes, like alcohol dependence (AD) (Schwandt et al., 2012). Additionally, recent studies show IL-6 has been found to be correlated with suicidal behavior. (Bramness et al., 2023). Therefore, increased IL-6 is associated with childhood trauma and high alcohol intake, which may result in cognitive decline and behavior changes. We administered questionnaires including the Alcohol Use Disorders Identification Test (AUDIT) and the Adverse Childhood Experiences Questionnaire (ACE) and collected saliva samples. We also measured working memory using a computerized STROOP task. Preliminary results (N =

93) show a positive relationship between adverse childhood experiences and alcohol consumption, $r(91) = .429$, $p < .001$, though data collection is ongoing.

The Relationship Between Undergraduate Research Participation and Educational Outcomes
Poster #35 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Amelia Baker & Audrey Beilharz
Research Mentor(s): Amy Buddie

This study investigates the relationship between participating in funded undergraduate research programs and pre- and post-graduation success among students at Kennesaw State University (KSU). Prior research suggests that engaging in research activities during undergraduate studies contributes to critical thinking skills, hands-on experience, and professional networking, all of which are crucial for career advancement (Seymour et al., 2004). Participation in undergraduate research has been associated with higher rates of employment and acceptance into graduate programs (Seymour et al., 2004). Moreover, involvement in research fosters a sense of professional identity and improves communication skills, further contributing to long-term career success (Jones et al., 2019). This study utilizes retrospective data from KSU's Offices of Undergraduate Research and Institutional Research to analyze pre-graduation success metrics, such as academic progression and retention. In addition, we used LinkedIn profiles to collect data on post-graduation outcomes, including employment status and further education. We analyzed data from 2019 to 2024, with a sample of 980 students who attended KSU and received funding from a KSU Office of Undergraduate Research program. The data includes several different funded programs, such as the First-Year Scholars Program, the Summer Undergraduate Research Program, and the Peer Ambassadors Program, providing a comprehensive view of students' participation in these programs. By assessing the influence of funded undergraduate research, the findings will provide insights to enhance research opportunities and support student success before and after graduation. Additionally, the results will explore whether participation in these research programs contributes to long-term outcomes, such as securing employment, pursuing further education, and overall career development. By examining these relationships, the study aims to provide evidence that can inform the development of initiatives designed to support student success during their academic journey and potentially foster meaningful post-graduation achievements.

Retrain the Brain: Situational Attribution for Lasting Bias Reduction
Oral Presentation (Microsoft Teams)
Friday, April 18, 12:15pm – 12:30pm
Undergraduate Student(s): Lily Thibodeaux & Sage Skillman

Research Mentor(s): Tracie Stewart, Anisah Bagasra, Ordene Edwards, Tim Martin & Jennifer Willard

Implicit biases, unconscious associations linking social groups to traits, can shape decisions in hiring, policing, and healthcare. While previous interventions to reduce implicit bias have shown short-lived effects, Situational Attribution Training (SAT) has been demonstrated to decrease automatic stereotyping by encouraging situational attributions for stereotype-consistent behaviors (Stewart et al., 2010; Stewart et al., 2022). This study expands on prior research by investigating whether multiple, short SAT sessions lead to longer-lasting and more generalized reductions in implicit biases toward both African Americans and Arab Muslim Americans. Participants are randomly assigned to either SAT for African American stereotypes, SAT for Arab Muslim American stereotypes, or a grammar-based control condition. Training consists of repeated sessions over five weeks, preceded and followed by assessments of implicit biases using the Person Categorization Task, explicit bias measures, and a resume hiring task. We anticipate that repeated SAT will result in sustained reductions in implicit bias that generalize to new stereotypic traits and influence participants' evaluations of job candidates. These findings will highlight the importance of extended, structured bias-reduction interventions and inform future strategies to promote equity in real-world decision-making.

Revealing Bias in the Courtroom: How Defendant Gender and Interviewer Type Influence Juror Perceptions in a Domestic Minor Sex Trafficking Trial
Poster #33 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Kirsten Martin, Jaz Woodard, & Hannah Shores
Research Mentor(s): Jennifer Willard & Dorothy Marsil

Individuals who are commercially sexually exploited (CSE) through force, fraud, and/or coercion or who are minors are victims of trafficking. Recently, psychology, public health, and legal scholars have increasingly focused on this global issue. Increased awareness has resulted in intensified efforts to prosecute sex trafficking perpetrators, especially those who are harming children, but little is known about juror decision-making in these cases. As such, it is important to understand how jurors may use certain factors in their individual deliberation processes. The purpose of this study was to examine factors that may influence mock juror decision-making in a case of domestic minor sex trafficking (DMST) using a 2 (Defendant Gender) x 2 (Type of Interviewer: Clinical Forensic Interviewer vs. Law Enforcement Interviewer) between-participants design. Jury-eligible adults were randomly assigned to read one of four brief trial summaries of the case and complete an online questionnaire evaluating guilt ratings, verdict, confidence, witnesses' believability, witnesses' credibility, and demographics. Descriptive statistics, logistic regression, and analysis of variance were used to analyze the pilot data. The preliminary results revealed a main effect of defendant gender, with jurors being more pro-

prosecution when the defendant is male rather than female. A main effect of interviewer type was not significant. However, there was a significant interaction such that jurors were more likely to be pro-prosecution when the defendant is male, and a clinical forensic interviewer testified. The findings from this study may offer insights on defendant gender bias and how the type of interviewer can impact trial outcomes. Understanding these factors may inform best practices for forensic and law enforcement interviewers and improve justice for trafficking victims.

Social Media, Stigma, and Mental Health Diagnosis
Poster #1 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Abigail Nessmith
Research Mentor(s): Anisah Bagasra

Many studies examining the relationship between social media and mental health stigma focus on the dramatization and malingering of mental illnesses, specifically how social media encourages its users to fake having a condition for attention. Despite malingering online being a growing topic, little research has been conducted to examine if the phenomenon of online malingering affects how stigma manifests itself. My study attempts to answer the question, "How does frequent social media usage affect one's level of stigma against mental disorders and their likelihood to believe someone who claims to be mentally ill?" by comparing stigma ratings and time spent on social media. This was done through collecting data from 2 groups, each containing 30 participants: those who spend less than 4 hours on social media and those who spend 4 or more hours on it. Each group of participants' data was completed using the Endorsed and Anticipated Stigma Inventory (EASI) in the form of a self report survey.

Student Psychosocial Adjustment in Relation to Student Success
Poster #25 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Julian Quintana
Research Mentor(s): Lauren Taglialatela

The purpose of this study is to examine student psychosocial adjustment and how it may be related to retention and success college students. More specifically, this study will analyze the factors such as social adjustment, academic adjustment, institutional attachment, and coping styles. As of 2022, the United States had 15 million students enrolled in undergraduate programs. 23% of freshman drop out, and students who continue take 6 to 8 years to finish a degree. With this protracted amount of time from entry to graduation, students accrue tens of thousands of dollars in debt. These metrics underscore the need to better understand factors related to student academic success. To that end, assessment tools were created to measure

student adjustment factors, social support, emotional state, and coping style in relation to student success metrics like GPA and progression. Data collection is underway, and data analysis will be completed by the end of March. This study will identify factors that lead students to drop-out and endeavor to find ways to keep them in higher education.

Undergraduate Student Research Reflections: Comparing Two Training Models in Psychology
Poster #36 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am - 9:45am
Undergraduate Student(s): Abigail Dingess
Graduate Student(s): Chazzidy Harper
Research Mentor(s): Amy Buddie & Kimberly Cortes

Methods of training undergraduates in scientific thinking have been explored in the natural sciences for some time. Yet few studies examine psychology alone or utilize critical reflections to compare training modalities. This study aims to fill that gap by highlighting two methods of training– the apprenticeship model and Course-based Undergraduate Research Experiences (CUREs). The apprenticeship model is a traditional form of training, where a professor mentors an individual or small group of students, whereas CUREs occur within a class. This study aims to answer which method of training has greater self-reported gains through an analysis of critical reflections written by students. This study utilizes a sample of 151 critical reflections from semester-long research experiences in psychology: 117 reflections from the CURE model of training and 34 from the apprenticeship model. This set of psychological critical reflections comes from a larger data set of over 800 STEM-based critical reflections collected over a 2-year period. Coding and analysis were conducted through NVivo, a qualitative coding software. Two researchers with an established inter-rater reliability manually coded each reflection. Initial codes reflected 4 categories: educational value, connections to coursework, values growth, and integrated problem solving. Additional rounds of open coding utilized a thematic analysis to examine the initial categories more thoroughly. Crosstab queries were conducted to examine the relationship of these codes with training models and demographic information. Results varied across the coding categories. Of these, educational value was endorsed most often. CURE reflections reported greater connections to past course work, personal values growth, and challenges than their apprenticeship peers. Apprenticeship model reflections endorsed greater connections for the use of their research in the future and growth in their work ethic. Findings will be used to inform future development of CURE and apprenticeship model experiences.

Using Cognitive Psychology to Probe AI Social Bias
Poster (Microsoft Teams)
Friday, April 18, 4:15pm – 4:30pm

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 Likert system, to observe whether GPT-4 would exhibit similar heuristic patterns in race, gender, nationality, religion, and social class domains. Our previous study that we are building upon showcased GPT-4 scoring lower than humans in terms of economic, race, and nationality social groups but higher in terms of the religious domain. This key finding prompted us to explore this phenomenon on a deeper level and enhance our methodologies and participant data. We will utilize additional methodology such as the switch-at-birth task which analyzes participants' essentialist thinking regarding individuals being born into social groups versus becoming a part of differing groups. We will also expand our human participant data collection methods by gathering a sample of U.S adult participants to test our methodologies on and later compare with GPT-4. Overall, we hope to gain a deeper command of artificial intelligences' susceptibility to essentialist bias comparatively to humans and its understanding of social groupings.

The Val66Met BDNF Polymorphism: A Link Among Impulsivity, Cognitive Flexibility and Substance Use
Poster #34 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Katelyn Nguyen
Research Mentor(s): Erica Holliday, Sharon Pearcey, & Cody Mashburn

Substance abuse is a growing epidemic, contributing to over 100,000 deaths in the U.S. in 2022. Identifying risk factors for alcohol and drug abuse is essential for developing prevention and treatment strategies. Brain derived neurotrophic factor (BDNF) is a neuronal protein crucial for the development and plasticity of neurons and mediates activities of other neurotransmitters such as dopamine, glutamate, GABA and serotonin. The Val66Met polymorphism of the BDNF gene is single nucleotide polymorphism (SNP) of the 66th codon of the BDFN gene where valine

(Val) is substituted for a methionine (Met). This genetic variation is associated with decreased expression of the BDNF protein. Lower protein concentrations may manifest as problems with executive functioning. Executive function is comprised of a set of mental processes used by humans to accomplish goals, plan and execute tasks, think critically, and respond to situations. Both impulsivity and cognitive flexibility are executive functioning measures which are linked to the development of substance use disorders. Individuals struggle to shift behaviors even when the initial rewarding effects of substances diminish. We examined the relationship among the Val66Met SNP of the BDNF gene with impulsivity, cognitive flexibility and substance use. We collected saliva samples for DNA analysis and administered cognitive tasks to measure these cognitive behaviors. The Number Letter Task was used to measure cognitive flexibility, and a delayed discounting task measured impulsivity. The Alcohol Use Disorders Identification Test (AUDIT) was also administered as our self-reported questionnaire to understand participants alcohol usage. We hypothesize the presence of the Met allele will display increased impulsivity and increased substance use.

Veterans & Visionaries: Georgia's World War II Veterans & the Civil Rights Movement
Poster #28 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Adrian Alicia, Michelle Foster-Smith, Kendal Motley, Miosha Quinn, Edwin Trejo-Rivera & Victoria Grace Tucker
Recent Graduate(s): Jerry Funkhouser
Research Mentor(s): Kristin Horan, Chris Hess, Brian Moore & Sophie Vincent

In this project, we aim to explore resilience in a population that is both historically underserved and contributed in an extraordinary manner to their community: World War II Veterans who participated in the Civil Rights Movement. By reviewing memorial cemetery burial records and ancestry records, the research team identified living family members of Veterans who may meet these criteria and reached out to them with information about the study. Data collection is ongoing, but four interviews have been conducted thus far. The interview protocol was adapted from a project called "Profiles of Resilience," which focused on adversity and resilience among military and first responder families. Preliminary content analyses of conducted interviews revealed that it may not be common for family members to have been told about or remember military stressors, but did report some stressors related to segregation or discrimination or other stressors such as family stressors. Participants reported several resources that promoted resilience, such as a strong connection with their religious community, a positive experience in their civilian job, and strong family relationships and experiences. Next steps in this project will involve continuing to conduct and analyze interviews throughout Spring 2025 and collaboration with KSU Museums Archives and Rare Books to create a traveling museum exhibit in Summer 2025. This project will continue to add to the literature on adversity and resilience in

populations who have served their nation and community in extraordinary ways and promote community engagement with state and national memorial cemeteries.

Young Adult Financial Identity: The Roles of Socialization and Efficacy
Poster (Microsoft Teams)
Friday, April 18, 12:30pm – 12:45pm
Undergraduate Student(s): Kayla Little
Research Mentor(s): Chanler Hilley

Identity formation is a salient developmental task for adolescent and young adult independence (Erikson, 1968; Arnett, 2000). Previous research investigated domain-specific efficacy but not whether mastery affects financial identity development. This study takes a financial identity capital approach (Butterbaugh et al., 2020) to explore how socialization and efficacy predict young adults' financial identity. College students (n = 651) completed an online survey measuring financial and psychosocial wellbeing. We used SPSS to conduct regression analyses of predictors of financial identity statuses. Further analyses will investigate sources of financial advice, mastery and financial self-efficacy as moderators. Direct financial teaching positively predicted moratorium, diffusion, and foreclosure, and negatively predicted achievement. Financial role modeling negatively predicted diffusion and foreclosure. Financial relationships positively predicted diffusion. Financial self-efficacy negatively predicted achievement and positively predicted moratorium. Mastery positively predicted diffusion. Findings suggest that aspects of parental financial socialization may not always relate to adaptive financial identities. Direct financial teaching may promote passive financial behavior, whereas financial role modeling may encourage youth to explore their financial identity (Khan et al., 2023). Financial self-efficacy may encourage identity exploration while mastery alone may not facilitate similar processes. Future research is needed to assess these findings across contexts and ages.

Communication & Media

An Exploration of Parent's Decisions to Give Kids Smart Phones and Manage Use
Poster #27 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Mikalah Cloward & Maia Giron
Research Mentor(s): Mackenzie Cato

Smartphones have become a central part of daily life for kids, with most parents providing phones to their children by 6th grade. This study explores the different reasons that motivate both the regulation and distribution of smartphones. Parents with children ages 9-14 were recruited and interviewed through semi-structured in-depth interviews, which were coded for

themes using grounded theory. We conducted 10 one-hour interviews in-person and virtually over the course of a three-week period. The interviews were transcribed and all identifying information was removed. Five themes emerged from the transcribed data, including: (1). Safety and privacy both online and in-person; (2) Effects on children and family dynamics; (3) Factors influencing the age of phone attainment such as peer pressure or perceived necessity; (4) Challenges for parents with locus of control and maintaining relationship with the child; and (5) Types of regulation styles. We found that parental discretion was based on security such as having a digital footprint, location monitoring, and staying reachable despite school regulations. Some parents embraced more regulation, such as contracts and rules prior to the device being given versus others who expressed that they quit monitoring after their children found ways around their restrictive methods. Themes indicated girls had higher rates of anxiety compared to boys post phone use. Furthermore, parental ideals and beliefs influenced regulation style. Our research raised discussions about limits on regulations such as what age to stop and parenting philosophies around privacy. Additionally, our study explored generational anxiety regarding tracking and social media influence. Unlike other studies in the field, this study focused solely on the factors leading to regulation and phone distribution, adding valuable information to a quickly evolving cultural landscape around smartphone use.

Documentary Film Production & Understanding of Film Festival
Oral Presentation (Microsoft Teams)
Friday, April 18, 3:45pm – 4:00pm
Undergraduate Student(s): Madalynn Hennig, Isabelle Loyd, Daniella Barbosa, Leihana Smith, & Elisa Fajardo
Research Mentor(s): Sangsun Choi

The objective of this project was to assist in the production of a short documentary film under Professor Sangsun Choi and to promote the 2025 Kennesaw Film Festival. To analyze Professor Choi's previous films, the styles, approaches, strengths, and weaknesses of each film were analyzed. Additionally, various external documentaries were assessed to provide a summary of the styles, strengths, and weaknesses observed. To assist in the production of the film, fieldwork was conducted in Gwinnett County, utilizing a mirrorless camera and other production equipment. The functions of a camera, tripod, and lighting were examined in order to film B-Roll, establishing shots, and supplementary footage. Visual experimentation with lenses, angles, and depth of field was utilized in order to achieve optimal footage. During the visits to galleries and meetings of artists Professor Choi was supported by monitoring audio levels and camera feed during interviews. Research establishing background information on a variety of film festivals was conducted in order to optimize the function of the Kennesaw Film Festival. To increase the

film festival's online and campus presence, promotional materials were created, revised, and distributed across the Kennesaw campus and Instagram. For marketing via Instagram, both video and image materials were used to increase the overall interaction. Footage was also incorporated from interviews conducted with student and alumni filmmakers into promotional materials. Posters, T-shirts, and stickers were designed based on the color and theme of KSU and the Film Festival. Posters to acquire submissions were displayed in areas to target the desired audience of filmmakers. By restructuring the website used in previous years, updated information for the festival was added along with a revitalized theme to match that of promotional material. The festival will take place on March 28th.

What's Your Story? Narratives and Career Development
Poster #17 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Alyssa Rachel De Leon & Ruqaiyah Njie
Research Mentor(s): Robin Mathis

People have many different reasons why they choose to pursue certain careers. In our research, we are gauging how the use of narratives influences our decisions on what career paths we choose to take. Based on the research we conducted for the purpose of this study, we have found that the use of narratives often does have a direct impact on how people choose to approach their career paths. Sometimes these impacts push them toward the career path they've been told about while other times it steers them away and in other directions. To get a bigger picture of what exactly these impacts are, we asked a few critical questions: What are some stories that you've heard in your life that have shaped your career direction? What are your major and/or career goals? Is there someone who has inspired you to make this decision, and how so? These questions have brought about a great deal of conversation from different perspectives, some whose stories led them down a certain path and others who have only been pushed in a direction, but not onto a set road. We conducted our research in a methodical way by interviewing students and holding focus groups, taking into account gender, racial, ethnic, geographic, class, and age-related differences. In these interviews and focus groups, we have found that the environment in which people grew up, the interests or career paths of those around them, as well as the stories that they've heard while growing up all have a major impact on their future career path. We are continuously attempting to understand how narratives impact the career choices of people and will continue to interview people to get a better view of it. We know that stories have a powerful impact on career choices and that the way that they are communicated is equally as powerful. These results will be presented at the Spring Symposium of Student Scholars.

Sociology & Criminal Justice

Cultural Appropriation Vs. Appreciation: Understanding Culturally Sensitive Decision-Making Through Moral Foundations Theory
Poster #15 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Joshua Chang
Research Mentor(s): Lisa Thompson

This study explores the relationship between moral foundations and perceptions of cultural appropriation versus appreciation. Participants were presented with a series of scenarios involving Native American, African American, and Asian American cultural contexts, and then their responses were evaluated and seen as how they related to cultural appropriation. Additionally, participants completed the Moral Foundations Questionnaire to identify their underlying moral values. By analyzing the correlations between their responses on moral foundations and the scenarios, this research aims to understand whether individuals with stronger values toward specific moral values (e.g., care/harm, fairness/cheating, loyalty/betrayal) are more or less likely to choose in engage in culturally appropriative behavior. The results will attempt to work towards having more discussions on cultural sensitivity and how the role of moral psychology plays a big part in cultural understanding.

Moral Traits and Emotional States: Exploring the Impact of Morality and Emotions on Decision-Making Through a Moral Foundations Lens
Poster #38 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Chrystal D. Alexander & Emily M. Martinez
Research Mentor(s): Lisa M. Thompson

Criminologists and psychologists are increasingly exploring both the role of emotions and morals in decision-making. However, these factors have been investigated independently of one another, either taking into account the fleeting nature of emotional states or the more static nature of moral intuitions. Therefore, this study aims to examine the connections between emotions, morality, and decision-making simultaneously, through the lens of Moral Foundations Theory and developmental perspectives. Specifically, we explore the relationship between morals and deviant decision-making, while accounting for emotional states and past experiences, by presenting participants with scenarios to be navigated in real-time. To measure this study, we use emotional priming techniques to influence the subject's decision-making process. We utilize classical music to prime our subjects to experience positive and negative emotions, while controlling for a group with no music to evaluate the impact our emotions have. Our goal is to

enhance theoretical understanding of the effect of emotions on moral pluralism and the decision-making process. Based on previous research, we would expect to find that emotional states do have a differentiating impact on how decisions are made. Findings from this research may provide useful information on the motivation for and navigation of deviant decisions.

Observing and Measuring the Links Between Moral, Deviant Behavior, and the 4F's Trauma Response Structure

Poster #36 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Emily Martinez & Chrystal Alexander
Research Mentor(s): Lisa Thompson

In 1915, American Physiologist Walter Bradford Cannon introduced "The 4F responses," a theory that essentially suggests that trauma responses (i.e., fight, flight, freeze, and fawn) can disrupt moral reasoning, potentially increasing the likelihood of participating in or accepting deviant behavior by altering how individuals assess right and wrong in both high-stress and ordinary situations. This project takes an interdisciplinary approach and uses the Moral Foundations Theory to explore how an individual's moral intuitions impact their trauma responses and behavioral outcomes. The current study uses a survey method to present participants with hypothetical scenarios, allowing for the measurement of decision-making outcomes and processes (e.g., reaction times, difficulty experience, confidence, etc.). Based on previous research and preliminary findings, we would expect to find that trauma responses would vary as a function of people's moral intuitions. Overall, the projection of the findings and results collected are to ultimately prove the links, relationships, and effects of these natural trauma responses towards moral decision-making.

Online Conformity: Exploring the Impacts of Moral Foundations on the Influence of Social Media

Poster #7 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Jahzara Collington
Research Mentor(s): Lisa M. Thompson

Social media appears to have a strong influence on the way that people form opinions and adopt mindsets, which may in turn influence their behavior. Additionally, "conformity" refers to when people engage in actions that replicate the actions of others, usually as a result of social influence and learned behavior. The objective of this study is to explore the impact of external influences like social media and internal influences like moral intuitions on behavioral outcomes and opinions. Here, we use a questionnaire to collect information on social media usage, moral

foundations, and the likelihood of adopting trends. Based on previous research, we would expect to find that both social media and moral intuitions would have differentiating effects on trend adoption and behavioral outcomes. Findings from this research may promote awareness of the effect that social media and online influences can have on offline behavior.

Realizing Relationships: How the Applications of Care Ethics are Influenced by Moral Intuitions and Moral Circle
Poster #35 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Giovanni Wemple
Research Mentor(s): Lisa M. Thompson

Philosophers and psychologists alike have long examined how an individual's morals impact ethical decision-making. However, prior research has examined this topic with a limited lens, neglecting the impact of how different interpersonal relationships and partiality towards others may impact our decision making. Therefore, we explore whether the impact of moral intuitions is moderated by different types of care relationships when making decisions that involve partiality. We operationalize moral intuitions through the lens of Moral Foundations Theory (MFT) and develop a set of scenarios in which participants are asked to choose between different types of caring relationships. The current study aims to discover links between individuals' specific moral foundation endorsement and their propensity to respond to our scenarios involving care. According to preliminary findings, we would anticipate that there is a link between one's moral circles and their decision-making process and outcomes. We hope to utilize this research to further analyze how people view relationships (i.e., their moral circle) and how those relationships impact their moral intuitions and decision-making.

Using Conflict Management in Police Training
Oral Presentation (Microsoft Teams)
Friday, April 18, 2:00pm – 2:15pm
Undergraduate Student(s): Kaylie Gomez
Research Mentor(s): Darina Lepadatu

Effective conflict management is a crucial skill in law enforcement, as it directly impacts public trust, officer safety, and overall community relations. This study investigates best practices for conflict de-escalation in police training, focusing on three key aspects: the prevalence of de-escalation techniques in training programs, the duration of training sessions dedicated to conflict management, and the specific content covered. By analyzing current training methodologies, this study aims to identify strengths and gaps within existing programs. Furthermore, it explores potential improvements to enhance officers' ability to resolve conflicts peacefully and reduce the

use of force. The findings of this research can inform law enforcement agencies and policymakers in developing more comprehensive and effective training programs that emphasize de-escalation strategies as a fundamental component of police work.

Government and International Affairs

The "She-Cession" in Academia: Determinants of Post-Covid Career Trajectories Among Women Faculty

Poster #29 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Ana Luisa Onofre, Hannah Anderson, & Kydall Moore
Research Mentor(s): Jennifer Purcell

The careers of women and mothers were disproportionately impacted by the COVID-19 pandemic. These negative impacts were compounded among women with caregiving responsibilities due to significant challenges associated with professional and personal role conflicts. The resulting phenomenon, the "she-session," describes the mass exodus of women from the formal workforce as well as career downshifting among women who remained in their professional roles but decreased hours and/or responsibilities. This study explores the variables impacting the career trajectory of women faculty with caregiving responsibilities. This poster explores said impacts through the analysis of nearly forty interviews of faculty women conducted in 2021 and 2025. Thematic analysis resulted in the following areas of focus: Value (Mis)Alignment, Gaps in Support, and Political Influences. The scope of career impacts on the participant cohort will be presented, including career advancements and shifts, both anticipated and unanticipated. Finally, recommendations for interventions to support faculty professional development and the higher education leadership pipeline will be presented.

College of Science and Mathematics

Chemistry and Biochemistry

Adsorption of Methyl Acetate on Zirconium (IV) Hydroxide
Poster #8 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Anthony London
Research Mentor(s): Mark B. Mitchell

The adsorption and chemisorption of methyl acetate on zirconium (IV) hydroxide were measured by gas cell Fourier Transformed Infrared Spectroscopy, using methyl acetate as an analogue of chemical warfare agents (CWA) and toxic industrial waste (TIW), to reduce impact. Liquid methyl acetate was chilled to -14˚C and 1.0 cc nitrogen gas was bubbled through to dilute the vapor. The nitrogen gas vapor mixture was flowed over 0.100 grams of zirconium (IV) hydroxide over a period of 10 hours, and the produced vapor from the reaction was then analyzed using an FTIR gas cell. Infrared Gas Cell Absorption spectra peaks were integrated during the adsorption and chemisorption of methyl acetate on zirconium (IV) hydroxide. The carbonyl function group FTIR peak of methyl acetate vapor is used in conjunction with the molar absorptivity constant to quantitatively access the rate of reaction over an extended time frame. While results are not definite, the data points to the viability of the substrate as a practical adsorbent of dangerous compounds. As the adsorption of the compound by the metal hydroxide behaves in an analogous mechanism to chemical warfare agents, such as the chemical Sarin, the rate of saturation is used to predict the feasibility of zirconium (IV) hydroxide as a remediation method of objects exposed to toxicants.

Alanine-based Temporin L Peptide Analogs to Inhibit Viral Replication in SARS-CoV-2
Poster #36 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Maryam Najeeb & Ishani Ganorkar
Research Mentor(s): Mohammad Halim

Throughout the past several years, Covid-19 has taken a heavy toll on people's health. Although small molecule drugs and vaccines have made an impact to improve patients' immunity and have served preventative measures, relatively new peptide therapeutics is gaining popularity. Small molecule drugs often lack having specific target functions, cause unwanted complications, and drug resistance. However, peptide therapeutics are gaining in popularity due to their impeccable specificity, high potency, and fast approval process. The goal of this research project is

to develop effect and potent analogs of Temporin L (TL) peptide to block the catalytic sites including Cys145 and His41 of the main protease of SARS-CoV-2. Utilizing computer aided design, 12 analogs were modelled incorporating alanine sequentially in the 12 positions of TL peptide. All analogs underwent molecular docking using HDOCK program to evaluate the binding energies against the main protease. The best three analogs (analog 3, 4, and 9) were evaluated by molecular dynamic modeling using YASARA software. The results were analyzed that reveal the radius of gyration, RMSD, solvent accessible surface area, and RMSF for each of the three analogs to compare their effectiveness. The best analog 3 was synthesized using the solid phase synthesis protocol using a rink-amide resin. Once the peptide synthesis is completed, the resin was removed by adding a high percentage of trifluoracetic acid (TFA). Subsequently, peptide solution was filtered and TFA was removed by blowing nitrogen and precipitated by adding iced-cold diether ether. Through a freeze-drying process, the peptide powder was created. Mass spectrometry was employed to confirm the mass of the synthesized peptides which showed two intense peaks at m/z 542.67 and 813.50 corresponding to [M+3H]3+ and [M+2H]2+, charge states, respectively. The inhibiting efficiency of this analog will be tested using FRET and LCMS based protease assays.

Alpha-methylated Phenylalanine Containing Peptide Targeting Amyloid Beta for Alzheimer's Treatment

Poster #24 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Iona Alatar & Lyric Gordon
Research Mentor(s): Mohammad Halim

Alzheimer's Disease (AD) is a neurodegenerative illness characterized by a decline in cognition and memory. In the USA, an estimated 6.7 million adults aged 65 and older are currently affected, with projections of 13.8 million by 2060 if the trend continues. AD-related deaths surged by more than 145% from 2000 to 2019. Shockingly, the CDC ranked Alzheimer's as the 7th leading cause of death in 2019, and it rose to the 5th leading cause in 2023. The Amyloid-Beta (Aβ) hypothesis proposes that the accumulation of Amyloid-Beta (Aβ) peptides in our cerebral cortex causes the formation of senile plaques leading to neuronal cell death. This research aims to develop potent analogs by modifying previously tested peptides for their ability to bind and inhibit the 1-42 Amyloid-Beta (Aβ) peptide. Multiple peptide sequences were modified to incorporate alpha-methylated phenylalanine, which has been demonstrated to enhance inhibitory properties. For synthesizing these c peptides, a CEM Liberty Blue peptide synthesizer was utilized to synthesize solid-phase peptides following standard Fmoc procedures and cleaved with 95% trifluoroacetic acid. The peptides in this study were then measured for their binding affinity with Amyloid-Beta (Aβ) using selected ion monitoring (SIM) based mass spectrometry assay. The dissociation constants (Kd) for Aβ–peptide interactions were estimated

based on the dose-response by fixing the Aβ concentration while varying the concentration of the linear and cyclic peptides. The three best linear peptides showed the Kd values of 299, 37, and 8.6 nanomolar (nM), respectively. Moreover, the best cyclic peptide demonstrated a Kd value of 49 nanomolar (nM). One of the alpha methylated phenylalanine containing peptide was synthesized and characterized and expected to show the best binding affinity. This study showed that both linear, cyclic and methylated peptides show promise to be excellent therapeutics in inhibiting amyloid beta.

Analysis and Comparison of Limonene Content in Oranges Using GC/MS
Poster #23 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Eli Briggs
Research Mentor(s): Wei Zhou

D-Limonene (C10H16) is a fragrant molecule found commonly in the peels of citrus fruits. This monoterpene is notable for its distinctive aroma and has been found to possess some beneficial health properties. Some recent studies have shown that the compound has minor cancer fighting properties, inhibiting certain tumor development pathways. In our quantitative analysis, an optimized extraction procedure has been utilized to obtain limonene from freshly peeled orange rinds followed by the quantification of limonene using gas chromatography mass spectrometry (GC/MS). D-Limonene, as well as the added internal standard used, have been clearly identified and well resolved in a 23-minute gas chromatographic elution, allowing quantification based on both external calibration and quantification using an internal standard to be performed. Limonene content from Cara Cara orange peels extracted by ethyl acetate have shown higher mass percent (2.1% ~ 1.7%) than that from reported values (~ 1.6% wt) in literature using methanol as the extracting solvent. The full dynamic linear range, the limit of detection, and the linearity of this analysis will be explored.

Bis-NHCs: Building Blocks for Novel Architectures
Poster #17 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Aidan Gerdis & Krish Patel
Research Mentor(s): Daniela Tapu

In 2020, the Department of Energy highlighted the need for advancements in catalyst and energy-storage materials as a critical challenge for future innovation. Carbene chemistry, particularly involving N-heterocyclic carbenes (NHCs), has gained prominence due to the wide range of synthetic and functional possibilities they offer. While research has predominantly focused on neutral NHC structures, limited attention has been given to their anionic

counterparts. Most existing studies explore monofunctional or difunctional NHCs, capable of chelation to a single metal center with less focus on multitopic NHCs capable of coordinating multiple metal centers. This project aims to address this gap by designing and synthesizing novel rigid anionic multitopic nonchelating N-heterocyclic carbene structures. These new compounds are intended to support bimetallic complexes and supramolecular cages, with the expectation of enhanced catalytic performance. Building on previous research, this project employs established synthetic techniques to create zwitterionic NHCs attached to rigid frameworks, preventing chelation and expanding their potential applications in catalysis.

Comparative Analysis of Turmerone Compounds in Various Turmeric Food Samples and Supplemental Products using GC/MS
Poster #26 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Audrey Anggraeni
Research Mentor(s): Wei Zhou

Turmeric (Curcuma longa) is a plant belonging to the ginger family Zingiberaceae. Native to South and Southeast Asia, the golden-yellow spice has been cultivated for dyes, spices, and a variety of health benefits since ancient civilization. Turmerones are responsible for turmeric's vibrant color, anti-inflammatory and antioxidant properties. With these medicinal properties, turmeric has been added into supplement capsules, immunity shots, and pain relief topical solutions. Turmeric is also widely used in traditional herbal medicine to help with diseases such as asthma and arthritis. We are interested in identifying and evaluating turmerone compounds in ground turmeric, turmeric supplement capsules, and turmeric rhizomes. Ethanol was selected as the extracting solvent. Sonification for 10 minutes was used to improve extraction. Extracted solutions from various samples have been analyzed using gas chromatography-mass spectroscopy (GCMS, Agilent-QP2010). Ar-tumerone, nonaromatic turmerone), and curlone have been identified as the three major turmerone compounds across all samples. They were eluted at 16.01 minutes, 16.23 minutes, and 17.71 minutes, respectively. Nonaromatic turmerone is relatively more abundant in ground turmeric, whereas aromatic turmerone has a higher abundance in turmeric supplement capsules.

Computational Study of the Proton Transfer in the H7O3+ Cluster
Poster #14 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Anna James
Research Mentor(s): Martina Kaledin

Proton transfer (PT) from one molecule to another is among the most studied phenomena in chemistry. PT requires the bond cleavage and the formation of a new one, AH+ + B -> A+ BH+. In protonated water clusters, such a process consists of the interconversion of hydrogen bonds. Experimentally, such a process can be observed as a significant increase of a dipole moment. However, other vibrational transitions often occur with small changes in the dipole moment while large changes in polarizability. In this work, we study the PT process in a protonated water cluster, H7O3+ using computational methods. We run geometry optimization and compare data of various methods, such as density functional theory (DFT) methods and highly accurate CCSD(T) level of theory, with available experimental data. Thermodynamic data of H7O3+ and its dissociation fragments, H5O2+, H3O+, and H2O are collected, and dissociation energies are calculated. Also, harmonic vibrational infrared (IR) and Raman spectra of H7O3+are calculated using normal mode analysis and compared to anharmonic spectra obtained from molecular dynamics simulations. Raman spectra of H7O3+ have yet to be recorded in the experiment. The second-order Møller–Plesset perturbation theory (MP2), Becke 3-Parameter Lee-Yang-Parr functional (B3LYP), Perdew-Burke-Ernzerhof (PBE) functional, and the Coupled Cluster theory are used in conjugation with AVDZ and AVTZ basis sets. IR and Raman spectroscopies are used to identify vibrational modes of a complex that cause changes in dipole moment and polarizability, respectively. Collected data on H7O3+ will aid in the determination of the polarizability tensor surface. H7O3+ and H5O2+ dissociation energies and their corresponding zero-point corrected values will be compared to the experimental values of Dalleska et. al. Dissociation energies provide insight into the strength of bonds in a molecular complex and reveal the accuracy of the given computational approach. Identifying anharmonic shifts and new vibrational modes in the vibrational spectra can aid in the understanding of the structure and interactions of the clusters. The shifts in spectra are due to the interactions between the clusters and their surroundings, as well as the symmetry of the molecules. The study of this small, protonated water cluster, H7O3+ is integral to the study of proton motion in biological and synthetic systems.

Corrosion Resistance in the Breathing Spinel AgA'Cr4Se8 Magnetocaloric Candidates
Poster #13 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Andres Jones & Lara Martins de Oliveira
Research Mentor(s): Madalynn Marshall

Magnetocaloric materials, which exhibit a significant temperature change upon the application or removal of a magnetic field, are promising candidates for solid-state cooling technologies. Breathing spinels are a class of materials that experience variation in chemical bonding and adapt to two differently sized tetrahedra in the pyrochlore lattice defined by a breathing ratio. Recently, these materials have emerged as magnetocaloric candidates due to their tunable

magnetic and structural properties. However, practical deployment in magnetocaloric refrigeration devices requires an in-depth understanding of their long-term stability under operational conditions, including exposure to cryogenic temperatures and high magnetic fields. This study explores the AgA'Cr4Se8 breathing spinel materials and investigates the corrosion resistance under such extreme conditions. Cryogenic corrosion testing was performed by immersing samples in liquid nitrogen to simulate prolonged exposure to low-temperature environments. Magnetic field-induced corrosion was assessed by subjecting the materials to magnetic fields of up to 1 Tesla. Post-testing characterization included X-ray diffraction (XRD) for structural integrity, scanning electron microscopy (SEM) for surface morphology, and energy-dispersive X-ray spectroscopy (EDS) to detect elemental degradation or oxide formation. The results provided key insights into the robustness of these materials in real-world applications.

Corrosion Resistance in Co-Based Spinel Magnetocaloric Candidates
Poster #12 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Lara Martins de Oliveira, Rosia Jones, & Andres Jones
Research Mentor(s): Madalynn Marshall

Spinel-based materials are widely regarded as promising magnetocaloric materials for refrigeration technology due to their tunable structural and magnetic properties. Recently, newly explored breathing spinels, particularly sulfides and selenides, have emerged as potential next-generation magnetocaloric materials for low temperature applications owing to their highly frustrated magnetic nature enabling large entropy changes and low magnetic transition temperatures. However, the long-term viability of these materials in magnetic refrigeration devices depends not only on their magnetocaloric performance but also on their chemical stability under operational conditions. This study addresses two key aspects: (i) cryogenic temperature and magnetic field corrosion testing on Co-based spinel magnetocaloric candidates, and (ii) synthetic exploration of new cobalt-based breathing spinel materials. Cryogenic corrosion testing was conducted by immersing the materials in liquid nitrogen while the corrosion resistance under high magnetic fields was evaluated by exposing the materials to varying magnetic fields of up to 1 T. Structural and surface integrity were examined using X-ray diffraction, scanning electron microscopy, and energy-dispersive X-ray spectroscopy before and after testing. This work not only advances the understanding of corrosion resistance in magnetocaloric spinels but also paves the way for the discovery of high-performance Co-based materials suitable for next-generation refrigeration technologies. Furthermore, the results of this study provide critical insights into their potential for long-term use in magnetocaloric cooling devices.

Counting of Microfibers in Lake Allatoona Sand

Poster #13 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Daniel Farris
Research Mentor(s): Marina Koether

Microfibers are present in sand. This study examines six beach sites on Lake Allatoona in Georgia to determine the concentration of microfibers in certain locations on the lake. Each sand sample will be analyzed up to six times. The concentration may increase by location based on proximity to the dam as the only outlet is release by the dam. Samples are gathered in the winter when the water level is low such that the sand taken is truly under water during the summer season. The sifted sand is weighed and transferred using a salt solution to a separator where the sand and the microfibers are separated by density. An oxidation step ensures any organic matter is removed prior to further density separation and finally filtration, with microfibers appearing on a filter. Using a microscope, microfibers are counted for each sample. It is expected that more microfibers will be found south of the dam as there is less water flow from the south towards the dam compared to the flow of water from the northeast.

Design and Development of Peptide Therapeutics Targeting the Alpha-Synuclein Fibrils in Parkinson Disease
Poster #22 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Vincent Dupard & Kira Galloway
Research Mentor(s): Mohammad Halim

Parkinson's Disease (PD) has the highest rate of increased death and disability of any neurological disorder, as well as being the second most prevalent neurological degenerative disease in the world according to the WHO. The symptoms are derived from the build-up of Lewy bodies (LB) leading to neuron degeneration, affecting both motor functions and memory recollection. Alpha-Synuclein protein is believed to be one of the sources for oligomerization and fibril formation. The aim of this research is to design and develop peptide analogs targeting alpha-synuclein to prevent oligomerization and fibril formation. Various analogs were computationally designed from a potent peptide to improve the crossing of blood-brain barrier and oral bioavailability. Molecular docking was employed to determine the binding affinity and interaction with Alpha-Synuclein. The peptides had docking scores ranging from -146.79 to -130.46. Analog 8 (-146.79) containing two phenylalanine in a helical turn showed the highest binding affinity and interaction at the docking sites. Based on the modelling results, this peptide was synthesized using the solid phase synthesis protocol using Liberty Blue peptide synthesizer. In this protocol, a high swelling rink-amide resin with a loading capacity of .6 mmol/g and 100-200 mesh size was used. After the peptide synthesis, the peptide-resin complexes were cleaved

with a cocktail containing high amount of trifluoracetic acid. The cleaved peptides were filtered and precipitated by adding cold ether. Then, the precipitate dissolved with acetic acid and freeze-dried overnight to form peptide powders. The synthesis of the peptide was confirmed by mass spectrometry. Three intense peaks were detected at m/z 406.23, 608.83, and 1216.66 which correspond to [M+3H]3+, [M+2H]2+, and [M+H]1+ charge states, respectively. The experimental mass is precisely agreed with the theoretical mass of the peptide. In future, biological assays of this and other favorable peptides will be carried out.

Design and Synthesis of Histidine-rich Peptides Analogs Targeting 3-Chemotrypsin Like Protease of SARS-CoV-2

Poster #21 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Cecilia Le & Lily Schwartz
Research Mentor(s): Mohammad Halim

Since the development of COVID-19, a disease caused by SARS-CoV-2, there has been a need for the development of an innovative solution to increase the bioavailability of inhibitors of SARS-CoV-2. COVID-19 has decreased the global life expectancy by 1.6 years from 2019-2020. Peptide therapeutics are effective because of their high affinity with receptors and low toxicity compared to small molecule drugs. Additionally, they can reduce off-target side effects because of their heightened target specificity and potency. The aim of this research is to design, model and synthesize the peptide that had the highest binding affinity and would be most effective when inhibiting the SARS-CoV-2 main protease (Mpro). The 3CLpro protein of SARS-CoV-2 was targeted because it is essential for viral processing of SARS-CoV-2. Ten (10) new analogues containing several histidine amino acids were designed based on a peptide which showed inhibition efficiency against the Mpro. Peptides were modeled in Alpha-Fold to obtain the 3D structures and were then processed through the HDOCK server for molecular docking. The peptide analog 9 with the strongest binding affinity was analyzed and prepared for synthesis using the solid phase synthesis protocol employing a high swelling rink amide resin. After the peptide synthesis, the bond between peptide-resin complex was cleaved with 95% TFA, 2.5% H2O, and 2.5% Triisopropylsilane. The cleaved peptides were filtered, precipitated by adding cold ether, and lyophilized using acetic acid. The mass spectrometry experiment was conducted by dissolving peptide in 50%:49%:1% acetonitrile: water: formic acid solution at a concentration of 50 micromolar. Three intense peaks were detected at m/z 428.58, 642.33, and 1283.58 which correspond to the charge states of the peptide. However, one of the glycine is noticed to cleave from peptide as well. After synthesizing the peptide correctly, the analog 9 will be tested for inhibition efficiency using protease assays.

Developing Glycine-rich Peptide Therapeutics Targeting Alpha-Synuclein Aggregation in Parkinson Disease

Poster #23 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Khang Tran & Nataly Barahona
Research Mentor(s): Mohammad Halim

Various neurodegenerative conditions like dementia, Alzheimer's disease (AD), and Parkinson's disease (PD) cannot be easily treated using current medical technology. Currently, over 55 million individuals suffer from dementia worldwide, with more than 10 million new cases diagnosed every year. The impact of dementia extends far beyond the individual, affecting also the lives of their families, friends, and caregivers by causing memory loss, behavioral changes, and social reclusion, which progressively get worse over time. In recent studies, scientists have uncovered a link between alpha-synuclein (α-syn) and Parkinson's disease. The misfolding and aggregation of alpha-synuclein, often called Lewy Bodies (LB), is extremely hard to exterminate, which suggests for a new therapeutic strategy. As a result of their high target specificity and potency, peptide therapeutics are designed to bind specifically to certain proteins or receptors, leading to enhanced efficacy, a disadvantage of small molecules. Furthermore, their amino-acid-based structure minimizes the risk of eliciting an immune response. This study aims to design glycine-rich peptide analogs to inhibit alpha-synuclein aggregation. By utilizing alpha-fold, 3D models of the ten peptide analogs were created. Subsequently using the molecular docking, the binding affinity of each of these analogs was determined. Among these analogs, one analog was synthesized using the solid phase synthesis protocol. In this protocol, high swelling rink amide resin with a loading capacity of 0.6 mmol/g and 100-200 mesh size was used. The peptide-resin complexes were cleaved, filtered and precipitated. Then, the precipitate dissolved with 10% acetic acid and lyophilized overnight to form peptide powders. The peptide was characterized by mass spectrometry. One intense peak was noticed at m/z 503.3 which corresponds to [M+2H]2+, change states which exactly agreed with the theoretical masses. For further studies, biological assay using LCMS and FRET will be employed to measure the inhibition efficiency of these peptides.

Ecdysone Receptor Protein Interactions Profile
Poster #31 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Matthew Frias, Layth Al-Sibai, & Ariadna Alpizar
Research Mentor(s): Rajnish Singh & Joanna Wardwell-Ozgo

Ecdysone is a steroid hormone critical for developmental processes in insects. Ecdysone binds to the ligand-binding domain (LBD) of the ecdysone receptor to begin metamorphosis. The LBD interacts with ultra-spiracle protein (USP), and an unknown number of other proteins to modulate gene expression. The identities of these proteins and understanding of their interactions with the LBD and USP, remains limited. The advanced biochemistry CURE lab will

use a yeast 2 hybrid assay which takes advantage of the DNA binding and activation domains of the GAL- 4 transcription factor. A fusion protein is composed of the binding domain (BD) and the LBD encoded on the pGBKT7 (bait plasmid, BD-LBD). The activation domain (AD) is fused to proteins from a cDNA drosophila library encoded on pGADT7 (prey plasmids). An interaction between a prey protein and bait protein will reconstitute the GAL4 transcription factor and induce expression of reporter genes resulting in blue colonies. To ensure the validity of the yeast two hybrid assay, a series of controls were run. For the positive control, 2 known interacting proteins: T-antigen (TAg) and p53 were used and for the negative control non-interacting proteins TAg and Laminin (LAM) were used. A yeast two hybrid assay using AD-TAg and BD-p53 produced blue colonies while no blue colonies were seen when AD-TAg and BD-LAM were used. We also did the yeast two hybrid assay with only the bait plasmid- BD-LBD and no blue colonies were seen indicating that the bait plasmid does not autoactivate reporter genes. After successful completion of control experiments, a library screen of BD-LBD interacting proteins will be carried and potential interactors identified. This research provides valuable insights with potential applications to the understanding of nuclear receptors.

The Effect of Sterics and Pre-Twisted Molecular Geometry on the Photophysical Properties of Nitrophenyl-Substituted Polycyclic 1,2-BN Heteroarenes

Oral Presentation (Prillaman Hall)
Wednesday, April 16, 9:00am – 9:50am
Undergraduate Student(s): Lilianna Kocai
Research Mentor(s): Carl Saint-Louis

Replacing one of the sp^2 C=C bonds of a polycyclic aromatic hydrocarbon with a boron-nitrogen bond results in flat-structured heterocycles known as aromatic azaborines (AAs). AAs are well-known for their distinct optoelectronic properties, which include photochemical stability, high molar absorption coefficient, and high fluorescent quantum yields, as well as large Stokes shifts and tunable absorption/emission spectra, making them ideal candidates for a wide range of applications. Adding a -NO_2 group to AA scaffolds, specifically pyrrolidinone-fused-1,2-azaborines (PFAs), to redshift their absorbance and emission and create electron-deficient n-type organic conjugates, causes significant emission quenching due to aggregate formation induced by strong intermolecular π-π stacking at high concentrations. This emission quenching phenomenon is referred to as aggregation-caused quenching (ACQ) emission. This practical limitation poses significant challenges for -NO_2 substituted PFAs' use in many applications. We hypothesized that increasing the steric interactions through the PFA scaffold by incorporating a pre-twisted molecular geometry by including bulky substituents such as methyl group will result in -NO_2-phenyl substituted PFAs with aggregation-induced emission (AIE), aggregation-induced emission enhancement (AIEE), solvatochromic and thermochromic properties. These findings will help to improve future AIE-active PFAs and better understand how molecular geometry affects these compounds' optoelectronic capabilities.

Engineering Stimuli-Responsive Multifunctional Fluorescent Materials
Poster #5 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Skylor Seetaram
Graduate Student(s): Blaise Williams
Research Mentor(s): Carl Saint-Louis

Replacing one of the C=C bonds of a polycyclic aromatic hydrocarbon with a BN bond results in flat-structured heterocycles known as aromatic azaborines (AAs). AAs are well-known for their distinct optoelectronic properties, which include photochemical stability, high molar absorption coefficient, and high fluorescent quantum yields, as well as large Stokes shifts and tunable absorption/emission spectra, making them ideal candidates for a wide range of applications. Adding a -NO2 group to AA scaffolds, specifically pyrrolidinone-fused-1,2-azaborines (PFAs), to redshift their absorbance and emission causes significant emission quenching due to aggregate formation induced by strong intermolecular π-π stacking at high concentrations. This emission quenching phenomenon is referred to as aggregation-caused quenching (ACQ) emission. This practical limitation poses significant challenges for -NO2 substituted PFAs' use in many applications. We recently demonstrated that inserting a twisted molecular geometry into the scaffold of -NO2 substituted PFAs relieves the π-π stacking interaction and results in aggregation-induced emission (AIE) at high concentrations, alleviating the ACQ issue. Even though the ACQ problem is resolved, the twisted -NO2 substituted PFA has limitations, such as low solubility in major solvents, which results in the loss of important optical properties. To overcome these limitations, we incorporated a benzoxadiazole derivative as an electron-deficient heterocycle to expand the π-system of the PFA while maintaining the twisted molecular geometry. The inclusion of the benzoxadiazole derivative resulted in increase solubility and the restoration of important optical properties creating stimuli-responsive multifunctional fluorescent materials. These findings will aid in the development of future electron-deficient chromophores with high solubility, as well as the improvement of optical properties for stimuli-responsive multifunctional fluorescent materials.

Exploring Protein Interactions to Understand Gene Regulation by the Drosophila Ecdysone Receptor
Poster #34 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Joshua Blackburn & Kaylee Stone
Research Mentor(s): Joanna Wardwell-Ozgo

The Ecdysone Receptor (EcR) is a nuclear receptor found in invertebrates, such as drosophila, that regulates gene expression during development and reproduction. While it is known that the

ligand binding domain (LBD) of the ecdysone receptor binds some accessory proteins besides the ligand to regulate gene expression, protein-protein interactions with the ligand binding domain of the ecdysone receptor is understudied, and identifying the full counsel of these proteins can give major insights into how the system regulates gene expression. This project uses the Yeast Two-Hybrid (Y2H) assay to investigate novel physical interactions between the LBD of EcR and proteins in a drosophila cDNA library. The LBD is fused to the DNA binding domain of Gal4, while a drosophila library of cDNA is fused to the DNA activation domain of Gal4, creating bait and prey proteins respectively. When bait and prey are transformed into yeast, and if they interact, Gal4 transcription factor is successfully reconstituted which then activates reporter genes resulting in blue colonies and resistance to the antibiotic aureobasidin, enabling the identification of novel protein-protein interactions. A preliminary check for autoactivation was completed by transforming our bait into yeast and performing the assay to ensure that reporter genes are not activated by the LBD in the absence of the DNA activation domain. Y2H controls were also performed; the positive control confirmed interaction between known interacting proteins p53 and T-antigen and the negative control confirmed that known non-interacting proteins do not activate reporter genes. By completing the check for potential autoactivation and positive and negative controls of the Y2H assay, it was determined that the assay is functioning as designed, and further experimentation can be completed. The library screening will be completed to determine proteins that positively interact with the LBD of EcR and potentially aid in gene regulation.

GC/MS Analysis of Allergens in Perfumes and Allergen-Protein Interaction via Molecular Docking

Poster #32 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Mary Smith & Noah Blair
Research Mentor(s): Wei Zhou

Beautification products have been around for a very long time, with perfumes being among the oldest forms. Many different ingredients are added to these perfumes, such as essential oils from different plants, to achieve certain desired scents. As the development of new and more beauty products expands, the study of possible unknown or hidden compounds in those products intensifies. We focused on the identification and quantification of allergen compounds, specifically coumarin and benzyl alcohol, present in various perfumes. The interaction between allergen molecules and human leukocyte antigens (HLA) protein after a perfume is sprayed and in contact with human skin is also our research interest. Interested compounds in perfumes and other beauty products can be identified and quantified via chromatographic separation followed by mass spectroscopic analysis (GC/MS). Bromobenzene was selected as the internal standard, and the elution procedure was developed via the Shimadzu QP2010 Plus GCMS system. Both coumarin and benzyl alcohol have been resolved and identified in a 27-minute elution process.

The calibration curves with and without internal standards have been constructed with excellent linearity (R2 = 0.999). Both allergens from various perfume samples have been quantified at low ppm levels. The allergen-protein interactions via molecular docking were analyzed via the HDOCK server. Preliminary results show that the unbiased docking (-92.8 kJ/mol) between the HLA-B protein and benzyl alcohol has better binding affinity than the bias docking (-68.33 kJ/mol). Further research will be done with molecular docking for coumarin, and the results will be summarized and presented.

Hormones and Their Possible Effect on Cancerous Growth Through the Model Drosophila

Poster #13 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Abigail Almond
Research Mentor(s): Joanna Wardwell-Ozgo

With the rate of cancer increasing all over the world, it is important to consider that we still don't have the best solution for patients. According to the American Cancer society, there will be an estimated 2,041,910 new cancer diagnoses and an estimated 618,120 cancer deaths in the United States in 2025. There is estimated to be 319,750 new breast cancer diagnoses for both sexes in 2025 (Cancer Facts & Figures 2025, 2025). Breast cancer often evolves from cells that receive information from hormones to drive its uncontrolled cell growth, but we still aren't sure how this is caused. One important pathway for cancer growth is the Hippo pathway. The Hippo pathway operates the same way in Drosophila as it does in humans. It is unknown however, if the Hippo growth control pathway and hormones work together to cause cancer. To better understand this, we use the model Drosophila to measure whether hormone signaling is important for tissue overgrowth. Drosophila (fruit flies) are a great model for diseases in the human body, as it is estimated that we share 60% of the same genes. This study uses the eyes of Drosophila to investigate if hormone signaling is important for yki-driven overgrowth in the eye tissue. To better understand the importance of hormones in disease, the Wardwell-Ozgo lab developed a set of tools to allow us the ability to investigate the role of hormone signaling at a cellular, tissue, or behavioral level. The eye specific Gal4-driver, GMR, was used to cause the overexpression of Yki (GMR-Gal4; UAS-YkiV5) and were crossed with flies with the proteins UAS–RFP (negative control), UAS-EcRLBD, UAS-EcRLBD-A83T, and UAS-EcR-all isoforms-RNAi (positive control). Then, when these crosses hatched, I chopped the heads off and took images of the heads from top and sides to measure the length and width of the eyes to test whether disrupting hormonal signaling changed the Yki-induced overgrowth phenotype. My prediction is that eye size will decrease with the co-expression of Yki and EcRLBD, showing that hormone signaling is important. By further understanding the role hormones play in hormone-driven cancers, we can develop better solutions and therapies for those diagnosed with these cancers. Our next step is to look at different tissues and see if what we find holds true. If growth

is affected in eye and wing tissue, we feel we may have uncovered a link that is broad biologically. If so, we can have increased confidence that this link exists in humans, leading to a more effective path and treatment for those with hormone-driven cancers. The Wardwell-Ozgo lab aims to better understand these hormones as driving forces of disease and development. We specifically follow the Ecdysone receptor, the major protein involved in hormone signaling in flies (Wardwell-Ozgo). The specific proteins used were UAS-EcRLBD and UAS-EcRLBD-A83T. We predict that GMR-Gal4; UAS-Yki-V5 will have a large overgrowth in the eyes, and depriving the tissue of proper hormonal signaling will show supporting evidence that hormones drive cancerous growth. My prediction is that eye size will decrease with the co-expression of Yki and EcRLBD, showing that hormone signaling is important. By further understanding the role hormones play in hormone-driven cancers, we can develop better solutions and therapies for those diagnosed with these cancers. Our next step is to look at different tissues and see if what we find holds true. If growth is affected in eye and wing tissue, we feel we may have uncovered a link that is broad biologically. If so, we are able to have increased confidence that this link exists in humans, leading to a more effective path and treatment for those with hormone-driven cancers.

Identification of Ecdysone Receptor Coregulators by Yeast Two-Hybrid Assay
Poster #30 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Juniper Bullock & Matthew Sortie
Research Mentor(s): Rajnish Singh & Joanna Wardwell-Ozgo

Ecdysone, a steroid hormone, has a crucial role in the development of insects and other arthropods. The ecdysone receptor is a heterodimer of EcR and ultraspiracle protein (USP). The ligand binding domain (LBD) located on the EcR subunit of the ecdysone receptor is the region that binds ecdysone and other proteins to regulate gene expression. Though the ecdysone receptor has been modeled in detail, the identity of the proteins that bind LBD is understudied and is the purpose of this research. A yeast two-hybrid (Y2H) assay is used to identify protein interactions with the LBD of the ecdysone receptor. Y2H assay uses the Gal4 transcription factor domains called DNA binding domain (BD) and the activation domain (AD). The LBD of the ecdysone receptor is fused with the BD of Gal4, acting as a 'bait' and the AD of Gal4 is fused with proteins from a drosophila cDNA library acting as the 'prey'. Gal4 is reconstituted when the two halves are brought into proximity by the interaction of bait and prey proteins enabling the activation of reporter genes, most prominent being the activation of alpha-galactosidase which in the presence of X-alpha gal gives blue-colored colonies indicative of protein-protein interactions. Control experiments were conducted to ensure assay validity. Autoactivation testing was performed to confirm that the bait construct does not independently activate the reporter gene in

the absence of prey. For positive control, a known interacting protein pair (p53 and T-antigen) was used to confirm that the Y2H system was functioning correctly. Negative control was performed by two non-interacting proteins (T-antigen and laminin) to verify that no non-specific interactions occurred. With controls successfully completed, the Y2H screen was conducted to identify proteins interacting with the ecdysone receptor. Positives will be further analyzed to identify novel proteins interacting with the ecdysone receptor.

Identification of Lipids in Bovine Brains Using Untargeted Liquid Chromatography and Mass Spectrometry

Poster #12 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Brian Dodson
Research Mentor(s): Mohammad Halim

Lipids are a crucial molecule for maintaining healthy brain cells. Imbalances of lipid classes are strongly correlated with certain diseases of the brain, which can extend to the rest of the body. Knowing the general lipid composition of healthy mammalian brains helps to identify changes that are caused by disease and use those markers to help develop more accurate diagnostic tests or even therapeutics for the disease. In this study, the lipid composition of bovine brain was determined by utilizing untargeted Liquid Chromatography-Mass Spectrometry (LCMS). This technique allows for accurate identification of the lipid classes found in a brain sample that has been prepared using Folch extraction. The Folch extraction is performed using a mixture of methanol and chloroform mixed with a brain sample. The mixture is allowed to incubate at room temperature for an hour while being mixed by a shaker to help extract the lipids. Then, water is added to mixture and centrifuged to separate the organic phase and the aqueous phase. The organic phase is transferred to another microcentrifuge tube to evaporate the organic solvent using a vacuum centrifuge. The sample is then reconstituted in methanol: acetonitrile (90:10). Once reconstituted, lipids are separated using a reverse phase C18 column in a Vanquish Flex HPLC, with a 12-minute gradient containing water and acetonitrile. The mass spectrometer is coupled with the LC in positive and negative mode to determine the m/z of the lipids present in the sample. Initially Compound Discover software was used to identify preliminary matches which then further filtered using the LIPIDMAPS software to classify the lipids such as Sphingolipids, Glycerolipids, Fatty acyls, Glycerophospholipids, and Sterol lipids. Preliminary analysis of a bovine brain showed the most prevalent lipid classes to be fatty acyls, by a large margin, followed by Glycerophospholipids.

Identification of Novel Co-Regulators of the Ecdysone Receptor Using a Yeast Two-Hybrid Assay
Poster #31 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Lyriq Lawyer & Teddy Nersesian
Research Mentor(s): Rajnish Singh & Joanna Wardwell-Ozgo

The Ecdysone receptor (ECR) is a nuclear receptor essential for gene regulation during Drosophila development, functioning as a heterodimer with ultraspiracle (USP). While this interaction is well established, the role of additional co-regulators remains unclear. This study aims to identify novel coactivators and corepressors that interact with the ligand-binding domain (LBD) of ECR and influence gene expression. To investigate these interactions, we employed the yeast two-hybrid (Y2H) assay, a widely used method for detecting protein-protein interactions. We fused the ECR LBD to the Gal4 DNA-binding domain (BD) and candidate co-regulators to the Gal4 activation domain (AD). If an interaction occurs, the BD and AD are brought together, activating reporter genes that enable yeast growth on selective media and producing blue colony formation via X-α-Gal hydrolysis. Additionally, resistance to aureobasidin serves as another reporter for interaction specificity. Our results confirmed that the ECR-LBD does not autoactivate the reporter genes, ensuring assay validity. Yeast transformed with LBD alone (Y190 + LBD) showed no growth on SD/-Trp/X-α-Gal/AbA plates, indicating no independent activation. While minimal background activity was observed on SD/-Trp/X-α-Gal plates, colonies remained white. Control experiments demonstrated specificity, with the positive control (Y190 + p53 with TAg) showing strong interaction and blue colonies, while the negative control (Y190 + LAM with TAg) showed no activity. By identifying proteins that modulate ECR activity, this study enhances understanding of steroid hormone signaling. These findings contribute to insights into nuclear receptor regulation in both Drosophila and mammalian systems, shedding light on hormone-driven gene regulation in health and disease.

Identifying Chemical Methods to Optimize the Lifetime of Peracetic Acid (PAA)
Poster #28 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Kortney Martin & Austen Monteith
Research Mentor(s): Daniel Sabo & Jordan Ash

Maintaining efficient and effective sanitation practices in the poultry processing industry has recently received significant attention. Peracetic acid (PAA) has been utilized during the immersion chilling process as an antimicrobial agent to ensure food safety, but its short lifespan has limited its potential. This study explores various chemical methods for lengthening the lifetime of PAA. Differing concentrations of ethylenediaminetetraacetic acid (EDTA), 1-hydroxyethylidene-1,1-diphosphonic acid (HEDP), dipicolinic acid (DPA), and aspartic acid

diethoxy succinate (AES), were used individually and in varying combinations within simulated and actual chiller water, as well as iron (Fe(III)) solutions. Simulated chiller water contained sodium, potassium, and magnesium cation total mixture at 1000ppm, with some trials also containing 1800 ppm BSA (bovine serum albumin). Iron solutions were synthesized at 200 ppm. A MP-9700E meter was used to measure the concentration of PAA at recorded time intervals, and the resulting half-life of PAA was calculated. The most effective concentration(s) and combination(s) of chemicals to increase the lifetime of PAA will be reported. This study is important to the poultry processing industry, for it has the potential to enhance food safety while reducing the associated costs of sanitation.

Identifying Protein-Protein Interactions with the Ecdysone Receptor Ligand Binding Domain
Poster #32 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Sloan Kearns & Farah Milford
Research Mentor(s): Rajnish Singh & Joanna Wardwell-Ozgo

Understanding protein-protein interactions (PPIs) are important in many biological processes. In the advanced biochemistry CURE lab, we focus on protein interactions with the ecdysone receptor (EcR) ligand binding domain (LBD) to better understand how the EcR functions to control development in drosophila. In our research, we use the yeast two-hybrid assay to screen for novel proteins that physically interact with the LBD of the Ecdysone receptor. This assay uses the modular nature of the transcription factor Gal4. The DNA binding domain of Gal4 is fused with the LBD to form the "bait" protein and it's DNA activation domain (AD) is fused to proteins from a drosophila cDNA library to form "prey" proteins, If the bait and a prey interact, the BD and AD domains will come together to reconstitute Gal4 and turn on reporter genes like alpha galactosidase which will turn the yeast colonies blue in presence of X-alpha gal. Control experiments were conducted to ensure that the assay is functioning optimally. Yeast two hybrid assay with bait LBD alone did not autoactivate the reporter genes. Known interactors p53 and Tantigen gave blue colonies indicating a true interaction while non-interacting proteins gave no blue colonies as expected. A library screen with the bait will be conducted and positive interactors will be identified. This research will add to the understanding of gene regulation by the ecdysone receptor.

Investigating the Impact of Sugar on Protein Stability by High Resolution Mass Spectrometry
Poster #25 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am

Undergraduate Student(s): Taylor Evans
Research Mentor(s): Mohammad Halim

Ensuring that protein, antibody, peptide, and enzyme-based medications maintain their native structure during long-term storage is critical to the safety and efficiency of pharmaceuticals. A critical aspect of preservation for protein-based therapeutics is excipients, such as sugars, that can maintain their stability. Sucrose is a widely used stabilizer in the pharmaceutical industry. Various research suggests that sucrose can preserve the conformational stability of proteins during storage conditions. We hypothesize that although sucrose preserves the protein structure, we suspect that sucrose can strongly bind with the protein through glycosylation which may alter the function of the protein. Glycosylation disrupts the native structure of the protein, promotes aggregation, blocks active sites, reduces function, and leads to degradation, all of which decrease the protein's shelf life. To test this hypothesis, we have employed high resolution mass spectrometry investigations monitoring the change of protein native conformation and glycosylation. Various concentrations of sucrose were prepared, incubated with a model protein Lysozyme, and analyzed using mass spectrometry. All mass spectra were obtained using an Orbitrap Exploris 240. In this experiment, the control sample was Lysozyme in water. At lower concentration of 0.1mM sucrose, Lysozyme showed the binding of one sucrose molecule. At an increased concentration of 0.5mM sucrose, seven sucrose molecules are adducted with Lysozyme, while incubation with 1mM sucrose exhibited the formation of nine adducts. Furthermore, Lysozyme incubated with 3 mM sucrose displayed fifteen sucrose adduct formation with Lysozyme. It is evident that despite widespread usage as stabilizing agent of protein-based therapeutics, sucrose is not an effective stabilizing agent because it promotes unintentional glycosylation, which may alter the protein function and stability. In future, tandem mass spectrometry experiments will be performed to locate the glycosylation site of sucrose.

Investigation of the Emerging Magnetic Behavior in a Breathing Spinel Material
Oral Presentation (Prillaman Hall)
Wednesday, April 16, 9:00am – 9:50am
Graduate Student(s): Rupali Mangotra
Research Mentor(s): Madalynn Marshall

The Pyrochlore lattice, a corner-sharing tetrahedral network, is a prime candidate for geometric frustration in three dimensions. This lattice appears in various materials, including spinels with the general formula AM_2X_4 (A = alkali, alkaline earth metals, heavier 3d transition metals, Ge, Cd, Hg; M = transition and post-transition metals; X = group 16 elements). Introducing two different-sized cations at the A site forms the breathing pyrochlore lattice, observed in materials with the general formula $AA'Cr_4X_8$. Partial A-site substitution creates two inequivalent

tetrahedra with bond distances d, d' and a breathing ratio d'/d, leading to two inequivalent nearest-neighbor magnetic exchange interactions J, J'. These additional degrees of freedom allow the tunability of frustration within the lattice, giving rise to exotic magnetic states.
This talk will explore the chemical tuning effects of A and A' sites on the structure, breathing ratio, and magnetic behavior in the breathing spinel $CuA'Cr_4Se_8$ family. $CuAlCr_4Se_8$ exhibits a highly frustrated magnetic nature with complex order and a freezing temperature (Tf) of approximately 13 K. Its strong frustration, exclusion of rare-earth elements, and low transition temperatures make breathing spinels promising magnetocaloric candidates for low-temperature applications. The complex magnetic order in this family provides a pathway to achieve a large magnetocaloric effect (MCE) via highly frustrated magnetism. Using an indirect measurement approach, we have assessed the MCE potential of the $CuA'Cr_4Se_8$ family.

A Mechanical Design of a High Vacuum Chamber with Mounting Racks for the Wide-Band Microwave Fabry-Pérot Resonator
Oral Presentation (Microsoft Teams)
Friday, April 18, 1:45pm - 2:00pm
Undergraduate Student(s): Rhys Medhurst
Research Mentor(s): Lu Kang

High vacuum systems permit supersonic expansion of pulsed molecular beams, so collision broadening is minimized, achieving high-resolution spectra; because of this, they are important for studying rotational spectroscopy in microwave frequency bands. This research focuses extensively on the mechanical design of a single high vacuum chamber that includes multiple mounting racks to fully support a narrow-band Fabry-Pérot resonator. The chamber must accommodate eighteen and three-quarters inch diameter reflective mirrors, each possessing a forty-inch focus length, to accomplish 1,000–10,000 microwave pulse reflections prior to free-induction-decay (FID) signals. Given laboratory constraints, the system is designed to function within each limited access space, using only single-phase, 120-V power. To achieve this purpose, the vacuum chamber will incorporate several vacuum feedthroughs, in addition to each modified JIS (B2290) 500-mm I.D. VG/VF flange for sealing and each tori-spherical tank head, including every ASA 11" O.D. flange for connection to a Varian VHS-6 oil diffusion pump. Inside, mounting racks will help with precisely positioning and adjusting the Fabry-Pérot resonator mirror. The research methodology combines ready-made vacuum parts with a literature review and design using SolidWorks. This cross-disciplinary project expertly bridges natural sciences and engineering, enabling students to cultivate large expertise in mechanical system design, vacuum technology, and microwave spectroscopy. The project's outcome will result in growing comprehension of high-precision vacuum systems, and the project will also strengthen teamwork and problem-solving skills. Hands-on experience with 3D modeling, motion control, and data analysis will also be gained. Ultimately, the integration of design and research development will be purposeful for the advancement of engineering within chemistry.

Metal Distribution in Sands of Lake Allatoona
Poster #9 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Josh Britton
Research Mentor(s): Marina Koether

Using an XRF instrument, metal content of sand from various locations around Lake Allatoona was determined. Multiple samples were obtained from the same location with varying results. Many locations were analyzed. There was no one location where a point source of contamination was apparent. The results will show the ppm of lead, chromium, mercury that was prevalent in the samples, along with some other metals. Comparison to acceptable concentration levels of the metals will be discussed.

Noncovalent Antiviral Peptide Stapling Targeting Main Protease of SARS-CoV-2
Poster #13 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Julia Franz
Research Mentor(s): Mohammad Halim

The recent coronavirus pandemic caused by SARS coronavirus 2 (SARS-CoV-2) continues to pose a significant health risk with over 2000 deaths in January 2025 alone. SARS-CoV-2 is an RNA virus comprising 16 nonstructural proteins, 4 structural proteins, and 9 accessory proteins. The nonstructural proteins are cleaved by the main protease (Mpro) of SARS-CoV-2, and the resulting fragments become centers for virus replication and transcription. Thus, inhibiting the Mpro prevents replication, enabling effective prevention and treatment of SARS-CoV-2. In this study peptide therapeutics are used to inhibit the Mpro due to their targeted binding ability to the catalytic dyad His41 and Cys145 with few off target effects. We synthesized two peptides and corresponding noncovalent staple peptide analogues to inhibit the Mpro. These peptides, identified for their high binding affinity in previous bioinformatics studies, are non-cytotoxic and exhibit potent antiviral properties. The corresponding analogues utilize non-covalent peptide stapling by inserting or replacing specific amino acids with an α-methyl-L-phenylalanine. The methyl group on the alpha-carbon helps limit the mobility of amino acids forcing the sidechain interactions between aromatic rings. These extra interactions commonly induce a helical structure providing external stability to the peptide. Efficacy of the peptides are characterized using a selected ion monitoring based LCMS (liquid chromatography coupled with mass spectrometry) assay yielding an inhibition concentration at 50% (IC50). Additionally FRET analysis of the peptides will be performed to yield a second IC50 for comparison. The current data suggests that the non-covalent stapled peptides more selectively target the Mpro compared to their linear counterparts.

Optimized Purification and Activity Analysis of Endothelial Nitric Oxide Synthase (eNOS, NOS3)
Poster #15 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Ieza Fatima
Graduate Student(s): Gillyan Jewett
Recent Graduate(s): Bethany Daniels
Research Mentor(s): Carol Chrestensen

Endothelial nitric oxide synthase (NOS3, also known as eNOS) plays a crucial role in vascular health by synthesizing nitric oxide (NO), which regulates vascular tone, blood pressure, and endothelial function. Despite its significance, producing active NOS3 for biochemical studies remains challenging. We developed an optimized protocol to yield full-length NOS3 in a highly purified and active state, validated by SDS-PAGE and spectrophotometric analysis. NOS3 is as a substrate of p38 alpha, we tested the ability of wild p38 alpha and two binding site variants to phosphorylate NOS3. Differential phosphorylation patterns enable us to predict the areas on p38 alpha that are likely to be physiologically relevant to the intracellular binding of NOS3 and p38. The successful purification of active NOS3 opens new avenues for investigating its structure-function relationships, regulatory mechanisms, and potential therapeutic applications in cardiovascular diseases. This optimized protocol provides a reliable means of obtaining recombinant NOS3 suitable for detailed biochemical and functional studies. Purified protein will facilitate future studies on NOS3 regulation and its role in endothelial health and vascular homeostasis. Our future research aims to elucidate the relationship between NOS3 and Sirtuin 6 (SIRT6), an NAD+-dependent deacetylase, to understand how SIRT6 modulates NOS3 function and its implications for endothelial health.

Proline and Methionine as Charge Reducing Agents in Native Mass Spectrometry
Poster #26 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Michelle Mba
Research Mentor(s): Mohammad Halim

Native mass spectrometry (MS) is an emerging technique that examines large protein complexes, revealing their structure, stoichiometry, and masses. Transferring weakly associated complexes from aqueous solution to a gaseous state using electrospray ionization (ESI) highlights the complexity of protein structure. With the addition of an amino acid as a charge-reducing agent, native MS allows for the observation of the tendency of protein and amino acids to compete for protein for protons during ESI, lowering the overall charged state of the protein. The chief objective of this research is to perform a comparative analysis of the effects of several amino acids

on the structure of a protein. Several amino acids solutions were prepared at varied concentrations (mM) with the model protein, lysozyme, to distinguish each solution by the changes of the charge distribution of folded and unfolded protein. The control, lysozyme in water, exhibited m/z peaks ranging from 8+ to 11+, with a dominant peak at 10+. When lysozyme was incubated at various concentrations of L-proline, the charge state distribution of the proteins shifted significantly favoring lower charge states from 5+ to 12+, where the most prominent peak at 8+. As the concentration of L-proline increased, a notable shift in the mass spectra was observed, continuously moving towards lower charged states. This shift suggests a correlation between the increased stability and adherence to the proteins' native structure. Importantly, proline was not adducted with lysozyme even at higher concentrations. However, for L-methionine, various charges states are observed from ranging from 9+ to 13+, lower concentrations (0.1 mM – 0.5 mM) were characterized by elevated spectral noise and the formation of adduct peaks in the protein native structure, indicating protein denaturation. However, in higher concentrations (0.8 –5.0 mM), the solutions were more stable and mimicked a similar trend seen in the concentrations of L-proline, maintaining the proteins' native structure. Further attempts are required to repeat these experiments to produce more reliable results.

Protease Stability of the Non-Covalent Staple Temporin L Peptide
Poster #20 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Shubh Patel, Matias Van Huffel, & Funsho Afolabi
Research Mentor(s): Mohammad Halim

Peptide therapeutics are very attractive over small-molecule medications, as they are highly selective, well-tolerated, and have less adverse effects. However, there are problems with making oral medications for peptide, as various digestive enzymes such as pepsin and trypsin degrade the peptide and prevent them from reaching the bloodstream and resulting in a stronger dosage. Our previous peptidomimetic design and in-vitro investigation revealed that a methylated analogue of Temporin L (TL) demonstrated an estimated IC50 at 4.57 μM which is higher than the natural TL peptide (38 μM) against the main protease (3CLpro) of SARS-CoV-2. However, generally this peptide has low stability against protease and liver metabolism. The aim of this research is to assess the proteases stability of Temporin L and its methylated pi-pi stable peptide in gastric and intestinal fluid containing proteases employing high performance liquid chromatography coupled with mass spectrometry (LCMS). In-vitro gastric and intestinal stability assay was performed by mixing the best staple peptide with gastric fluid containing pepsin and intestinal fluid comprising pancreatin at 37°C. Samples was removed at various time points and acetonitrile was added, then centrifuged, supernatant was taken and mixed with water and analyzed by LCMS. The absolute abundance of the intact peptide in MS was monitored compared to the abundance of the peptide at zero min (100%). The methylated

Temporin L peptide showed increased half-life over 60 min in-vitro gastric fluid containing pepsin, however, the non-methylated TL showed half-life less than 30 mins. Molecular docking of these peptides targeting pepsin and trypsin was conducted to reveal the mechanism behind the improved stability of the methylated staple peptide.

Proteins that Bind with the LBD of the Ecdysone Receptor Responsible for Gene Regulation in Drosophila
Poster #32 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Portia Simpson & Lauren Black
Research Mentor(s): Joanna Wardwell-Ozgo & Rajnish Singh

The Ecdysone Receptor (ECR) is a nuclear receptor in Drosophila regulating gene activity. ECR consists of a ligand binding domain (LBD), which binds the ligand and other proteins, enhancing its ability to regulate gene expression involved in signaling pathways linked to processes such as cell growth, cell differential, and metamorphosis. However, many proteins are still unknown. This research aims to discover new interacting proteins via yeast two-hybrid assay. This assay uses the modular nature of Gal4, a transcription factor, with a DNA-binding domain (BD) and a DNA activation domain (AD). Gal4 AD-prey proteins from a drosophila cDNA library will be screened with Gal4 DNA BD fused to LBD (bait). If bait and any prey proteins interact, the Gal4 transcription factor is reconstituted and reporter genes are activated, as indicated by blue-colored colonies and resistance to antibiotic aureobascidin. So far, yeast transformations, LBD autoactivation, and positive and negative mating controls have been performed. White colonies appeared on all plates; therefore, the yeast transformations were successful. No colonies appeared on the DDO/X/A plate with LBD; therefore, Gal4 DNA BD-LBD does not autoactivate the reporter genes. Blue colonies appeared on the DDO/X/A plate for the positive control, and no colonies appeared for the negative control. All the controls work as expected, so we will proceed with the library screening of potential LBD protein interactors using the yeast two-hybrid assay. Gaining insights into these interactions expands our understanding of the ECR dynamics in Drosophila. This knowledge has potential implications for human health as nuclear receptors are linked to similar cellular activities.

Quantitative Analysis of African Grogue
Poster #24 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Bee Williamson
Research Mentor(s): Wei Zhou

A quantitative analysis on African Grogue, a type of alcohol most like American Moonshine, for possible contaminants from both the fermentation process as well as distillation. The initial qualitative analysis was done using GC-MS to find what contaminants were present in the samples and quantitative was done using a variety of methods such as GC-MS and UV-Vis spectroscopy. The major species of concern were phthalate and copper salts from distillation as well as harmful alcohols like methanol, propanol and butanol that can arise from fermentation. Only a few of the samples had detectable amounts of phthalates however the majority of samples contained detectable levels of butanol, propanol, methanol and acetic acid.

Removal of Per- and Polyfluoroalkyl Substances from Water Using Deep Eutectic Solvents

Poster #14 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Matthew Berg
Graduate Student(s): Abdul Hannan
Research Mentor(s): Mohammad Halim

Per- and Polyfluoroalkyl substances (PFAS) are diverse groups of synthetic chemicals containing multiple fluorine atoms attached to the alkyl chain. These compounds are commonly known as 'forever-chemicals', due to their extraordinary stability and superior properties. PFAS chemicals are found in the most modern products such as cleaners, aerosol sprays, non-stick cookware, food packaging, fabrics, and firefighting foams. Due to the high presence of these chemicals in manufactured products, PFAS can leach into the soil and then contaminate water supplies. Removal of these chemicals from water poses great challenges. Deep Eutectic Solvents (DESs) are emerging green solvents with promising usages in a variety of applications. These solvents have been linked to extracting various bioactive compounds from plant products, foods, and pharmaceuticals. However, very few studies are reported to remove PFAS using DESs solvents. The overall aim of this study is to develop a DES screening method for the effective removal of PFAS from water utilizing liquid chromatography and mass spectrometry. For preliminary studies, two DESs including Camphor: Menthol and Menthol: Octanoic Acid were synthesized by heating and stirring two components for over one hour. For extraction, PFOA (Perfluorooctanoic acid, an important PFAS) solution was prepared in water and added with DES in 1: 2 ratios (w/w). The DES: PFOA solution was then vortex and centrifuged to establish a bilayer suitable for accurate separation. The water phase solution was collected and run in the liquid chromatography and mass spectrometry to determine the amount transferred to DES phase. A calibration curve of PFOA was established using liquid chromatography and mass spectrometry varying the concentration of PFOA from 0.1 micromolar to 50 micromolar. Our preliminary results showed that camphor and menthol show promise in the extraction of PFOA

from water, meanwhile other DESs such as menthol: octanoic acid will be tested to compile DES solvents suitable for PFOA extraction from water supplies.

The Role of Mono and Disaccharides in Solubilizing and Enhancing Insulin Stability
Poster #15 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Sophia Rodriguez
Research Mentor(s): Mohammad Halim

Over the past 20 years, the FDA has approved 894 therapeutic proteins, which include 354 monoclonal antibodies and 85 peptides or polypeptides, representing a significant advancement in the biomedical industry. However, the complexity of these treatments presents serious stability challenges during storage. Issues such as deamidation, oxidation, aggregation, and disulfide shuffling can jeopardize their efficacy and safety. Insulin, a peptide hormone essential for glucose homeostasis, must maintain its structural integrity to remain biologically active in therapeutic formulations. However, its stability is influenced by environmental factors such as cosolvent, pH, and temperature, which may unfold and destabilize its native structure. Previous studies showed that both glucose and sucrose play important roles in stabilizing proteins; however, sucrose stands out as the more effective choice. The mechanism behind this enhanced stabilization lies in sucrose's ability to increase solvent crowding around the protein. This crucial interaction significantly boosts the protein's stability, especially at elevated temperatures, making sucrose an indispensable ingredient for maintaining protein integrity in various applications. This study investigates how different mono and disaccharides such as glucose, lactose, sucrose, and maltose affect insulin's folding and stability. To assess the stability of Insulin, various samples of Insulin are prepared in water and in solutions containing mono and disaccharides. High resolution mass spectrometry was used to monitor the folding, unfolding and adduct formation of Insulin in the presence of mono and disaccharides. The results indicate that glucose does not form any adduct with insulin, suggesting it does not interfere with insulin's structure and may help preserve its stability. Sucrose exhibited the highest level of adduct formation with insulin, with nine sucrose adducts are noticed with insulin. Lactose and maltose demonstrated a similar adduct formation pattern but to a lesser extent. Our preliminary results showed that disaccharides may not be suitable for Insulin and peptide stabilization.

Structural Behavior of the Sb-doped Magnetocaloric Candidate CrNiP
Oral Presentation (Prillaman Hall)
Wednesday, April 16, 9:00am – 9:50am
Undergraduate Student(s): Miriam Raggs
Research Mentor(s): Madalynn Marshall

The magnetocaloric effect, a thermodynamic phenomenon, can provide a more efficient and environmentally friendly route for cooling technology compared to traditional compressor-based systems. The rare-earth free MM'X alloys where M and M' = transition metal and X = main group element, have received much attention as excellent magnetocaloric candidates. These materials can exhibit a strong magnetostructural coupling resulting in a large entropy change typically over a wide temperature range, optimal for magnetic refrigeration. Based on recent theoretical work, the MM'X alloy CrNiP has been predicted to be a promising magnetocaloric material. In this talk I will present the synthetic methods and structural analysis of Sb doped CrNiP from powder X-ray diffraction techniques. With only a small percentage of Sb dopant into CrNiP we see the material begin to transition from the orthorhombic TiNiSi-type to the hexagonal Ni2In-type structure. As a result, chemical pressure can be used to tune the structural variation in the MM'X alloy CrNiP. This will provide a unique tool to tailor the potential magnetocaloric effect which will be investigated in our future studies.

Structure Disorder and Magnetic Behavior of an Olivine-Type Cathode Material
Oral Presentation (Microsoft Teams)
Friday, April 18, 2:15pm – 2:30pm
Undergraduate Student(s): Hamida Hassan
Research Mentor(s): Madalynn Marshall

Our research investigates the structure disorder and magnetic behavior of $Li(Mn,Fe)PO_4$, an olivine-type material relevant for lithium-ion battery applications. Using single-crystal neutron diffraction at Oak Ridge National Laboratory, we precisely determined Mn and Fe occupancy, revealing a 56% Fe and 44% Mn distribution at the atomic 4c site within the Pnma space group. Additionally, we observed significant lithium site vacancies (78% occupied), influencing the material's electrochemical and magnetic properties. The varying Mn/Fe ratio affected spin reorientation transitions, shifting from antiferromagnetic alignment along the a-axis to the b-axis. Our findings provide crucial insights for optimizing olivine-based cathodes, enhancing energy storage performance.

Synthesis and Characterization of New Bis(amidines)
Poster #19 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Rhianna Allen, Francis Ilori, Lily Baghramian, & Mason Hipp
Research Mentor(s): Micheal Stollenz, Sanjay Dutta, & Tomasz Kruczyński

We have demonstrated that polydentate bis(amidines) with additional N-donor sites serve as versatile ligands for new multinuclear Cu(I) clusters, which are powerful blue-and green light

emitters for OLED (organic light-emitting diodes) applications relevant to energy-saving light sources, such as in computer and smartphone flatscreens. Depending on their molecular structures, these clusters can also serve as catalysts for important C–C bond and C–heteroatom (N, O, S, P) bond formations. Such catalytic reactions are of fundamental importance for the synthesis of complex organic compounds of pharmaceutical interest, fine chemicals, monomers, or new materials. Herein, we present a series of bis(amidine) ligands that serve as molecular scaffolds for these multinuclear Cu(I) clusters. Another important aspect is their ability to form inter and intramolecular N–H···N hydrogen bonds. Such hydrogen bonds are of fundamental importance in catalysis and biological systems.

Synthesis and In-Vitro Inhibition Assay of Cation-Pi Peptide Targeting Main Protease of SARS-CoV-2
Poster #22 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Ngoc Diep Dong
Research Mentor(s): Mohammad Halim

The severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2) main protease (Mpro) has been identified as an essential enzyme for viral replication and transcription, making it a key target for therapeutic intervention in COVID-19 treatment. In this study, three peptides: SLFWQWKSKFLGR, SLFWQWHSKFLGR, and SLFWQWRSKFLGR were synthesized to inhibit Mpro activity through cation- interactions. The attractive force between the positive charge of the basic amino acids, the side chain of lysine (K), histidine (H), and arginine (R) with the electron-rich -system of an aromatic ring of phenylalanine (F). This cation- interaction plays a key role in stabilizing molecular structures, particularly in biological systems, and can be critical for enzyme inhibition. The peptides were engineered based on their ability to form stable non-covalent interactions with Cys145 and His41 residues present in the active site of Mpro, with the aim of blocking the proteolytic activity necessary for viral polyprotein processing. The three peptides were synthesized using solid-phase peptide synthesis (SPPS) and characterized by mass spectrometry, which confirmed its expected molecular weight and purity. Once synthesized and validated, all three peptides were evaluated in biological assays to determine their inhibitory potential against SARS-CoV-2 Mpro. Each assay was repeated three times to ensure reproducibility, consistency, and statistical significance. Additionally, a fluorescence resonance anergy transfer (FRET) assay was conducted for all three peptides to further assess their binding interactions and efficacy against Mpro. The FRET assay evaluates the binding interactions of the peptides with Mpro by monitoring energy transfer between donor and acceptor fluorophores. Through this research, the potential of cation- interaction-based peptides as inhibitors of viral

proteases was explored, with a focus on targeting Mpro as a therapeutic strategy. The successful inhibition of Mpro could provide a promising approach for developing antiviral therapies against SARS-CoV-2.

Towards the Synthesis and Characterization of a New TrisNHC Ligand
Poster #11 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Imani Adenuga, Evan Stackpole, Michael Evans, & Jabren Cannida
Research Mentor(s): Daniela Tapu

The chemical industry heavily relies on transition metal catalysts to efficiently create a variety of petrochemicals. Catalysis allows these changes to happen under mild conditions, all while ensuring high selectivity and yield. This makes it essential to develop new catalyst systems that boost activity using cost-effective materials in mild conditions. Over the past several decades, N-heterocyclic carbenes (NHCs) have surfaced as a significant class of carbon-based ligands. Their unique electronic and steric properties have made them valuable components in many catalytically active metal complexes. A key factor in the advancement of NHC-based catalysis has been the design and synthesis of new NHCs, which offer a variety of electronic and steric characteristics. This project is centered around creating a novel, rigid, anionic polyNHC. This distinctive carbene could act as a foundation for developing a range of trimetallic complexes and metallo-supramolecular systems—innovative structures that existing NHC ligands can't achieve. Thanks to their unique electronic properties, these NHC-metal complexes are expected to offer significant benefits over traditional cationic metal complexes of neutral NHCs, including improved reactivity and solubility. Moreover, we'll be sharing our progress in integrating this ligand into a series of transition metal complexes.

Ecology, Evolution, and Organismal Biology

Are Leaf Decomposition and Morphology of Hybrid Chestnuts Functionally More Similar to American or Chinese Chestnuts?
Poster #16 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Jessica Does & Brandon Duarte
Graduate Student(s): Katherine Dobson
Research Mentor(s): Mario Bretfeld

American chestnut trees were once prevalent in the Eastern U.S. forests, but the species went functionally extinct due to a pathogen that was introduced via trade of Chinese chestnut trees. In

order to reintroduce the American chestnut to its native habitat, American and Chinese chestnut trees have been cross bred over the last few decades to create hybrids that maintain the characteristics of American chestnuts but have the pathogen resistance of the Chinese chestnut. The goal of our study was to compare leaf morphology and decomposition rates of American, Chinese, and hybrid chestnuts in order to test whether hybrids function similar to American chestnuts. We measured average leaf decomposition rates via cellular respiration of leaf samples from American, Chinese, and hybrid chestnut trees over a 6-week period. In addition, we measured average stomatal density and leaf area from the same set of trees. We hypothesized that higher stomatal density would increase the rate of decomposition. We also hypothesized that average decomposition rates, leaf mass area, and stomatal density would differ based on tree genotype, with leaves from hybrid chestnut trees falling in between American and Chinese. The results of our analysis suggest that stomatal density does not have a significant impact on decomposition of the leaves. We also found that the Chinese chestnut leaves have a significantly higher average stomatal density compared to American and hybrid chestnuts. From our data, we conclude that hybrid chestnuts appear morphologically similar to American chestnuts but differ from Chinese chestnuts. However, the implications on decomposition were inconclusive and require further study.

Assessing the Osmoregulatory Capabilities of American Alligator Lingual Glands
Poster #17 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Graduate Student(s): Benjamin Angalet
Research Mentor(s): Nicholas Green

Crocodilians inhabit a wide variety of aquatic, marine, and estuarine habitats on 4 continents. Saltwater-adapted species and populations face considerable osmoregulatory challenges in maintaining homeostasis with respect to plasma salt [NaCl] concentration. In addition to the kidneys and cloaca found in all crocodilians, crocodiles possess a salt-secreting lingual gland whose presence and function is less understood in other crocodilians. This study investigates the lingual gland anatomy, physiology, and potential function of American alligator (Alligator mississippiensis) populations exposed to varying salinity levels. At each of four sites (Jekyll Island, Sapelo Island, Okefenokee NWR, and Banks Lake NWR), we will capture 12 to 15 alligators and collect plasma ion concentrations and lingual tissue samples for histological analysis. Anatomical and histological assessments of tissue biopsies processed via microscopy will identify inter-population differences. Researcher safety will be ensured using a field-standard jaw prop device. This study will enrich our understanding of alligator physiology in estuarine habitats, which will become critical over the next 100 years as sea levels rise and many coastal alligator habitats are expected to become more saline. Findings will advance reptilian physiology research by clarifying the evolutionary novelty and significance of the crocodile (and

perhaps alligator) lingual gland. As apex predators, the individual health and population viability of alligators is crucial to the conservation of ecosystems they inhabit. Additionally, the study's insights into alligator osmoregulatory mechanisms may inspire advancements in treating human conditions related to fluid and electrolyte imbalances, such as kidney disease, heart failure, and dehydration, by revealing natural strategies for managing salt and water balance under extreme environmental stress.

Assessing the Possible Resistance to Cardiac Glycoside Toxins in Opheodrys aestivus
Poster #29 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Isabelle Flowers
Research Mentor(s): Todd Pierson

The coevolution of predators and prey has produced many different adaptations in each. Certain species, for example, are protected by toxins which present a physiological challenge to the predators that consume them. Similarly, others have developed defensive mechanisms such as toxin resistance. The Rough Greensnake (Opheodrys aestivus), a serpent species native to North America, is an insectivore with a diet primarily composed of crickets, grasshoppers, and other bugs. Recently, one Rough Greensnake was documented consuming a Monarch Butterfly—species protected by cardenolide toxins.. Monarchs sport bright, vibrant colors as a warning sign of toxicity to predators. This curious observation prompted this research: a study investigating the potential Rough Greensnake resistance to the toxins sequestered by Monarch Butterflies. We used two samples of snake DNA (extracted from muscle tissue and a shed skin) to conduct Polymerase Chain Reaction (PCR) and amplified the ATP1A1, ATP1A2, and ATP1A3 genes, which code for the subunits of Na^+/K^+-ATPase. We then sequenced this DNA and examined sequences for amino acid substitutions that have been observed in other organisms resistant to these toxins. As such, the purpose of our study was to determine whether or not such substitutions were present within the Rough Greensnake. Here, we expanded upon the previous research, report our preliminary findings, and highlight opportunities for future research in this field.

Colorimetric Variation in White-Footed Mice Across an Urban-to-Rural Gradient in Georgia
Poster #18 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Xzavier Sartee, Anna Hoyt, & Ava Farrell
Graduate Student(s): Sydney Morton
Research Mentor(s): Nicholas Green

Urbanization is a rising concern for species across the globe as the human population continues to increase and human impacts on native ecosystems expand in scope and intensity. With the novel challenges due to human land use, wildlife populations are facing issues with food, mate, and space availability likely leading them to change their natural habitats and preferences. Our study investigates the effects of urbanization on Peromyscus leucopus (white-footed mouse) populations across rural, suburban, and urban sites in northern Georgia. Small mammals like P. leucopus are especially susceptible to urbanization and habitat fragmentation due to their limited likelihood to disperse and travel across impervious surfaces such as roadways. During field sampling, we noticed that mice captured in urban sites tended to have darker dorsal pelage, and hypothesized that this may be due to adaptation to life in an environment with greater soot and air pollution. We collected P. leucopus individuals from 17 sites along the urban-to-rural gradient extending northward from Atlanta, Fulton County, Georgia to rural Bartow County, Georgia. We collected DNA samples, standard measurements (mass, total length, tail length, hindfoot length, and pinna length), and the skull from each individual. We then quantified the coat color of each individual from digital photographs using imageJ by measuring the intensity of the red, green, and blue channels (R, G, and B, respectively). We then analyzed the colors using principal components analysis (PCA) to quantify differences between animals captured at urban, suburban, and rural sites. These data may serve as potential indicators of adaptation to selective pressures such as habitat fragmentation, food availability, and changes in predation risk, or simply genetic drift. Our results have the potential to inform not only conservation efforts but also public health by increasing knowledge of the new ecology of these disease vectoring animals.

Effects of Urbanization on Freshwater Fish Species Community Structure in the Etowah River Watershed
Poster #15 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Graduate Student(s): Mayuko Mizutani
Research Mentor(s): Nicholas Green

The Etowah River watershed, located in northern Georgia, United States, is a region of significant ecological and geographical importance. It hosts over 70 endemic species of freshwater fish, many of which are protected at the federal or state level. From 2000 to 2019, stream fish were sampled in various reaches throughout the watershed via seine netting and electrofishing. The fish data were then georeferenced and combined with public human population and landcover data so that we could explore the effects of anthropic land cover use and other environmental factors on freshwater fish community structure. We hypothesized that anthropic land use leads to degradation of stream communities because impervious surfaces lead to

increased runoff which can alter stream flow and negatively impact water quality. We predicted that locations with greater proportions of anthropic land use would have lower biodiversity, and locations with greater proportions of natural land in their watersheds would have greater biodiversity. We then used catchment-scale land cover, human population size, latitude, and elevation to model stream fish species richness and other community structure metrics. These findings may help inform conservation of native fish communities in the face of increasing human population size and land use change.

Exploring the Environmental Factors that Affect Color Change in the Green Anole
Poster #30 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Ilana Reyea
Research Mentor(s): Todd Pierson

The green anole (Anolis carolinensis) is the only native anole in the United States and one of the most common reptiles throughout its range. These anoles are rather slender and small, ranging from five to eight inches in length as adults and are found throughout the southeastern United States, living in a wide variety of habitats such as swamps, forests, parks, and even residential areas. Individual green anoles are capable of changing their color—fluctuating between various shades of green and brown. But why? Previous studies have tested alternative hypotheses of camouflage (or background matching), thermoregulation, and social interactions. Here, we provide an independent test of the role of thermoregulation and background matching using 1,175 records of anoles from Atlanta, Georgia from a citizen science database. From each observation, we recorded the type of background the anole was found on, the color of background, and the color of the anole. Using R, we extracted local air temperature and weather data. We then built a series of models to identify the relationships between anole color and air temperature, background type, and background color. Here, we present preliminary results discussing the strengths and weaknesses of the citizen science data to answer our preliminary hypotheses.

Genetic Diversity and Population Structure of Cuscuta rostrata in the Southern Appalachian Mountains
Poster #14 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Rosie Porter, Eladia Scott, & Gabrielle McDonner
Research Mentor(s): Joel McNeal

Cuscuta rostrata is a parasitic plant found at high-elevation locations in the Appalachian Mountains. Cuscuta rostrata populations range from West Virginia in the North to a few widely spaced populations in Georgia at its southernmost distribution. Our research aims to amplify

variable microsatellite loci in C. rostrata and assess genetic differences across populations. We extracted DNA from multiple C. rostrata populations and tested microsatellite primers to evaluate their effectiveness in amplifying these loci via polymerase chain reaction (PCR). We seek to optimize DNA amplification of these loci to determine if low genetic diversity is a threat to the small, isolated Georgia populations which may be particularly susceptible to climate change.

Investigating Seasonal Changes in Sediment Porewater Nutrient Pools in Seagrass Beds of Jobos Bay, Puerto Rico
Poster #27 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Kameryn Kimbrough & Raven Winant
Research Mentor(s): Troy Mutchler & Mark McCarthy

Seagrass meadows are critical to marine ecosystems, providing habitats and stabilizing sediments. However, human activities contribute to excess nutrient loading, which can alter nutrient budgets and cause eutrophication. While nitrogen cycling in seagrass beds has been studied, limited research examines how seasonal variations in freshwater input influence sediment porewater nutrients, particularly in the tropical estuaries. This study explores the relationship between seasonal precipitation and nitrogen availability in seagrass meadows in Jobos Bay, Puerto Rico. The hypothesis predicts that increased rainfall during the wet season (April–November) leads to higher terrestrial runoff, elevating nitrogen concentrations in sediment porewater, particularly in inner bay sites. Sediment cores (~7cm deep) were collected from four sites, stored on dry ice, and transported to the lab for analysis. Samples were centrifuged to extract porewater and analyzed with standard spectrophotometric techniques to quantify ammonium concentrations. Initial findings revealed high but variable, porewater ammonium concentrations at Station 10 (225±134 μM) and Cayo Barca (213±203 μM) in March 2023. Concentrations were 85±28 μM in vegetated sediments and 125±45 μM in unvegetated sediments at the Mar Negro site. Comparisons will be made to measurements made during the wet season (August and October) to determine if seasonal precipitation influences the cycling of nutrients and may have an effect on the production and health of seagrass. Conservation initiatives and management plans to reduce manmade nutrient inputs in coastal ecosystems can benefit from understanding these trends.

Modeling Potential Effects of Ocean Acidification on Shell Formation in Pacific Oyster (Crassostrea gigas)
Poster #19 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Paulina Gierlak

Research Mentor(s): Nicholas Green

As the climate changes and oceans become warmer, ocean waters are becoming increasingly acidified from their historical pH near 8, with a low of 7.8 expected by 2100. This phenomenon of ocean acidification is caused by atmospheric CO2 dissolving into ocean water, with which it reacts to form carbonic acid. Increasing acidity interferes with the ability of many marine fauna to construct shells and exoskeletons from CaCO3. Because of this, ocean acidification poses a serious threat to many shell-forming marine species and understanding that threat will be vital to conservation efforts. Predictive models for how ocean acidification will affect marine species, such as coral reefs and mussels, currently exist and are crucial areas of research. One such species is the Pacific oyster Crassostrea gigas, the most cultivated oyster in the world, which supports a $7.5 billion per year industry worldwide. We investigated how ocean acidification may impact oyster harvests under different climate change scenarios. We hypothesized that the projected ocean pH changes would impact oyster harvests because of the detrimental effects of reduced pH on shell formation and maintenance. To test this hypothesis, we constructed dynamic energy budget (DEB) models of mussel growth and maintenance and parameterized them for C. gigas. We then ran these models under different ocean pH scenarios defined by data from the Ocean Carbon and Acidification Data System, built by the National Centers for Environmental Information (NCEI). These pH scenarios are derived from two different climate scenarios, the Shared Socioeconomic Pathways (SSP) 245 "middle of the road" scenario with some mitigation and the more severe SSP585 "fossil fueled development" scenario. Our findings have the potential to inform the sustainability of these ecologically and economically important marine animals.

Morphological Variation in White-Footed Mice Across an Urban-to-Rural Gradient in Georgia

Poster #12 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Perla Hernandez, Xzavier Sartee, Anna Hoyt, & Emmy Perras
Graduate Student(s): Sydney Morton
Research Mentor(s): Nicholas Green

Urbanization is a rising concern for species across the globe as the human population continues to increase and human impacts on native ecosystems expand in scope and intensity. With the novel challenges due to human land use, wildlife populations are facing issues with food, mate, and space availability likely leading them to change their natural habitats and preferences. Our study investigates the effects of urbanization on Peromyscus leucopus (white-footed mouse) populations across rural, suburban, and urban sites in northern Georgia. Small mammals like P.

leucopus are especially susceptible to urbanization and habitat fragmentation due to their limited likelihood to disperse and travel across impervious surfaces such as roadways. We collected P. leucopus individuals from 17 sites along the urban-to-rural gradient extending northward from Atlanta, Fulton County, Georgia to rural Bartow County, Georgia. We collected DNA samples, standard measurements (mass, total length, tail length, hindfoot length, and pinna length), and the skull from each individual. We then took 19 measurements from each skull and digitized 21 landmarks from each skull. Assuming that any genetic variation between populations would be reflected in skull morphology, we analyzed the skull measurements using principal components analysis (PCA) to quantify differences between animals captured at urban, suburban, and rural sites. These morphological data may serve as potential indicators of adaptation to selective pressures such as habitat fragmentation, food availability, and changes in predation risk, or simply genetic drift. Our results have the potential to inform not only conservation efforts but also public health by increasing knowledge of the new ecology of these disease vectoring animals.

Pollinator and Pollinator Plant Communities within Restored Montane Longleaf Pine Ecosystems

Poster #18 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Graduate Student(s): Hanen van Rossem
Research Mentor(s): Matthew Weand

Historically the fire-dependent and biodiverse longleaf pine (Pinus palustris) ecosystem was the dominant ecosystem of the Southeastern US. This ecosystem's range was massively reduced due to land conversion and fire exclusion, causing the decline of many native species. Efforts to restore and protect longleaf pine stands are now ongoing with the goal of expanding habitat and refuge for threatened species. Differences in restoration practices and prior land use may influence the extent to which restored habitat patches can support pollinators and their plants. This study compared pollinator plant biodiversity between restored neighboring montane longleaf pine stands that differed in prior composition and current management practices. Flowering stem surveys were conducted monthly from February to November of 2024. Pollinator plant richness, abundance, and Shannon diversity were greater in prior timber plantation sites than in prior mesophied forest sites. Prior plantation sites contained 27 species that were missing from prior forest sites, but the community composition did not differ significantly between site histories unless seasonal differences were ignored. Seasonality was a stronger influence on community composition than site history. Soil samples from prior plantation sites were lower in LBC, Mn, P, Zn, and had a higher pH. The only soil measurements that correlated with changes in community composition were LBC and P. The results of this study can inform future restoration management efforts by identifying conditions that best assist longleaf pine understory community recovery, increase local pollinator biodiversity, and provide refuge for endangered species suffering from habitat loss.

Updating the Phylogeography of Four-Toed Salamanders with Additional Genetic Sampling from the Appalachian Mountains.
Poster #33 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Erick Montes de Oca
Research Mentor(s): Todd Pierson

The four-toed salamander is found throughout a wide range in North America, which provides different environmental and geographic challenges that may structure patterns of phylogeographic diversification over time. A previous study used mitochondrial DNA sequence data to propose phylogenetic relationships between clades, finding especially high levels of haplotype diversity in the southern Appalachians. In this current study, we sought to better understand the phylogeographic relationships of the four-toed salamander within the Appalachians—including new samples collected since the completion of the previous study . We used polymerase chain reaction (PCR) and existing primers to amplify mitochondrial DNA from samples, conducted Sanger sequencing, and then aligned these sequence data with those from the previous study. We then used the data to build a phylogenetic tree and place our samples within the existing phylogenetic framework. We hope that our new data—along with larger-scale genomic data from the same samples—will help us gain a better understanding of the genetic diversity and distribution of this salamander, aiding conservation efforts. We also hope that it highlights the importance of the Appalachians as a biodiversity hotspot and in the biogeographic history of amphibians.

What's in a Fish? The Historical Ecology of Parasites of Freshwater Fish in Georgia
Poster #23 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Joshua Blackburn, Andrian Chan, Abigail Charles, Alexis Edem, Cassie Ellenberger, Ally Gomez, Camron Martin, Ashley Zamora, Jade Salis, & Nick Tsangarides
Research Mentor(s): Whitney Preisser

Within the state of Georgia, there are over 260 species of freshwater fish. Despite the large biodiversity, there is very little known about the parasitic diseases within these fish. Understanding these parasites better, and how they may affect their hosts, may give researchers a better understanding of the interactions within our freshwater ecosystems. In order to fill in this gap in research, we studied the parasites of freshwater fish in Georgia to better understand their relationships with their hosts. Specifically, we seek to answer two main questions: How have

parasite communities of fish changed over the past two decades in Paulding and Cobb counties? What environmental and host variables contribute to the observed community changes? To gather our data, we dissected fish from Kennesaw State University's Mountains-to-Metro Biodiversity Collection. We dissected each fish by removing their right eye, right gills, and internal organs. We then examined these specimens underneath a dissecting microscope and carefully extracted any parasites found within. These parasites were identified morphologically, and we analyzed the data with mixed models to determine 1) how parasite diversity and abundance have changed over the past two decades and 2) how hosts and environmental factors contributed to these changes. We will discuss preliminary results. With this project, we hope to better understand the interactions between species within our waterways. This project can also reveal patterns that help us understand how aquatic life is responding to anthropogenic pressures.

Mathematics

From Benford's Phenomenon to Scientific Explanation
Poster #8 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Nyasha Muzerengi
Research Mentor(s): Irina Pashchenko

This research investigates the application of Benford's Law in analyzing the first-digit probabilities of real-world functions, focusing on economic data. Six datasets were collected, each containing an index and actual data values, ensuring statistical fairness and a sample size exceeding 100 for validity. Using Excel, the data was structured and transformed to simplify calculations, enabling graphical representations for analysis. The study found that Benford's Law, which was originally developed for datasets following exponential rules, was not observed in the analyzed functions due to the specific nature of the data. While the law can be applied to other algebraic functions, each type of function provides a unique formula for first-digit probabilities. The selected datasets did not align with the expected probability distribution, partly due to inconsistencies such as abrupt jumps instead of a continuous sequence. The graphical visualization of data played a crucial role in identifying these deviations. These findings emphasize that while Benford's Law is a powerful tool for detecting irregularities in naturally occurring datasets, its applicability depends on the dataset's underlying structure. The study highlights that the law's effectiveness is not universal and varies with different algebraic functions. Understanding when Benford's Law does not apply is equally valuable, as it prevents misinterpretation in fraud detection and data validation. This study reinforces the importance of careful dataset selection in statistical analysis and data science applications.

Properties of Eigenvalues of the Fractal Laplacian

Poster #12 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Andrew Chincea
Research Mentor(s): Eric Stachura

We investigate the properties of the eigenvalues of the fractal Laplacian. We begin by defining the fractal Laplacian operator in one dimension and formulate the corresponding Dirichlet eigenvalue problem. Analytical solutions are obtained for specific fractal parameters, and computational results illustrate the structure of eigenvalues and their associated eigenfunctions. We extend our analysis to two dimensions using separation of variables. Our findings contribute to a deeper understanding of how fractal geometry affects the spectral characteristics of differential operators.

Molecular and Cellular Biology

Alterations in Synaptic AMPA Receptor Function Following Prenatal Cannabinoid Exposure: Implications for Neurodevelopmental Deficits
Poster #31 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Kylie Tenhouse
Research Mentor(s): Vishnu Suppiramaniam

The increasing legalization of cannabis has led to a marked rise in prenatal cannabinoid exposure (PCE), a trend projected to continue. PCE has been associated with long-term neurodevelopmental impairments, particularly affecting learning and memory; however, no therapeutic strategies currently exist to mitigate these cognitive deficits. This study examines the impact of PCE on the biophysical properties of synaptic AMPA (α-Amino-3-Hydroxy-5-Methyl-4-Isoxazole Propionic Acid) receptors, which are critical mediators of excitatory neurotransmission, synaptic plasticity, and memory processes. To elucidate the mechanisms underlying AMPA receptor dysfunction, pregnant Sprague Dawley rats were administered either sesame oil (control) or 5 mg/kg Δ9-tetrahydrocannabinol (THC) via oral gavage from gestational day 5 to postnatal day 9. Electrophysiological recordings were performed on hippocampal synaptosomal AMPA receptors in adolescent offspring (postnatal days 40–50) from both experimental groups. Results demonstrated a significant reduction in AMPA receptor open channel probability and conductance in PCE offspring relative to controls. These findings indicate that prenatal THC exposure disrupts AMPA receptor function, potentially impairing synaptic plasticity mechanisms such as long-term potentiation (LTP) that is required for memory formation. Given the pivotal role of AMPA receptors in memory encoding, PCE-

induced alterations in receptor function may contribute to the cognitive deficits observed in exposed offspring. This study provides critical insights into the synaptic pathophysiology underlying PCE-related learning and memory impairments, highlighting the urgent need for targeted interventions to counteract the neurodevelopmental consequences of prenatal cannabinoid exposure.

Analysis of Secreted Metabolites During Predation of Myxococcus xanthus on Pseudomonas aeruginosa
Poster #23 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Klaudya Hernandez, Kim Altamirano, & Cara Erickson
Research Mentor(s): Ramya Rajagopalan

Pseudomonas aeruginosa is categorized by the World Health Organization as one of the most multidrug-resistant pathogens in need of control. Myxobacteria is a single-celled predatory soil bacterium and a potential source of novel antibiotics. They are social and seen to hunt in "wolf" packs cooperatively. Under starvation conditions they will aggregate in compact structures filled with spores known as fruiting bodies; only germinating when nutrients become available. In our research group we have shown that Myxococcus xanthus (predator) is able to predate on isolated Pseudomonas aeruginosa (prey) cells. This is supported by our observations in microscopic mixed cell assays using fluorescent tags to track prey cell death. However, a unique resistance response to predation is observed in a population of P. aeruginosa when predator and prey are spotted side-by-side. P. aeruginosa blocks M. xanthus advancement and resists predation. To determine if there are any metabolites associated with the resistance response we performed a side-by-side spot predation assay with M. xanthus and P. aeruginosa. We used a bilayer of partial-starvation agar plates, with a porous cellophane layer between the two layers of agar. After incubating for 48-hrs, bacterial spots as well as agar blocks from the lower agar layer corresponding to the spot placement were collected and placed into a 60:40 ratio of methanol and water mixture to be analyzed using Liquid Chromatography Mass Spectrometry (LCMS). This is to determine the role of secreted metabolites in the predation evasion response of P. aeruginosa. We expect to see differential expression of metabolites during predation of M. xanthus on P. aeruginosa in comparison to the control spots. Determining the evasion strategies of this bacterium could lead to the development of alternative methods to combat this pathogen.

An Analysis of Silver Diamine Fluoride Usage for Arresting Caries in Children
Poster #3 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Sarah Evans
Research Mentor(s): Christina Scherrer

One of the most common diseases in children is dental caries (cavities). The typical treatment involves fillings, but due to frightening equipment and anticipated pain, that may not always be the right answer for children. Silver diamine fluoride (SDF) is a newer treatment option for caries in the United States. It has the ability to arrest caries with a simple paint-on application as opposed to drilling. In this research, we aimed to summarize the variety of published information on SDF to aid in medical decision-making. The method of research included completing a literature review of SDF using articles found on PubMed Central (PMC) of the National Institutes of Health (NIH). A wide range of articles were assessed for data on properties, history, mechanism of action, usage on children, and other key areas to determine all possible benefits and drawbacks of SDF. At the end of the analysis, both negative and positive aspects were found and summarized. Although SDF has drawbacks due to its staining properties, it also presents numerous benefits like high efficacy and ease of application. By having clear information on SDF, improving availability, insurance coverage, and use in School-Based Health Centers is possible.

Applying Genome Editing to Modify the Akirin Gene in the Fruit Fly for Research
Poster #2 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Graduate Student(s): Shaila Akter
Research Mentor(s): Anton Bryantsev

The highly conserved gene Akirin is present in flies and humans and regulates a variety of processes, from immune responses to muscle development. However, the regulatory mechanisms governing its expression and function remain largely unexplored. To better understand Akirin regulation, we first assessed its expression in the head, thorax, and abdomen of a Drosophila fly using quantitative RT-PCR. We found that this gene is expressed throughout the entire fly, but at different levels. The highest Akirin expression was observed in the abdomen, and the lowest in the thorax. For further analysis, we decided to use CRISPR/Cas9 technique to modify the endogenous Akirin gene to incorporate a small peptide (FLAG) in its coding sequence and make it trackable by FLAG-specific antibody and fluorescence microscopy. We have created a guide RNA and recombination template containing the desired sequence modification. The CRISPR efficiency was controlled by inducing modification of the gene ebony, which was irrelevant to our research but produced a tractable phenotype (i.e., black body). After screening genomic DNA from >60 individual flies, we found one hit, but it did not produce the desired modification upon further validation by immunostaining. This work is in progress, but, if successful, it will establish a new research tool to study the Akirin gene. As a future direction, we plan to employ FLAG-tagged Akirin protein in a pull-down assay followed by mass spectrometry to identify

protein partners interacting with Akirin, providing deeper insight into its role in muscle formation.

Applying Optogenetics to Study Muscle Resistance to Mechanical Stress
Poster #1 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Pedro Santos
Research Mentor(s): Anton Bryantsev

From humans to fruit flies, many of Earth's living organisms rely on muscles for essential life functions. However, mechanical stress from these activities can sometimes lead to muscle damage, which, over a lifetime, may result in muscle loss and associated negative outcomes. In this study, we aim to identify genetic factors associated with muscular resistance to constant mechanical stress. To achieve this, we will use the model organism Drosophila melanogaster and optogenetics— a technique that uses light to control cellular processes in genetically modified cells expressing light-sensitive opsin proteins. The flies in this study express the opsin protein CsChrimson in motor neurons that innervate the jump muscle. By subjecting them to an exercise regimen using red light stimulation, we induce muscle damage and assess the extent of degeneration. This system will allow us to screen for and identify genetic factors that may either enhance or impair muscle resistance to mechanical stress.

Assessment of Real Time Internalization of Cell Penetrating Peptide Cargos with Adaptors
Poster #31 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Nathaniel Turner
Research Mentor(s): Daniel Morris & Jonathan McMurry

Cell penetrating peptides are a promising tool for an efficient and effective way to deliver therapeutic cargos to intracellular targets. CPPs have shown the ability to easily permeate cell membranes but are often entrapped in endosomes where they are either recycled out of the cell or digested in lysosomes. The rate of CPP internalization, effect of internalization on target cells, and method of transport across the membrane are poorly understood aspects of CPP delivery. One promising CPP adaptor is TAT-CaM, which consists of HIV transactivator of transcription peptide, the CPP, fused with human calmodulin. Cargo proteins are noncovalently and reversibly linked to TAT-CaM via binding to a calmodulin binding site engineered onto the cargo. During endocytosis and cellular trafficking cargos readily dissociate and efficiently avoid endosomal entrapment. In this study we assess the process of intracellular delivery, endosomal

entrapment, and endosomal escape of fluorescent CPP cargos with a variety of adaptors, and how this effects the action of the CPP complex within the cell. We will use confocal microscopy to visualize the process of intracellular delivery of the CPP complex. Assessing this process in real time answers many valuable questions such as cellular responses to CPP internalization, internalization rate, efficiency of cargo dissociation from TAT-CaM and other cargos, rate of endosomal escape in relation to different CPPs, and potential mechanisms of intracellular transport. Answering these questions opens the door to developing more efficient and effective CPP adaptors to deliver therapeutic cargos to intracellular targets.

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

Poster #22 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Oliver Buckley, Ayyan Paracha, Journey Lark, Levi Brigham, & Taylor Clay
Graduate Student(s): Aaron Walker
Research Mentor(s): Soon Goo Lee

The 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) primarily produces pathogenic IAA from indole-3-acetaldehyde (IAAld). While each ALD shares a common reaction mechanism, their substrate specificity varies. As part of the 2024 Mentor Protégé Research Program in the College of Mathematics and Sciences at Kennesaw State University, 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 in 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, combined with biochemical analysis, provides valuable insights into the evolution of enzyme function and molecular architecture in the IAA biosynthetic pathway of the bacterial pathogen P. syringae.

Biochemical Characterization of UGT74B1 in Glucosinolate Biosynthesis: Tools for Understanding Natural Product Production

Poster #30 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Levi Brigham, Aurora Yuen, & Brianna Brady
Research Mentor(s): Soon Goo Lee

Plant natural products hold significant potential for various nutritional and pharmaceutical applications. Among them, glucosinolates (β-D-thioglucoside-N-hydroxysulfates) are sulfur-rich, nitrogen-containing secondary metabolites primarily found in Brassica plants (e.g., broccoli, mustard, and oilseed rape) and the model plant Arabidopsis thaliana. Due to their diverse bioactivities, ranging from anti-herbivory defense in plants to anti-cancer properties in humans, glucosinolates have garnered significant research interest. As participants in the 2024–2025 First-Year Scholars Program at Kennesaw State University, our research team aims to elucidate the biochemical and structural basis of the core enzymes and regulatory proteins involved in glucosinolate biosynthesis, an economically important class of natural products. Since Fall 2024, we have identified and characterized UGT74B1, a UDP-dependent glycosyltransferase (UGT) enzyme, which plays a key role in the glucosinolate biosynthetic pathway in Arabidopsis thaliana. Specifically, we have developed optimal strategies for overexpressing and purifying UGT74B1 using a heterologous expression system in Escherichia coli. This research will provide insights into the three-dimensional structure of UGT74B1 and explore how modifications in glycosylation patterns regulate glucosinolate levels. Ultimately, this work will support the development of strategies to enhance glucosinolate production, potentially benefiting human health.

Can a Ceh-27 Transgene Rescue Neurodevelopmental Defects?
Poster #17 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Kihaan Patel
Graduate Researcher: Karunambigai Kalichamy
Research Mentor(s): Martin Hudson

Disruptions to nervous system development and function can be severely detrimental to organismal survival. The nematode Caenorhabditis elegans is an ideal model to study these processes due to their simplicity, and well characterized genome. Since they are transparent, we can use genetically encoded reporter genes to aid in observing their cell fate and neuronal morphology. C. elegans also have an invariant cell lineage which enables precise identification and tracking of individual cells for developmental investigation at the cellular level. In this study, we focused on the gene ceh-27, a C. elegans homolog of the human gene Nkx2.1. In humans, heterozygous mutations in Nkx2.1 lead to attention deficit hyperactivity disorder, in addition to other congenital defects. Previous work in the Hudson lab identified ceh-27 as a master regulatory gene for embryonic development, in addition to being essential for

development of the AlY interneurons. Homozygous mutants of ceh-27 exhibit embryonic lethality. To better characterize this gene, we reintroduced ceh-27 genomic DNA marked with coelomocyte RFP into wildtype worms, then crossed this transgene into ceh-27(ok1655) mutants, balanced with the tmC12 balancer chromosome. We also introduced an AIY-specific transgene into this mutant background to determine whether the reintroduction of ceh-27 is sufficient to rescue AlY interneuron fate. Our ultimate goal is to gain a deeper understanding about the way that ceh-27/Nkx2.1 affects C. elegans nervous system development and how these processes are conserved in humans.

Can a Ceh-27/Nkx2.1 Transgene Rescue Ceh-27 Neurodevelopmental Defects?
Poster #9 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Meryl Gilmore
Research Mentor(s): Martin Hudson

When the development of an organism's nervous system is interrupted or altered, it can significantly impact that organism's ability to survive and function properly. In our lab, we use a species of nematode called Caenorhabditis elegans as a model organism to characterize the roles of important transcription factors in human neurodevelopmental disorders such as attention deficit hyperactivity disorder (ADHD). Utilizing C. elegans makes analyzing this process in a lab very easy for many reasons; they are very small, have a rapid life cycle, invariant cell lineage, transparent bodies, and most importantly, around 80% of their genes have human orthologs. In C. elegans, ceh-27, which is orthologous to human NKX2-1, acts as a homeobox (master controller) gene. Previous research in the Hudson lab revealed that ceh-27 is necessary for normal embryogenesis. In ceh-27 mutants, the AIY interneurons and SMDD motor neurons do not develop correctly, leading to embryo fatality. This indicates that ceh-27 controls the normal development of these cells. In humans, mutations in the NKX2-1 gene can lead to the development of ADHD, characterized by hyperactivity and impulsivity. To better understand the role of ceh-27 in embryonic development, we set out to rescue this mutation. To do this, we injected wild type animals with ceh-27 genomic DNA (marked with coelomocyte RFP) then crossed that transgene into ceh-27 mutants, balanced with the tmC12 balancer chromosome. Work is on-going to determine if the transgene will rescue AIY neuron development in embryos. Once we better understand the role that ceh-27 has in neuron development, we can then apply this to our knowledge of its human homolog's role in neural development.

Characterization of ceh-27/Nkx2.1 in Caenorhabditis elegans Pharyngeal Nervous System Development
Poster #20 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Essix Apollo Moser & Lindsey Knight

Research Mentor(s): Martin Hudson

Attention Deficit Hyperactivity Disorder (ADHD) is a polygenic hereditary disorder affecting roughly 250 million people worldwide. The ADHD associated gene Nkx2.1 codes for the homeobox transcription factor NKX2-1, which plays a critical role in regulating gene expression by binding to specific DNA sequences and controlling the transcription of target genes. Heterozygous mutations in Nkx2.1 are linked to the development of benign hereditary chorea, which also presents as ADHD in adults. Understanding the gene regulatory environment around Nkx2.1 is critical for characterizing its downstream effects on neurodevelopment and can help identify other genes that contribute to ADHD. Nkx2.1 is highly conserved across phyla, allowing the use of model organisms to better understand Nkx2.1 function. The nematode Caenorhabditis elegans (C. elegans) can be used to study Nkx2.1 through its orthologous homeobox gene ceh-27. C. elegans has an invariant cell lineage, well defined nervous system, and fully mapped genome which makes it ideal for characterizing the role of ceh-27. Our preliminary data suggests that ceh-27 plays a role in neuronal specification and is required for normal pharyngeal development. However, its specific regulatory targets remain unclear. To further investigate ceh-27's gene regulatory environment and its downstream influence on pharynx development, genetically encoded florescent reporters were crossed into a ceh-27 null mutant allele to highlight different cell types within and around the pharynx. Through the use of confocal time-lapse video microscopy and direct analysis of pharyngeal specific markers, we aim to confirm that ceh-27 has key roles in embryonic pharyngeal nervous system development. Future directions include using single cell RNA sequencing to further characterize ceh-27 transcriptional targets.

Characterizing the Regulatory Environment of the Homeobox Transcription Factor ceh-27/Nkx2.1 in Nervous System Development
Poster #18 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Lindsey Knight
Research Mentor(s): Martin L. Hudson

Transcription factors are regulatory proteins that can activate or repress gene expression by interacting with DNA sequences. Nkx2.1 is a homeodomain transcription factor in humans that is responsible for normal nervous system formation and function. Heterozygous mutations in this gene have been associated with attention deficit/hyperactivity disorder indicating a need for further study to better understand the transcriptional regulation of this gene and its role in neural development. Nkx2.1 is strongly conserved across phyla, allowing us to examine its regulatory environment in a simple model organism, such as the nematode Caenorhabditis

elegans. The well characterized genome, invariant cell lineage, and simple nervous system, and the availability of powerful genetic tools, make C. elegans ideal for fundamental studies on the brain and its development. The C. elegans ortholog of Nkx2.1, called ceh-27, is a homeodomain transcription factor that is absolutely required for embryonic development and the formation of the AIYL/R interneurons. A key feature of homeodomain proteins is their DNA-binding site, and many have been identified as regulating their own transcription. The purpose of this project is to determine if ceh-27 is transcriptionally autoregulated in order to better understand the regulatory mechanisms controlling Nkx2.1 expression in humans. Data collected from 4-D timelapse microscopy assays indicate that ceh-27 works to repress its own transcription; animals with a homozygous ceh-27 mutation exhibit increased ceh-27 transcriptional activity compared to wild type organisms. Future work will identify ceh-27 autoregulatory elements along with downstream genes under the transcriptional control of ceh-27.

Characterizing the Role of PMT-2 in C. elegans Larval Development
Poster #17 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Ashley Zamora
Research Mentor(s): Martin Hudson

Nematode parasitic infections are becoming more prevalent in humans and animals. It is estimated that over 3 billion people have gotten at least one nematode infection in their lives, whether from hookworm, roundworm, or pinworm. Working on parasitic nematodes is difficult because they can be hard to culture in the lab. To circumvent this problem, we took the approach to working with Caenorhabditis elegans, a non-parasitic nematode that is easy to grow in culture. Studies have shown that nematodes synthesize phosphatidylcholine by a novel pathway which uses the enzymes PMT-1 and PMT-2. Our focus is to develop enzyme inhibitors of PMT-2, because the phosphatidylcholine biosynthetic pathway is crucial to the synthesis of membrane phospholipids. In particular, the PMT-2 enzyme is unique to nematodes, which should make it easier to target nematodes specifically. The pmt-2(ok2419) V/nT1[qIs51] strain is a homozygous lethal deletion mutation balanced by GFP-tagged translocation chromosome. Translocation balancers are difficult to work with because of aneuploidy, which is when there is an abnormal number of chromosomes in a cell. To facilitate our characterization of the pmt-2(ok2419) mutation, we set out to build a simple linked inversion balancer. Ten wildtype males were crossed with tmC16 homozygous mutants, then the resulting heterozygous F1 males crossed with oxTi396[eft-3p::mCherry] hermaphrodites. This cross was transferred daily to new plates to not have any self-fertilization with progeny in newer generations. These two reporters together are expected to have a mCherry marker in the pharynx and broad red nuclear fluorescence in body wall muscles and other tissues. Our preliminary data indicates that PMT-2 mutants may fail to molt out of the first larval stage. Work is ongoing to better characterize the role PMT-2 in larval development.

Comparison of KSU STEM Student Reflections on their Undergraduate Research Experiences: CUREs vs. The Apprentice Model
Oral Presentation (Prillaman Hall)
Wednesday, April 16, 9:00am – 9:50am
Graduate Student(s): Chazzidy Harper
Undergraduate Student(s): Abigail Dingess
Research Mentor(s): Kimberly Cortes & Amy Buddie

Undergraduate research (UR) is recognized as a high-impact practice that enhances student engagement, academic success, and professional preparedness (Council on Undergraduate Research, 2024). It allows students to develop essential skills, including critical thinking, problem-solving, and communication, while gaining hands-on experience in scientific inquiry (Linn et al., 2015). Numerous studies highlight the benefits of undergraduate research, but few have compared Course-Based Undergraduate Research Experiences (CUREs), a classroom-integrated research model, with the traditional apprentice model, a traditional mentorship-based research approach. Additionally, limited research has examined students' perceptions of their experiences in these research models. Using a qualitative, phenomenological approach, we analyzed N=850 reflections from STEM students who participated in research between Fall 2022 and Spring 2024. Data was coded using NVivo software based on four key themes: Educational Value, Connectedness Insights, Integrated Problem-Solving, and Values Growth (Kennesaw State University, n.d.). To ensure inter-rater reliability, two trained coders reviewed a subset of reflections, achieving 90% agreement. Findings reveal distinct benefits associated with each research model. Students in CUREs reported higher levels of interpersonal development and a greater ability to relate research to broader scientific objectives. In contrast, the apprentice model, which follows a traditional mentor-student structure, provided students with in-depth technical training, opportunities for independent inquiry, and stronger personal growth. Demographic analysis highlights the potential of CUREs to promote inclusivity in STEM education, as they were found to engage a higher proportion of underrepresented and first-generation students compared to the apprentice model. These findings suggest that both models play complementary roles in undergraduate education, addressing different aspects of student development. Future research will enable a longitudinal assessment of trends in UR experiences and their broader impact on student success and diversity in STEM.

CPP-Mediated Intracellular Delivery of Antibodies
Poster #9 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Joy Davis
Research Mentor(s): Jonathan McMurry & Daniel Morris

Possible new therapeutic drugs often fail because they cannot cross cell membranes to reach intracellular locations where they are needed, a particularly vexing problem for large molecules such as therapeutic antibodies. A possible solution to this problem, and the source of this research project, is using cell-penetrating peptides (CPPs) to deliver macromolecules across membranes. CPPs can cross membranes, carrying with them molecules to which they are attached. In this study, a CPP-adaptor protein, TAT-CaM, was used to deliver a truncated form of Staphylococcal Protein A (CBS-SpAtr) to the cytoplasm of living mammalian cells. SpAtr binds the Fc region of IgGs with pM affinity. Our proximal goal is to use TAT-CaM to mediate delivery of CBS-SpAtr-bound IgG, which would potentially allow delivery of a specific antibodies across cell membranes for the purposes of labelling subcellular structures, neutralizing intracellular pathogens, etc. To test this possibility, we designed, expressed, and purified CBS-SpAtr. Binding kinetics of the purified protein showed fast-on, slow-off kinetics, nM in the presence of calcium, and negligible affinity in its absence. Antibody binding showed the anticipated pM binding and was unhindered in the presence of TAT-CaM binding. Cell-penetration experiments were performed with baby hamster kidney (BHK) cells to assay SpAtr deliveries. Experiments are underway to deliver SpAtr into cells with an attached fluorescent antibody to label subcellular structures, e.g. nuclear pore proteins, to demonstrate proof-of-concept. The results show hope for future success in delivering SpAtr with antibodies into cells for possible new therapeutics.

CPP-Mediated Delivery of Peptidoglycan Hydrolases as Novel Enzybiotics
Poster #6 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Jacob Clarson & Tina Willoughby
Research Mentor(s): Jonathan McMurry & Daniel Morris

In the medical field there has always been a topic of discussion on how to deal with nosocomial diseases. Recently there has been an upturn of pathogens that are nosocomial while also being antibiotic resistant as they hide inside the cell. Peptidoglycan hydrolases (PHs), which degrade the cell wall structures of bacteria, are a promising alternative to traditional chemotherapeutics. However, against intracellular pathogens such as Staphylococcus aureus, they, too, face a significant problem in crossing the cell membrane. Cell-penetrating peptides (CPPs) offer the possibility of overcoming delivery barriers for biomolecules, but protein 'cargos' often get trapped in the endosomal pathway, failing to escape which ultimately averts the cargo from getting to its desired destination. The McMurry Group developed TAT-CaM to solve the problem by utilizing non-covalent, Ca2+ -dependent coupling between CCP to a cargo via calmodulin-calmodulin binding site (CBS) interactions. By employing TAT-CaM to deliver PHs with engineered CBSs, we hypothesize that we will be able to efficiently deliver PHs to mammalian cell interiors,

resolving intracellular infections. In this study, several CBS-PHs were designed, expressed, purified, characterized and delivered to mammalian BHK cells. First steps in assaying antibacterial activity in a tissue culture infection model will also be described. Success will enable further initial development of a novel, a class of antibacterial therapeutics.

Determining the Impact of Per- and Poly-Fluoroalkyl Substances (PFAS) on Mosquito Morphology
Poster #11 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Brooklyn Galvan & Bennett Robertson
Research Mentor(s): Andrew Haddow

The toxicity of per- and poly-fluoroalkyl substances (PFAS) on aquatic invertebrates has been well documented. These "forever chemicals" are released from industrial factories, military bases, civilian airports, and waste facilities where products containing PFAS are made, used, and discarded. Contamination settles in aqueous sites where insects such as mosquitoes develop, including agricultural fields and sewers. The current study exposed immature stages of the Asian tiger mosquito, Aedes albopictus, to the median lethal concentration (LC50) of a common PFAS, perfluorooctane acid (PFOS). Morphological characteristics were recorded and analyzed. This study furthers our understanding of the impacts of PFAS on mosquito development.

Examining Novel Bacteriophage Against Staphylococcus Species
Poster #29 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Alexis Williams & Ross Wood
Research Mentor(s): Melanie Griffin

Viruses are infectious microbes containing DNA or RNA within a protein coat. They are nonliving and require a host to replicate. Bacteriophages are viruses that utilize bacteria as a host organism. Bacteriophages are highly selective and do not infect human cells; they only target disease-causing bacteria and do not disrupt the body's normal microbiome. Antimicrobial resistance jeopardizes the ability to treat bacterial infections. As such, it is necessary to explore new treatment options, such as phage therapy. Currently, bacteriophages are only used to treat disease in situations where all other options have been exhausted. More information is needed for phage therapy to become more widespread and available for use in healthcare settings. KSU alumnus Ross Wood processed samples from opossum intestines and isolated a bacteriophage, which he named MRSAΦOPP. He hypothesized that through interactions with humans and human waste, opossums may encounter pathogens and phages that could be relevant to modern

medicine. His preliminary findings show that the phage shows some lytic activity in S. aureus and Enterococcus species. This project aims to expand on Ross' research with MRSAΦOPP and examine its ability to infect and lyse an array of Staphylococcus species (S. aureus, methicillin-resistant S. aureus, S. intermedius, and S. saprophyticus). A spotting assay will be used to determine the effect of the phage on a host. The host species is mixed with molten top agar and poured onto LB plates to grow a bacterial lawn. The bacteriophage is serially diluted and spotted directly onto the lawn. If the phage successfully infects and kills the host, plaques, areas of dead bacteria, will form. Findings thus far indicate that the phage MRSAΦOPP effectively lyses MRSA and S. aureus. Further research to characterize and type phage MRSAΦOPP will be conducted in the upcoming weeks.

Examining the Developmental Effects of Knocking Down S-adenosylmethionine Synthases in MET-2 Mutants that Fail to Properly Inherit Chromatin States
Poster #9 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Vanessa Landeros, Braden Malveaux, & Aubrey McDaniel
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. Loss of either SPR-5 or MET-2 leads to progressive accumulation of H3K4me2 over generations that correlates with sterility and slight developmental delay. Recently, S-adenosylmethionine synthases, SAMS-1 and SAMS-4, which are critical enzymes in a biochemical pathway that generates the methyl donor S-adenosylmethionine (SAM), were shown to regulate distinct populations of H3K4me during stress response. These findings raise the interesting possibility that SAMS-1 and SAMS-4 may affect development in spr-5 and met-2 mutants that inherit increased aberrant levels of H3K4me. To test this in a curriculum-based undergraduate research experience (CURE) implemented in Developmental Biology (BIOL_4390K), students performed developmental progression assays on spr-5 and met-2 single mutants after knocking down either SAMS-1 or SAMS-4 via RNA interference (RNAi). 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.

Developing a Genetic Model to Study Cancer-Induced Muscle Wasting
Poster #13 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Ryan Grindle
Research Mentor(s): Anton Bryantsev

Colorectal tumors are often associated with debilitating skeletal muscle loss, leading to poor cancer patient survival. However, the exact mechanisms driving this effect remain unclear. To identify key genetic factors influencing muscle sensitivity to tumors, our lab uses the Drosophila fruit fly model. In our system, experimental tumors in the fly midgut are induced by overexpressing the mutated oncogene yki using the UAS/Gal4 expression system, which subsequently causes degeneration of the Indirect Flight Muscles (IFMs). Our preliminary study identified several target genes in IFMs that may mediate tumor sensitivity, but their roles require further validation through knockdown studies. However, simultaneously manipulating gene expression in the midgut and muscles requires two independent expression systems. In this study, we aim to adopt the LexA expression system to induce gut tumors while reserving UAS/Gal4 for regulating gene expression in the IFMs. This approach is challenging, as it requires integrating multiple genetic constructs into a single experimental fly. To achieve this, we applied traditional fly crosses to combine constructs located on different chromosomes. As proof of principle, we intend to knock down the gene cbt in the IFMs of flies with gut tumors. If successful, this experimental system will enable systematic screening of genetic factors involved in cancer-induced muscle wasting, providing valuable mechanistic insights.

Examining the Developmental Effects of Knocking Down S-Adenosylmethionine Synthases in SPR-5 Mutants that Fail to Properly Inherit Chromatin States
Poster #6 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Anna Abdala, Jaynie Adams, Jiji Ansari, & Aaliyah Applin
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. Loss of either SPR-5 or MET-2 leads to progressive accumulation of H3K4me2 over generations that correlates with sterility and slight developmental delay. Recently, S-adenosylmethionine synthases, SAMS-1 and SAMS-4, which are critical enzymes in a biochemical pathway that generates the methyl donor S-adenosylmethionine (SAM), were shown to regulate distinct populations of H3K4me during stress response. These findings raise the interesting possibility that SAMS-1 and SAMS-4 may affect development in spr-5 and met-2 mutants that inherit increased aberrant levels of H3K4me. To test this in a curriculum-based undergraduate research experience (CURE) implemented in Developmental Biology (BIOL_4390K), students performed developmental progression assays on spr-5 and met-2 single mutants after knocking down either SAMS-1 or SAMS-4 via RNA interference (RNAi). 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.

Examining the Developmental Effects of Knocking Down S-Adenosylmethionine Synthases in SPR-5 Mutants that Fail to Properly Inherit Chromatin States
Poster #7 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Abigail Charles, Brandon Duarte, Adriana Espiritusanto Diaz, & Sri Gunturu
Research Mentor(s): Brandon Carpenter

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Examining the Developmental Effects of Knocking Down S-Adenosylmethionine Synthases in SPR-5 Mutants that Fail to Properly Inherit Chromatin States
Poster #8 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Liya Hamid, Blake Hill, Hannah Ho & Jailyn Johnson
Research Mentor(s): Brandon Carpenter

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Examining the Developmental Effects of Knocking Down S-adenosylmethionine Synthases in MET-2 Mutants that Fail to Properly Inherit Chromatin States
Poster #3 (Siegel Student Recreation and Activities Center)
Thursday April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Vanessa Landeros, Braden Malveaux, & Aubrey McDaniel
Research Mentor(s): Brandon Carpenter

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Examining the Developmental Effects of Knocking Down S-Adenosylmethionine Synthases in MET-2 Mutants that Fail to Properly Inherit Chromatin States
Poster #9 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Arianna Parrish, Emily Pogue, Sierra Powe, & Alesse Powell
Research Mentor(s): Brandon Carpenter

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Examining the Developmental Effects of Knocking Down S-Adenosylmethionine Synthases in MET-2 Mutants that Fail to Properly Inherit Chromatin States
Poster #10 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Emily Vaughn, Mikias Worku, Josefa Wulf, & Mattie Villhauer
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. Loss of either SPR-5 or MET-2 leads to progressive accumulation of H3K4me2 over generations that correlates with sterility and slight developmental delay. Recently, S-adenosylmethionine synthases, SAMS-1 and SAMS-4, which are critical enzymes in a biochemical pathway that generates the methyl donor S-adenosylmethionine (SAM), were shown to regulate distinct populations of H3K4me during stress response. These findings raise the interesting possibility that SAMS-1 and SAMS-4 may affect development in spr-5 and met-2 mutants that inherit increased aberrant levels of H3K4me. To test this in a curriculum-based undergraduate research experience (CURE) implemented in Developmental Biology (BIOL_4390K), students performed developmental progression assays on spr-5 and met-2 single mutants after knocking down either SAMS-1 or SAMS-4 via RNA interference (RNAi). 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.

Exploring the Role of Hormones in Cancerous Growth
Poster #7 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Violet Coughlin

Research Mentor(s): Joanna Wardwell-Ozgo

Cancer, or uncontrolled cell growth, is a rapidly advancing and devastating disease that affects many. Cancer treatments often fail because cancer presents differently between patients and the treatment doesn't effectively target each specific characteristic. This leads to the cancer mutating and recurring, but if we can improve our understanding of cancer biology, we can create better and more precise treatments fit to every individual patient. Some cancers, particularly breast cancers, are hormone-receptive. This means that when certain hormones are present, they can encourage cancerous cells to grow, but we still don't fully know why this happens. To better understand why this occurs, I used the model Drosophila (fruit flies) to see how hormone signaling contributes to cancerous overgrowth. Drosophila is ideal to use in this study because they share 60% of their genes with humans. My project uses Drosophila eye tissue of the model organism to test this question. The Hippo growth pathway is responsible for regulating tissue and organ growth, and causes uncontrolled cell growth when dysregulated. Over- expression of Yorkie, the Drosophila equivalent to the proteins YAP and TAZ causes tissue overgrowth in Drosophila. Ecdysone, the main steroid hormone in insects, binds to its receptor (EcR) to regulate developmental transitions and coordinate cellular changes at each stage of development. My project specifically tests if ecdysone influences cancerous growth caused by the activation of the Hippo growth control pathway. I used the gal-4 driver, GMR-Gal4 to cause the over-expression of Yorkie specifically in Drosophila eyes. I cross those flies to UAS- RFP (negative control), with the experimental 1, UAS – EcRLBD and our experimental 2 UAS-EcRLBD-A483T, and UAS-EcR- all isoforms- RNAi (positive control). After these cross-hatched, I chopped the heads of the flies of the correct genotype and imaged the sides and tops to analyze the width and length of the eye. I hypothesize that ecdysone plays a crucial role in cancerous growth and loss of ecdysone will make the growth smaller. This discovery will support the idea that hormone signaling plays a crucial role in cancerous growth. This makes us one step closer to getting answers on how hormone-driven cancers may be treated in the future.

Hands-On Healing: The Role of Creative Art and Clay in Happiness and Stress Reduction

Poster #13 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Aria Mokhtari, Mahdi Ghasemi, Melika Eshaghian, Kat Bishop, Brittany Turner, Ryan Golshir, Ana De Faria Lima, Kaylee Stone, & Soojin Lee
Research Mentor(s): Jennifer Cooper

Stress and mental health concerns are increasing among students at Kennesaw State University. Creativity has gained recognition for their therapeutic benefits. This research investigated the impact of clay sculpting on stress reduction and emotional well-being. Through qualitative and quantitative assessments, we analyzed participants' self-reported stress levels before and after

participating in clay sculpting. A pre-and post-event survey measured the impact of engagement in these activities. After evaluating feedback and statistical trends, this study can provide evidence supporting clay sculpting as an effective tool for enhancing mental well-being among students. Stress levels were assessed using numerical rating scales (a form of Likert-type question) and matrix Likert-scale items, then analyzed using descriptive statistics, including mean comparisons and distribution checks to evaluate trends before and after participation. Data will be presented to demonstrate the effectiveness of clay sculpting as a tool for enhancing mental well-being among students.

How Do We Build a Muscle? Let Me Count the Genes...
Poster #25 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Camille Santana
Research Mentor(s): Scott Nowak

Akirin is a nuclear cofactor involved in the gene regulation of embryonic heart patterning in Drosophila melanogaster. During development, Akirin facilitates gene expression by integrating Twist transcription factor activity with chromatin remodeling machinery to facilitate the proper level of Twist-regulated gene expression. Our data indicates that Akirin regulates cardiac and skeletal muscle patterning through interactions with both SWI/SNF-class and NuRD/CHD4-class chromatin remodeling complexes. Excitingly, this mechanism appears to be conserved from insects to mammals and other metazoans. We are employing a combination of forward genetic screens paired with live imaging analysis of cardiac function to uncover novel genetic loci that may work with Akirin during skeletal and cardiac patterning. To date, we have uncovered several loci that appear to fit these criteria. Our current work centers on two of these candidate loci, hyd and Ppn, both of which appear to interact with akirin during these developmental events. The identification of these novel Akirin interactors will yield new insights into the mechanisms by which cofactors such as Akirin are critical for developmental processes.

Identification of a Candidate Akirin Enhancer Sequence
Poster #19 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Alyssa DeSantis
Research Mentor(s): Scott Nowak

Akirin, a small nuclear protein with conserved function across eukaryotes, is a critical determinant in the development of functional, robust cardiac and skeletal patterning and musculature. Akirin serves as a transcription cofactor by acting as a link between transcription factors such as the gene Twist. Akirin uses chromatin remodeling complexes to ensure that Twist functions appropriately during transcription. If Akirin function is impaired, the resulting

muscle patterning and structure is greatly impacted. We have identified a short sequence within the first intron of akirin that is highly conserved among closely related Drosophilid species. We are evaluating this sequence for possible promoter or enhancer activity. This evaluation is accomplished utilizing a variety of in vivo and in vitro techniques, both in live Drosophila embryos, as well as in cultured S2 cells. We have determined that a likely candidate enhancer sequence does indeed occur within this conserved element and are investigating a number of candidates that regulate this particular DNA sequence for akirin expression.

Identification of Potential Orthologous PMT-2 Genes in Parasitic Nematodes
Poster #28 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Andres Manuel Muradas Esquivel
Research Mentor(s): Martin Hudson

Nematodes such as Caenorhabditis elegans and the parasitic Haemonchus contortus share a phosphobase methylation pathway, analogous to those in plants and Plasmodium species. This pathway converts phosphoethanolamine (pEA) to phosphocholine (pCho) for the Kennedy pathway to enable the production of phosphatidylcholine- an essential component for phospholipid biosynthesis. This pathway is divided into two functional domains of phosphoethanolamine methyltransferase: N-terminal (PMT-1), which initiates the methylation of pEA to phosphomonomethylethanolamine (pMME), and C-terminal (PMT-2) that continues to methylate the pMME and the phosphodimethylethanolamine (pDME) intermediate to yield pCho. In nematodes, the PMTs are encoded by two distinct paralogous genes. There is growing interest in studying the structure and biochemical function of PMT-2 for potential drug targeting, driven by the need to develop novel nematicides that can combat parasitic nematodes that infect animal, human, and plant hosts; fueled by recent concerns about anthelmintic resistance in nematodes and the rising prevalence of parasitic infections associated with the expanding human population, changes in climate, and agricultural intensification. We employed the NIH's Basic Local Alignment Tool (BLAST) to detect probable nucleotide and protein sequences in parasites containing unannotated pmt-2 genes orthologous to those known in C. elegans and H. contortus across numerous sequence databases. Additionally, the Conserved Domain Search, also provided by the NIH, aided in locating conserved domains characteristic of PMT-2, namely the N-terminal vestigial domain and the S-adenosylmethionine-dependent methyltransferase (SAM) binding site. The presence of a pmt-2 gene was further analyzed using gene prediction software like GENSCAN and GeneID, which are capable of identifying and estimating the exons of protein-coding genes to formulate hypothetical sequences that may be identified in the genomes of parasitic nematodes in future studies. To date, we have predicted a number of pmt-2 genes, including those in Teladorsagia circumcincta, Ascaris lumbricoides, and Globodera rostochiensis, and plan to expand our predictions to other nematodes listed in the

neglected tropical diseases category, as well as others of significant medical, veterinary, and agricultural importance.

Intracellular Spatial Dynamics of Metal Transcription Factor 1
Poster #30 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Blake Hill & Michael Brian
Graduate Student(s): Minh Phung
Research Mentor(s): Eric A Albrecht & Carol Chrestensen

Metal Transcription Factor 1 (MTF-1) is a cytoplasmic transcription factor protein involved in cellular response to metal ions and stress. During cellular stress or heavy metal exposure, MTF-1 proteins translocate to the nucleus and bind DNA metal response elements (MRE), initiating the transcription of genes associated with intracellular metal regulation (e.g., zinc transporter (ZnTs), Zrt-/Irt-like protein (ZIP), metallothioneins). MTF-1 is positioned as a key sensor of cellular processes that trigger the need for bio-metals such as zinc. Therefore, monitoring its spatial distribution in cells can provide insight into what cellular conditions cause its intracellular movement. To visualize MTF-1 eukaryotic cellular location, chemically competent E. Coli (strain: DH5-α) cells were transformed with an MTF-1 plasmid containing Green Fluorescent Protein (GFP) and ampicillin (amp) resistance inserts. Transformed cells were selected using amp+ agar plates. Visible colonies were harvested then grown in amp+ Lennox Broth (LB) broth for amplification followed by plasmid purification. Purified endotoxin free plasmids were transfected into human embryonic kidney (HEK) 293T cells and imaged using fluorescent microscopy techniques. Control data demonstrated plasmid transformation, high yield purification, and efficient transfection. We aim to use this instrument to study intracellular MTF-1 trafficking during wound and regeneration and to determine if its nuclear translocation is regulated by reactive oxygen species.

Investigating the Role of CND-1 in C. elegans Neuromuscular Development
Poster #10 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Alex Brown
Research Mentor(s): Martin Hudson

Disorders such as autism and schizophrenia have been on the rise during the 21st century. A gene that has been linked to these disorders is NeuroD, which codes for a transcription factor that helps control cell fate in the early development of neuron and pancreatic cells. Caenorhabditis elegans, a species of nematode, has a simple and easily observable nervous system with genes homologous to humans. This makes them a prime candidate for research into human

neurodevelopmental disorders. Previous research revealed that cnd-1, the homologous transcription factor to NeuroD, was found to control the expression of ceh-5, a Vax2-like homeobox class transcription factor, in RME head motoneurons and PVQ interneurons. cnd-1 functions with the Hox gene ceh-13 in defining the fate of DD-class embryonic ventral nerve cord motorneurons. However, it is unclear how body wall muscles interact with DD neurons, how cnd-1 plays a role in that process, and the implications this could have for certain neuromuscular dysfunctions. To address this research gap, we designed an approach to create a C. elegans strain containing both the cnd-1 mutation and genetically encoded fluorescent body wall muscle markers. The strain RSL85 contains an unc-27::GFP (green fluorescent protein) that is expressed in the body wall muscles. Our study aims to cross unc-27::GFP with our cnd-1 mutant and observe muscle cell morphology in comparison to our control unc-27::GFP strain. We expect to see differences in neuromuscular connectivity, which may explain the uncoordinated movement seen in cnd-1 mutants.

Knocking Down S-adenosylmethionine Synthases, SAMS-1 and SAMS-4, Exacerbates Developmental Delay when Histone Methylation is Inappropriately Inherited
Poster #4 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Penelope Rodriguez
Graduate Student(s): Sundas Johnson
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. Loss of either SPR-5 or MET-2 leads to progressive accumulation of H3K4me2 over generations that correlates with sterility and slight developmental delay. Maternal loss of both SPR-5 and MET-2 allows the H3K36 methyltransferase, MES-4, to maintain H3K36 methylation at germline genes in the soma leading to ectopic expression germline genes and a more severe developmental delay. Interestingly, a new study demonstrated that S-adenosylmethionine synthases, SAMS-1 and SAMS-4, which are critical enzymes in a biochemical pathway that generates the methyl donor S-adenosylmethionine (SAM), regulate distinct populations of H3K4me during stress response. These findings raise the interesting

possibility that SAMS-1 and SAMS-4 may affect development in spr-5, met-2, and spr-5; met-2 mutants that inherit moderate and high levels of H3K4me, respectively. To test this, we are currently performing developmental progression assays on spr-5, met-2, and spr-5; met-2 mutants after knocking down either SAMS-1 or SAMS-4 via RNA interference (RNAi). We plan to present our findings at the upcoming Spring Symposium of Student Scholars.

Making Pigments with Fungi
Poster #6 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Mary Hogrefe
Graduate Student(s): William Murphy
Research Mentor(s): Christopher Cornelison

The pigment eumelanin, characterized by a brown-black hue and a plethora of documented properties, has seen a surge of interest in different industries, mainly medicine, cosmetics, and electronics. While natural and synthetic sources of the pigment are currently available, each have their limitations, highlighting demand for a more viable alternative. Wood spalting in nature is typically carried out by white rot fungi and provides a potential mechanism for melanin production. White rot fungi are of particular interest for melanin-production research because they are capable of breaking down lignin with the enzyme laccase, which is excreted through fungal digestion. Current research suggests that laccase is able to catalyze melanin formation, making this fungal group popular for melanin-yield assays. This experiment employs laccase's extracellular catalytic abilities to synthesize melanin beyond fungal hyphae, reducing the number of purification steps needed to isolate melanin samples. This project uses a series of dual culture plate assays to identify antagonistic effects and fungal-fungal interactions associated with Xylaria polymorpha and Pleurotus ostreatus, the fungi chosen for this experiment. As white rot fungi, these species are expected to demonstrate increased melanin production. X. polymorpha also exhibits a high level of pigmentation that suggests high natural levels of melanin production. In addition to plate assays, this project also features submerged fermentations of encapsulated fungi for facilitation of melanin biosynthesis. Once all data is gathered, melanin yields will be compared between single- and dual-cultures of fungi, and fungal-fungal interactions with be analyzed to reveal the correlation between melanin production and microbial competition.

Polysialic Acid Promotes Hippocampal Synaptic Plasticity by Modulating AMPA Receptor Function: Implications for Cognitive Enhancement
Poster #25 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Allisa George
Research Mentor(s): Vishnu Suppiramaniam & Kawsar Chowdhury

Polysialic acid (PSA), a highly negatively charged carbohydrate polymer attached to the neural cell adhesion molecule (NCAM), has emerged as a critical modulator of synaptic plasticity in the hippocampus. This study investigates the concentration-dependent effects of PSA on hippocampal long-term potentiation (LTP), a key form of synaptic plasticity underlying hippocampal-dependent memory. NCAM, a transmembrane glycoprotein involved in neurite outgrowth, cell migration, and synaptogenesis, has been implicated in synaptic modulation through PSA modification. While previous research has demonstrated PSA's ability to modulate synaptic plasticity, the specific mechanism remains not fully explored. Glutamate receptors, particularly α-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid (AMPA) and N-methyl-D-aspartate (NMDA) receptors, play fundamental roles in excitatory neurotransmission and synaptic plasticity. The NMDA receptors play role in LTP induction, whereas AMPA receptors are crucial for LTP expression. Our findings reveal that PSA enhances LTP in a concentration-dependent manner by potentiating AMPA receptor function. This enhancement of hippocampal synaptic plasticity by PSA underscores its significance as a crucial regulator of neuronal function and cognitive enhancement. By facilitating LTP, PSA contributes to improved learning and memory processes. Our future investigations will focus on exploring the potential for PSA as a therapeutic option for various neurological and psychiatric disorders.

Predator Species Across Different Kingdoms: A Bacterial Agar Art Exhibition
Poster #16 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Cara Erickson, Klaudya Hernandez, & Kim Altamirano
Research Mentor(s): Ramya Rajagopalan

Predators are essential across all domains of life, regulating populations, shaping ecosystems, and driving nutrient cycles. This agar art exhibit showcases a range of predatory species across different kingdoms, highlighting their roles in sustaining biodiversity. In 1995, gray wolves (Canis lupus) were reintroduced to Yellowstone National Park, triggering a trophic cascade that regulated elk populations, restored vegetation, and increased beaver numbers. This shift improved river ecosystems and enhanced biodiversity, demonstrating the landscape-shaping power of apex predators. Owls serve as both aerial predators and bioindicators. By controlling rodent populations, they prevent agricultural damage and disease spread, while their presence—or absence—reflects ecosystem health. A decline in owl populations often signals habitat loss or pollution, emphasizing their ecological importance. In the plant kingdom, the waterwheel plant (Aldrovanda vesiculosa) is a free-floating aquatic carnivore that preys on small invertebrates like water fleas and mosquito larvae. By regulating insect populations, it potentially reduces disease

vectors, showcasing plant-based predation. At the microbial level, predatory bacteria like Myxococcus xanthus and Pseudomonas aeruginosa play vital ecological roles. M. xanthus, a soil-dwelling bacterium, preys on other bacteria by swarming and secreting digestive enzymes, controlling microbial populations, and suppressing plant pathogens. P. aeruginosa, acting as a biocontrol agent, produces antimicrobial compounds that inhibit fungal pathogens and contribute to bioremediation by degrading organic pollutants. This artistic representation of predation across kingdoms emphasizes the interconnectedness of ecosystems and the unseen influence of predators. Through bacterial agar art, we contribute to STEAM and explore nature's complexity.

Production of Eumelanin Through Fungal Competition
Poster #5 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Mars Palazzo
Graduate Student(s): William J. Murphy
Research Mentor(s): Christopher Cornelison

Because of its many properties, including ultraviolet resistance, antioxidant activity, and bioremediation potential, eumelanin is utilized in many industries from cosmetics to electronics. As the demand rises, production of the pigment requires more cost effective, efficient, and ethical manufacturing. Currently, eumelanin is typically sourced from Sepia officinalis, the common cuttlefish. However, production of eumelanin from this source has proved environmentally problematic and inefficient. Fortunately, fungi present another avenue for eumelanin production. White rot fungi digest wood by excreting laccase enzymes extracellularly. Research has shown that laccase can catalyze the reaction to produce eumelanin. Many species of fungi have been documented as able to produce eumelanin, leading to further investigation into fungal sources of the pigment. Most notably, fungi will produce eumelanin as a defense mechanism when encountering other fungi in wood. This phenomenon is known as spalting. Spalting forms dark lines of eumelanin through wood, which are visible to the naked eye. These fungal interactions have sparked interest in co-culturing species of white-rot fungi. These lines of eumelanin create barriers between the two species. This study features a dual culture plate assay between the two white rot fungi Pleurotus ostreatus and Exidia spp. to highlight interactions between the two. As well, submerged fermentations of encapsulated fungi will be carried out to facilitate eumelanin production and identify relationships between pigment yields and fungal interactions.

Search for Novel Arsenic-Containing Antibiotics
Poster #10 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Wayne Lie, Jeb Harrelson, & Joseph Teshome

Research Mentor(s): Masafumi Yoshinaga

Arsenic is one of the most potent environmental toxins. On one hand, therefore, many bacteria have evolved arsenic-detoxifying mechanisms to counteract such a powerful substance. On the other hand, surprisingly, some bacteria utilize arsenic in metabolism, as an electron acceptor/donor, osmosis, or other functions. Another way to employ arsenic is in antibiotics. Some bacteria weaponize environmental arsenic to combat other bacteria, producing compounds with potential medical uses, as represented by arsinothricin (AST), the first known arsenic-containing antibiotic that controls various pathogens. These insights open new pathways in the pharmaceutical field to innovate in novel, arsenic-containing antibiotics that can help combat modern, high-priority diseases like tuberculosis and malaria. The goal of this project is to identify novel arsenic-containing antibiotics, which we hope can be utilized long-term to shed light on our shrinking antibiotic arsenal and help combat drug-resistant bacteria. The gene set (so-called biosynthetic gene cluster, or BGC) required for AST biosynthesis was used to search bacterial genome databases, which led to the discovery of several prospective BGCs for novel arsenic-containing antibiotics. In this project, four bacterial strains with the prospective BGCs were selected and cultured with arsenic under various conditions, testing their ability to produce novel arsenic-containing antibiotics. After several days of culture, bacterial cells were removed by centrifuge, and the resulting supernatant (i.e., liquid medium) were collected, and arsenic species in the media was analyzed by liquid chromatography coupled with inductively-coupled plasma mass spectrometry (LC-ICP-MS). As expected, unknown arsenic species were detected from some of the cultures, suggesting that the prospective BGCs are for novel arsenic-containing antibiotics. We are currently repeating the experiments to confirm the obtained results. Our study will provide insight into the arsenic biogeochemical cycles of various bacterium and their potential uses in the drug industry and medical field.

Study on AsRiPPs, Arsenic-Containing Ribosomally Synthesized and Post-Translationally Modified Peptides
Poster #21 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Eric Campos & Shifa Jiwani
Research Mentor(s): Masafumi Yoshinaga

Arsenic (As), the "king of poisons," has been a potential agent in medicine, particularly in antibiotic production. Notably, some bacteria utilize As to produce unique antibiotics, as represented by Arsinothricin (AST), the first known As-containing antibiotic. AST effectively controls various pathogens while sparing human cells, demonstrating the potential of As-containing antibiotics as a new pipeline for our shrinking antibiotic arsenal. To discover further

novel As-containing antibiotics, we mined bacterial genome database using the AST Biosynthetic Gene Cluster (BGC) and found prospective BGCs for novel As-containing antibiotics in two Actinomyces: Microbispora rosea and Amycolatopsis tolypomycina. Gene analyses suggest that the BGCs code for As-containing RiPPs (Ribosomally Synthesized and Post-translationally modified Peptides), which we named AsRiPPs, where one gene encodes a precursor peptide with the remaining genes involved in post-translational modifications. From the M. rosea AsRiPP BGC, we selected four genes (one precursor peptide gene and three modifier genes), which we hypothesize are the minimum required gene set to produce an As-containing precursor of the encoded AsRiPP. The precursor peptide gene was solely expressed or co-expressed with the modifier genes in Escherichia coli in the presence of As and the AsRiPP production was analyzed. So far, we confirmed that the precursor peptide gene was expressed when solely expressed in E. coli and successfully purified the peptide by affinity chromatography. We are currently examining the strain that co-expresses the precursor peptide gene and modifier genes. As an alternate approach, we cultured A. tolypomycina with As and examined the production of the AsRIPP. As a result, we found that the strain produced an organic As species with antibiotic activity, suggesting that the strain produces an As-containing antibiotic, presumably an AsRiPP. These results demonstrate that further As-containing antibiotics exist in nature, offering a new avenue for the discovery of antibiotics.

Synergistic Effect of Clove & Cinnamon against Aspergillus flavus in Georgia Peanuts
Poster #30 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Alaina McClelland & Ari Schwartz
Research Mentor(s): Premila Achar & Mohammad Halim

Aspergillus flavus poses significant economic and health risks in peanuts due to aflatoxin B1 (AFB1) contamination. This study examines the synergistic effects of Clove and Cinnamon Essential Oils (EOs) as natural antifungal agents to control A. flavus growth and reduce AFB1. A strain of A. flavus was isolated from peanuts, subcultured on Potato Dextrose and Rose Bengal agar medium, autoclaved for 15 minutes and incubated at 25°C for 6 days allowing growth. A treatment plan was developed to determine the minimum inhibitory concentration (MIC) of A. flavus against various concentrations of these oils. Master Cultures were prepared at specific concentrations ranging from 500 to 2500 ppm for both oils and for the controls. A. flavus sample was exposed to EO concentrations by micropipetting the oils directly onto the center of the fungal growth. Untreated samples were used as + & - controls. The effectiveness of each oil was evaluated by measuring fungal colony diameter. In addition, synergistic effects of both EOs were similarly tested. The AFB1 in all treated and untreated samples of A. flavus were quantified using the Vanquish™ MD system, with further analysis by LC-MS on the Orbitrap Exploris™ 240. The R^2 value of each experiment was calculated to determine the most effective treatment for inhibiting fungal growth. Both EOs exhibited antifungal properties, with Clove

being more effective at lower concentrations. The combination of Clove and Cinnamon EOs showed enhanced inhibition, especially at 2500 ppm. AFB1 contamination decreased with increasing EO concentrations, particularly when both oils were combined, with significant reduction in AFB1 levels observed at 250ppm and 2000ppm. Our findings provide evidence of potential use of both Clove & Cinnamon against A. flavus in Georgia peanuts as an eco-friendly biological control agent as an alternate to synthetic fungicides in Integrated Pest Management (IPM) program.

Studying the Relationship Between EcR Signaling and the Hippo Growth Pathway in Developing Drosophila Wings through dILP8 Expression
Poster #14 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Olivia Nilson, Noah Zaker, Kameryn Kimbrough, & Jaqueline Martinez Balderas
Research Mentor(s): Joanna Wardwell-Ozgo

Ecdysone is a hormone that binds the Ecdysone Receptor (EcR), a transcription factor, to control Drosophila development. EcR regulates development by activating or repressing transcriptional targets which is influenced by the binding of other proteins called coregulators. To better understand EcR transcriptional activity and how it influences development our lab developed a set of tools that disrupts EcR signaling by preventing coregulators from binding endogenous EcR. Interestingly, the coactivator Taiman has been shown to bind both EcR and Yorkie, a component of the Hippo Growth Control Pathway. One of the genes that both of these pathways control is dILP8, but we do not know if they work together or independently to regulate dILP8 expression. To test this, we overexpressed our genetic tools in the developing Drosophila wings in the background of a series of transcriptional reporters that contain fragments of the dILP8 promoter. Our results show that EcR signaling does regulate the dILP8 promoter independent of the Hippo Growth Pathway. These results suggest that hormone signaling does affect targets of the Hippo Growth Control Pathway.

What Does it Take to Make a B-body?
Poster #14 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Graduate Student(s): Sharar Naiarin Haque
Research Mentor(s): Anton Bryantsev

Nuclear domains are distinct compartments within the nucleus that selectively concentrate specific proteins, yet their regulation remains largely unclear. One such domain, B-body, forms in Drosophila flight muscles and contains the RNA-binding protein Bruno (Bru). Previous work in our lab identified the long non-coding RNA Hsr-omega as a scaffolding molecule for B-body.

Here, we investigate which regions of Hsr-omega and Bru are essential for B-body formation. Using bioinformatics, we selected several Hsr-omega regions: the conserved 5′ region (Hsr5) found in all isoforms, the core repetitive region (RR) present in long isoforms, and three extended regions (RF1, RF2, and RF3) unique to the longest isoform, Hsr-omega-RF. We cloned and expressed these regions in flight muscles, then used immunofluorescence and in situ fluorescence hybridization to assess their co-localization with Bru. Additionally, we expressed Bru mutants to identify the protein regions required for Hsr-omega interaction. None of the truncated Hsr-omega constructs were able to interact with Bru to form B-body-like structures. However, the ability of Bru to bind Hsr-omega in B-bodies was mapped to its RNA-Recognition Motif 2 (RRM2). These findings suggest that protein recruitment into nuclear domains depends on RNA-binding specificity, while RNA's ability to organize nuclear domains is length-dependent.

Physics

Analysis of Nanoceria Using Raman Spectroscopy
Poster #20 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Andrew Hiu
Research Mentor(s): Kisa Ranasinghe

Nanoceria, the simplified name for cerium oxide nanoparticles, has been found to have significant antioxidant properties that allow for clinical uses in combating neurodegenerative diseases. The coexistence of the two valence states, Ce3+ and Ce4+, within the nanoceria provides its antibacterial and anti-cancerous properties. To investigate the existence of the Ce3+ and Ce4+ valence states, two sets of bio-glasses, NaBCe4 and NaBCe6, were melted at the high-temperature furnace for 3 hours at 1100°C. The melt is quenched, and the glass samples were heat-treated for 10 minutes, 20 minutes, 30 minutes, and 1 hour at 500°C to grow the crystals. Using a mortar and pestle, the glass pieces were crushed and sifted into particles less than 500 microns but greater than 425 microns. These samples were then investigated under Raman spectroscopy using a 532-nanometer laser to analyze the chemical structure of the bio-glass samples. Results showed that the NaBCe4 samples had peaks at 502cm-1 and 580cm-1, signifying that there were nanoceria of Ce3+ valence inside the samples. Inside the NaBCe6 samples, peaks at 440cm-1 were sighted, meaning there were significant amounts of nanoceria of Ce4+ valence in the samples. These results indicate nanoceria with Ce4+ in NaBCe4 tends to transform into Ce3+ valence as the glass is heat treated, whilst the nanoceria in NaBCe6 transforms to Ce4+ as the glass is heat treated for 30 minutes.

Building a Mini Computer Cluster for the Simulation of Particle Collisions
Visual Art #2 (Siegel Student Recreation and Activities Center)

Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Caleb Helblin & Tyler Poole
Research Mentor(s): Andreas Papaefstathiou

Scientific computing requires the use of clusters of computers to facilitate complex calculations that would otherwise not be feasible. In this project, we construct a small version of such a cluster, made out of Raspberry Pi's, single-board, general-purpose computers that are high-performance and low-cost. We then put our cluster to use to simulate events that occur at high-energy particle colliders, such as the Large Hadron Collider at the European Organization for Nuclear Research (CERN), comparing our simulations to actual experimental results.

Modeling the Structure of High Performance Optical Coatings
Poster #10 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Hannah A. Walker & Siddhi Patel
Research Mentor(s): Kiran Prasai

Gravitational wave detectors such as LIGO use highly reflective low-thermal noise mirrors made up of amorphous oxides coatings. To increase the sensitivity of these detectors, coatings with further reduction in thermal noise are crucial. We explore atomic structure amorphous TiO_2-ZrO_2 doped GeO_2 as it is being studied for application in coatings. Using molecular dynamics simulations, we obtain atomic models and we highlight the key aspects of the atomic structure that might affect the optical and mechanical response of these coatings.

Synthesis and Electrical Characterization of Single Crystalline and Polycrystalline Materials
Poster #13 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Lucas Ruth & Brady Wilson
Research Mentor(s): Chetan Dhital

There are many different combinations of elements that will make different materials with different electrical and magnetic properties. Most of these materials' electric and magnetic properties have not been studied, so the correlation between the compounds that makeup the materials and the electric and magnetic properties of them are not fully understood yet. Research must continue in order to collect data on different materials. This will give us a better understanding of the properties associated with each material, compound, and element. The electric and magnetic properties of most materials are not understood. The purpose of this research is to gain insight into the electric and magnetic properties of certain materials. The flux method was mainly used to form the single crystalline materials. The flux method is a crystal

growth method that uses a flux to dissolve materials. Crucibles were filled with elements to be formed into the desired single crystalline material. The crucibles were then flame sealed in a glass tube under vacuum. The crucibles were then placed in a muffle furnace. With gallium as the flux, the elements dissolved and then formed single crystals of the desired material. Immediately after the crucibles were taken out of the furnace, a centrifuge was used to separate the molten gallium from the single crystalline material. The Bridgman method was also used to make some single crystalline materials and arc melting synthesis was used to make polycrystalline materials. The electric and magnetic properties of the crystalline materials were then measured using a SQUID magnetometer. The electric and magnetic properties of these materials are now understood.

Geer College of the Arts

Music

Analysis of Québécois Traditional Vocal Répertoire "La Bonne Chanson"
Poster #24 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Isaac Cruz-Benitez & Jackson Kodani
Research Mentor(s): Peter Fielding

Along with the course of the project, both Isaac and Jackson analyzed traditional Quebecois choral music and created tone collections of the pieces. This research examined pieces by identifying for each the name, time signature/meter, key signature(s), and tonic note. Then, by creating physical drawn pitch maps that were transferred into digital copies in notation software such as Sibelius and Finale, the research concluded a comparison of all the pitches in each choral piece. By contrasting these pitch maps, trends within the pieces were identified.

Theatre and Performance Studies

The Evolution of Attitudes and Perceptions of First-Year Theatre Students
Oral Presentation (Microsoft Teams)
Friday, April 18, 2:45pm – 3:00pm
Undergraduate Student(s): Gracie Cork
Research Mentor(s): James Davis

First-year theatre students face challenges as they adjust to their first semester of college. Time management, navigating academic expectations, and building a sense of community are key factors that influence their academic and personal growth. The purpose of this study is to explore how attitudes and perceptions of first-year theatre students evolve as they progress through their first semester of college. The study strives to analyze how they manage these demands and how their experiences contribute to their overall academic success and growth. The methods used were a combination of data collection including collecting and organizing data from multiple surveys, interpretation, and visualization. The data comes from Dr. Jim Davis and all of his previous students in the fall semester of the years; 2022, 2023, and 2024. Three surveys were administered by Dr. Jim Davis to his fall semester first year students, sample size was around 17-20 students. The results showed most students were worried about having enough confidence to put themselves out there, mainly all the students talked about how hard it was to balance their academic and creative responsibilities. By the end of the semester, many shared a similar

recognition of the importance of effective time management and finding support from peers and faculty. When asked what three things they were told about college, most of the students said college will be the best years of their life or the most challenging years, the students reflected on the duality of the college experiences either being the best or most challenging. Students also realized the importance of effective time management, becoming more academically successful overall. Many students also noted the value of finding support from peers and faculty throughout the semester. A sense of community appears to be essential not only for emotional support but also for academic success.

A Kennel Built from the Inside: Dog Act & the Sacrifice of Agency
Oral Presentation (Prillaman Hall)
Wednesday, April 16, 3:00pm – 3:50pm
Undergraduate Student(s): Mitch Witcher
Research Mentor(s): Tom Fish

Spring 2025, KSU's Department of Theatre & Performance Studies produces Dog Act by Liz Duffy Adams, a play about two post-apocalyptic vaudevillians named Zetta Stone and Dog. The latter is a young man who has willingly demoted his species from human to dog. On the surface, their transformation is humorous, but its reasoning is truly, deeply sad. When Dog was a young boy, he made an unintentional decision that led to the genocide of his people, and his grief and atonement manifested with him swallowing those feelings and becoming a dog, or in other words, less than human. The artist-scholar presentation focuses on my background research and strategies as the actor assuming the role of Dog in KSU's production. In particular, I focus on the concept and embodiment of agency, inspired by György Gergely's scholarship. If agency is a person's capability to commit an action or make a decision, agency is absent for Dog-it is not taken by force but willingly given away. I use an analysis of Dog Act, along with a performed selection from the play, to demonstrate how individuals in modern society give up their own agency to protect their own way of life, remove the threat of societal morals, and avoid existentialist dread in an uncertain world.

Southern Polytechnic College of Engineering & Engineering Technology

Civil and Environmental Engineering

Accelerating Tornado Disaster Response with Automated Level of Damage Classification
Poster #9 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Chao He & Tracy Le
Research Mentor(s): Da Hu

Tornadoes are among the most destructive natural disasters in the United States, with over one thousand occurrences annually, causing significant human and economic losses. Rapid and accurate damage assessment is critical for effective disaster response, but traditional manual methods, relying on the Enhanced Fujita (EF) scale, are time-consuming and prone to human error. This study addresses these challenges by developing an automated tornado damage classification system using deep learning. Leveraging a curated dataset of thousands of labeled post-event images from NOAA's Storm Damage Viewer, categorized by EF0 to EF5 ratings, this work trained and evaluated deep learning models to predict damage severity. The results demonstrate the potential for scalable and accurate damage assessments, offering critical insights for emergency responders. Additionally, the study introduces a benchmark tornado damage dataset to advance future research in this domain. These contributions aim to enhance disaster response efficiency and resource allocation in tornado-affected areas.

Addressing Design Challenges in Punching Shear of Corner and Edge Columns in Post-Tensioned Concrete Slabs
Oral Presentation (Microsoft Teams)
Friday, April 18, 2:15pm – 2:30pm
Recent Graduate(s): Logan Muse
Research Mentor(s): Mohammad Jonaidi

This paper represents a scholarly exercise conducted as part of the academic requirements for Kennesaw State University's course, CE 6900, "Special Topics in Civil Engineering," a part of the Master of Science in Civil Engineering program. This study aims to investigate punching shear, exploring its nuances and implications within the broader context of structural engineering. The majority of punching shear research on reinforced concrete flat-plate systems utilizing headed studs has focused on interior slab-column connections. However, recent tests on

the behavior of edge and corner columns indicate that additional study is needed to validate the building code assumptions regarding punching shear design. Physical testing shows that the observed shear stresses along the critical punching perimeter are lower than the theoretical values estimated by calculations. The punching shear design formulation provided by the American Concrete Institute (ACI) accounts for the reduction in the fraction of column moment transferred as shear at the critical section. However, this assumption has not been consistently applied in some engineering design practices and commercial concrete design software, potentially leading to designs that do not adequately account for the flexural stresses in the slab. Without a thorough understanding of ACI 421.1R-20 and ACI 318-14 or the calculations performed by design software, structural engineers risk adding unnecessary shear reinforcement at columns near free edges and producing longer rail lengths than required. This, in turn, leads to congestion and construction difficulties during concrete casting. The findings of this study suggest that refining reinforcement placement using a more accurate interpretation of ACI provisions can enhance design efficiency. The results provide structural engineers with improved recommendations for reinforcement layout, reducing unnecessary shear reinforcement while maintaining safety and constructability.

An Analysis of Factors that Affect Work Zone Crash Severity
Poster #25 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): James Coker
Research Mentor(s): Sunanda Dissanayake

Roadway work zones pose a significant threat to the lives of both motorists and construction workers, by changing the route of a roadway and having workers operate close to moving vehicles. With driving culture varying from state to state in the US, analyzing crash data from a particular region is the most effective way to determine what causes severe work zone crashes. This study investigates five factors that may contribute to the injury severity of work zone crashes in the state of Georgia: Speed limit, time of day, average annual daily traffic (AADT), number of lanes, and manner of collision. Using Georgia work zone crash data from 2019-2023, this study cross-analyzes each factor with KABCO injury severity. Using a chi-squared test, it was found that all factors are significantly correlated to the severity of work zone crashes. The manner of collision had the highest chi-squared value, indicating that it is the most significant out of the factors considered in regard to influencing the crash severity. Based on the results, it is recommended to implement median break-away barriers in work zones to reduce head on collisions with oncoming traffic and to force motorists to slow down to navigate the constricted roadway. In addition, using reflective cones and speed monitoring displays may help drivers navigate and slow down on roadways in darker conditions when the chance for fatal crashes is heightened.

Assessing a Solution for GA Work Zone Safety Through Cross Classification
Poster #26 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Asiah Lightfoot
Research Mentor(s): Sunanda Dissanayake

Work zone safety is a health risk for drivers and construction workers. In Georgia, work zone crashes have decreased over the past 5 years, but the number of fatalities has still been over 1,000 each of those years. Studies have proven solutions such as lowering the speed limit or relying on current traffic control devices to be ineffective. The risks associated with these crashes must be recognized to improve upon previous solutions or innovate new ones from the results. The objective of this study is to utilize cross classification to identify factors that contribute to work zone crash deaths and severe injuries in the state of Georgia. The following factors found within the Georgia Department of Transportation were cross classified with the KABCO severity scores: manner of collision, urban & rural, segment annual average daily traffic, work zone type, and posted speed limit. GDOT data dating from the years of 2019-2023 was gathered and placed in contingency tables using each factor versus crash severity. The expected values were then calculated from the gathered data (or observed values) and placed in new tables for each factor. Then, the observed and expected values were used to calculate the chi-square value of each factor. The results showed that all listed factors are indeed risk factors that influence crash severity. Work zone type had the smallest chi-square value and manner of collision had the highest. Therefore, the manner of collision is the most significant regarding the severity of work zone crashes. In conclusion, energy absorption median stoppers could be built on Georgia's highways to reduce the amount of collision type crashes. Additionally, improved traffic control devices may help lessen the flow of traffic and strategically placed radar-based feedback systems may help drivers become more aware of their high speeds within work zones.

Assessing Cyclist Safety on and Around Marietta Campus
Poster #1 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Mat Yun
Research Mentor(s): Adam Kaplan

[In the U.S. alone, ten of thousands of people die every year in car-related accidents, and the design of the roads can impact its role in future conflicts or the prevention of such. The use of bicycles and effective and safe road designs can allow for trips to be taken without the space requirement and emissions of a personal vehicle. Collisions involving bicycles can also be less severe than those involving vehicles, and they can improve public health as it is an active mode of transportation. But they can be more dangerous and time-consuming than driving if the

necessary infrastructure is not effectively designed or built. This research project focuses on assessing the safety of bicyclists on and around the Marietta campus of Kennesaw State University. Our process is to record potential points of concern and create a ranking system to rank their safety and effectiveness at incorporating the use of bicycles. We will reference previous road safety studies to build a system that can effectively determine the "grade" of a specific section and use this to suggest improvements to the city officials of Marietta. The findings will inform infrastructure recommendations, including improved lane markings, enhanced connectivity to existing bike trails, and policy advocacy for cyclist-friendly campus planning. This study highlights the need for data-driven safety measures to encourage cycling as a viable campus transportation option.

Comparative Analysis of Deep Learning Models for Structural Defect Segmentation in Bridges
Poster #4 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Kiara O'Neal
Research Mentor(s): Da Hu

Automated structural defect detection is essential for ensuring the safety and maintenance of civil infrastructure, particularly in bridges where defects such as cracks, spalling, and corrosion can compromise structural integrity. This paper presents a comparative study of three semantic segmentation models—U-Net, Feature Pyramid Network (FPN), and DeepLabv3+—for detecting and classifying structural defects in bridge imagery. Each model was evaluated using two encoder architectures, EfficientNet B3 and MobileOne S4, to assess the impact of different feature extraction strategies on segmentation accuracy. The experiments were conducted using the DACL benchmark dataset, which includes a wide range of defect classes. FPN paired with EfficientNet B3 demonstrated the highest mean accuracy across most defect categories, outperforming the other combinations, particularly in detecting common defects such as cracks and graffiti. However, certain defect types, such as hollow areas and cavities, presented challenges for all models. These results highlight the effectiveness of deep learning models in automated defect detection, while also identifying areas where further refinement is needed to improve performance in more complex defect scenarios.

Exploring Beneath the Surface: Mapping the Underground with AI and Radar
Poster #8 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): John Haly, Kevin Gonzalez, & Alex Abounassar
Research Mentor(s): Da Hu

Ground-Penetrating Radar (GPR) is a vital technology for non-invasive subsurface exploration, enabling the identification of buried objects and structural anomalies. A key challenge in interpreting GPR data is the reliable recognition of hyperbolic signatures within noisy B-scans. In this work, we present a deep learning-based framework for automated hyperbola detection that directly learns from real GPR data, eliminating the need for manual feature engineering. Leveraging a carefully curated dataset of annotated radar images, our convolutional neural network model extracts and exploits high-level features to distinguish hyperbolic reflections from clutter and other background interferences. Experimental evaluations demonstrate that our approach achieves superior accuracy and robustness compared to traditional methods, reducing both false positives and missed detections. This advancement not only accelerates GPR data processing but also improves the reliability and scalability of subsurface mapping. By harnessing the power of AI and radar, we provide an automated solution that can be easily integrated into existing workflows, paving the way for more efficient geological surveys, infrastructure assessments, and archaeological explorations.

Feasibility Study of Cut-Flower Floating Wetlands on Nutrient Removal
Oral Presentation (Prillaman Hall)
Wednesday, April 16, 1:00pm – 1:50pm
Undergraduate Student(s): Roshni Chimmili, Aaron Zheng, & Hunter Quarles
Research Mentor(s): Amy Gruss

Eutrophication caused by excess nutrients in aquatic environments presents significant ecological challenges. Floating treatment wetlands (FTWs) offer a nature-based solution by leveraging plant uptake and microbial activity to improve water quality. This feasibility study explores the effectiveness of cut-flower FTWs in reducing nitrogen (N) and phosphorus (P) levels within a controlled greenhouse environment. The experiment is conducted in a tub of water simulating natural conditions, where key parameters such as nutrient concentration, dissolved oxygen (DO) levels, pH stability, and temperature are monitored. The study develops a floating mat prototype has been developed with a nutrient solution added to the system to mimic excess nutrients in stormwater. Water conditions are tested regularly, with nitrate and phosphorus levels analyzed in the lab with test kits. It is anticipated that the addition of flowering plants will gradually decrease nutrient concentrations in the mesocosm water, improving overall water quality. Future research will focus on optimizing plant growth, refining system stability, and preparing for field implementation at Kennesaw Stadium in May. Findings from this study will contribute to the broader understanding of FTWs as a sustainable water treatment strategy.

Investigation of the Flexural Strength Capacity of Concrete Made with Steel Fiber, Glass Powder and Fly Ash as Partial Replacement of Cement
Poster #1 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm

Undergraduate Student(s): Servando Ledezma Pastor Izara & James Ray Story Jr.
Research Mentor(s): Adrijana Savic

Steel Fiber Reinforcement is used to improve durability and toughness in concrete. Using steel fiber in production of concrete could eliminate the need for steel reinforcing and has potential to reduce CO2, which is important for producing environmentally friendly concrete. Cracking and fracturing under dynamic load could be prevented with enhancing the durability of concrete. Flexural Strength Capacity of Concrete depends on different variables, such as concrete mixture, compressive strength, cracking… Traditional concrete has flexural strength of 400-700psi (2.76 MPa-4.83 MPa) determined using a 3-point bending test, simulating the loading of the vehicle on the slab. The goal of this project is to produce high quality concrete mixture which could be resistant to dynamic loads. This work presents current progress toward developing concrete mixture design resistant to dynamic loads, which is important for pavement design. A 3-point bending test will be utilized at Kennesaw State University in order to determine the difference between the flexural strength capacity of reinforced concrete and flexural strength capacity of concrete fabricated using Fiber Glass Rebars. Concrete beams with square cross section 6in x 6in and 5ft (15cm x 15cm x 1.67m) length will be cast at Kennesaw State University using the same concrete mixture design and different type of rebars. Deflection of the beams will be measured using dial indicator.

Machine Learning for Predicting Vehicle and Power Plant Emissions in the United States
Poster #36 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Damian Martinez Gonzalez & Sahil Patel
Research Mentor(s): Mahyar Amirgholy

Electric vehicles (EVs) produce significantly fewer emissions compared to traditional vehicles running on fossil fuels. However, the increase in electrical energy consumption of EVs from the power grid, driven by their rising adoption and higher vehicle miles traveled due to lower maintenance and travel costs, results in higher greenhouse gas emissions from power plants. This research develops a machine learning model to predict greenhouse gas emissions from power plants at the state level as EV energy consumption from the power grid increases. The proposed model is built on the Meta Prophet platform, which is specifically designed to capture temporal patterns and seasonality. Trained using the National Renewable Energy Laboratory (NREL) Cambium database, the proposed model provides accurate predictions of CO2, CH4, and N2O emission rates from power plants over the coming months and years under eight distinct pricing, taxation, and development scenarios. We apply the proposed model to predict the increase in

emissions of CO2, CH4, and N2O from power plants in response to the growing energy consumption of EVs from the power grid across the United States.

Smart Transportation Solution for GA Parents
Poster #21 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Sai Bhargav Palepu, Lorna Flowers, Joshua Raj, Erik vaquero, Cole McGough, Christal Woodward
Graduate Student(s): Proma Dutta, Yash Rakeshbhai Patel, Sarala Lasanthi Gunathilaka
Research Mentor(s): Parth Bhavsar

Traffic congestion, specifically stop-and-go traffic, is one of the main reasons for the increased density of particulate matter (ex: PM 2.5 and PM 10, a key contributor to respiratory problems in adults and kids). Pick-up and drop-off events in K-12 schools, specifically elementary and middle schools, increase stop-and-go traffic, which eventually increases pollution significantly. This research aims to reduce traffic congestion and air pollution during school drop-off and pick-up times. The first phase of the project focuses on modeling existing traffic conditions in an elementary school. We will be using video analytics software to process video data collected from the school site. We will also utilize the GDOT website to collect additional data, such as the average speed of the roadways. Using this data, Synchro software will be used to develop existing traffic conditions. In addition, we will also do a survey on parents to understand their perspective on various issues such as wait times and transportation modes. Based on this, we will proceed to the second phase, in which we will identify potential solutions to optimize traffic and queues during the pick-up and drop-off processes. We would like to create an application for parents and guardians to optimize school pickup and drop-off processes with this data. Through this research, we hope to gain an understanding about traffic and pollution issues around schools and how we can utilize technology to optimize health and efficiency.

Utilizing a Mid-Size Shake Table for Structural Dynamics and Earthquake Engineering Research and Education
Poster #18 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): John Xu & Gagandeep Narang
Research Mentor(s): Metin Oguzmert

In structural dynamics, it is important to understand the properties of structures and their responses to controlled vibrations and simulated earthquakes. A mid-size shake table provides valuable data for both research and education. In this study, a sample single-story structure is

mounted on the shake table to observe its dynamic response under various conditions. Additionally, a custom damping device, designed and fabricated using a 3D printer, is introduced to investigate damping effects in structural systems. The main questions of this project are: How do different amounts of damping and mass added to the structure influence the collected data? How can these results be integrated into engineering education? The sample structure is secured to the shake table and Shake Table control software is used to generate simulated earthquakes or sinewave vibrations. Accelerometer data is collected from both the shake table platform and the top of the sample structure for analysis. To control damping, a custom damping device is designed and 3D-printed. This device introduces a variable damping mechanism by modifying the frictional interaction with the sample structure. The design allows for adjustable damping levels, enabling a controlled study of energy dissipation in dynamic systems. To adjust mass, clamps and washers are used to incrementally, adding weight to the sample structure. Finally, experimental data is exported to Excel and compared with the control data. Through this project, a operation guide has been developed for operating the Shake Table II and conducting structural dynamic analysis. The data collected demonstrated that increasing damping reduces peak acceleration, while additional mass influences the system's natural frequency. These findings supports structural dynamics principles, reinforcing the shake table's effectiveness for both research and education. The sample structure, along with the custom damping device, successfully simulates structural responses, illustrating energy dissipation and resonance effects.

Electrical and Computer Engineering

Designing an Aerodynamic Shell for the Kennesaw all Weather Autonomous Drone III
Poster #6 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Peter Garuccio
Research Mentor(s): Adeel Khalid

This research details the creation of shell for the Kennesaw all Weather Autonomous Drone III (KWAD III) that is designed to be both aerodynamic and weatherproof, suited for KWAD III's mission profile as a large, eight-rotor unmanned aerial vehicle. Several airfoil-based and real-world designs are tested using computational fluid dynamics to determine which has the highest aerodynamic efficiency (lift/drag), and then this most efficient design is adjusted for even greater aerodynamic efficiency. Once an acceptable design is reached, a prototype is created with considerations for material choice, manufacturability, mission parameters, and water-resistance. After these requirements are completed, this data is shared with the rest of the KWAD III team to create a functioning shell for KWAD III.

Development of a Cost-Effective 3D-Printed Smart Glove for Hand and Finger Posture Measurement in Prosthetic Control and Rehabilitation
Poster #7 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Aiden Jackson, Lukyan Hnidets, Abhijeet Surakanti, Rodrigo Ledesma-Ledesma, & Britt Walker
Research Mentor(s): Coskun Tekes

Accurate measurement and prediction of hand and finger posture are essential for advanced prosthetic control and stroke rehabilitation. Commercially available data gloves, such as Manus, CyberGlove, and StretchSense, utilize flex sensors, IMUs, or capacitive sensing to provide high-fidelity motion capture. While these systems offer precise hand tracking, they come with significant limitations, including high cost, software restrictions, and limited adaptability to different hand sizes. The high price of commercial gloves makes them inaccessible for many research labs and rehabilitation centers, restricting their widespread use in personalized healthcare and assistive technology applications. To address these challenges, this study presents the development of a cost-effective, customizable 3D-printed smart glove designed to provide accurate ground truth measurements for predicting hand and finger postures. The glove integrates low-cost flex sensors and an inertial measurement unit (IMU) to capture finger bending and hand orientation. This design maintains high measurement accuracy while significantly reducing costs compared to commercial alternatives. To validate the system's reliability, the glove's measurements are compared with a Leap Motion Controller, a widely used optical tracking device for hand kinematics. Furthermore, a virtual hand animation developed in Unity is used to visualize gesture predictions, allowing real-time feedback and interactive validation of the system. Electromyography (EMG) signals from the forearm are also recorded to train a deep learning model for accurate static and dynamic gesture prediction, with ongoing efforts to optimize model performance. This system presents a scalable solution for researchers, clinicians, and engineers in the fields of prosthetic control, rehabilitation, assistive technology and human-computer interaction. By providing a low-cost, customizable alternative to expensive commercial gloves, this research advances the development of intelligent wearable technologies that enhance motor function recovery and improve the quality of life for individuals with limb impairments.

Development of Memristor-based Artificial Synapses for Brain-like Neuromorphic Computer Chips of the Future
Poster #20 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Benjamin Meza, Trevor White, Paxton Joseph, & Shlok Sohoni
Research Mentor(s): Sandip Das

Neuromorphic computing aims to mimic the brain's neural architecture to achieve highly efficient, low-power artificial intelligence systems. A key component of this vision is the memristor, a device capable of simulating synaptic plasticity by adjusting its resistance based on past electrical activity. This study investigates whether memristors are viable as artificial synapses to be used in neuromorphic computing. Our research primarily involved learning the theoretical foundations of memristors, understanding their electrical characteristics, and designing simulated circuits using LTSpice. By modeling simple neuromorphic circuits, we analyzed how memristor-based systems can store and process information akin to biological neural networks. While we did not fabricate physical devices, based on our simulations, we can anticipate that the memristors will effectively demonstrate hysteresis loops, which is indicative of artificial synapses and the physical implementation of the memristors is the next goal of the project. This work contributes to the broader discussion of next-generation computing, highlighting the potential of memristors in advancing AI hardware efficiency and brain-inspired learning models. Based on this project's findings, it is believed that using memristors as a vector towards neuromorphic computing has many benefits, such as memory that holds its state even without the presence of electricity, real time adaptation, and improved sensory applications.

High-Sensitivity Microfluidic Solenoid for Magnetically Tagged Antigen Detection in Early-Stage Infectious Disease Diagnostics

Poster #19 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Manas Shakti Singh, Connor Bhavsa, Scott Eyre, Alexis Ladao Blundell, & Jaden Dudley
Research Mentor(s): Hoseon Lee

To quantify biomolecule presence in humans, microbead tagging methods have been utilized extensively in the biomedical field. Our team quantifies infection progression of the Dengue Virus using superparamagnetic microbeads, certain bonds to bioindicators, and a microfluidic solenoid. We propose using the antigen NS1 coupled with ThermoFisher Scientific Dynabeads coated in EDC/NHS, IgG antibody, and IgM antibodies for tagging virus bioindicators. This collective bioindicator complex will be passed through a microfluidic solenoid to induce discrete and countable voltages and therefore countable number of antibodies for our novel early detection method. This novel method addresses challenges in false negative rates and offers enhanced early detection capabilities of viral incubation which is crucial for virus treatment and mitigation. To improve the sensitivity of the device, the team proposes a strong magnet at one end of the micro-solenoid to pull the magnetically tagged antigen through. This will enable higher acceleration, and subsequent voltage, through the solenoid than conventional mini pumps. To further validate this method, COMSOL Multiphysics software is used to simulate the voltage induced when the magnetically tagged antigens pass through the microfluidic solenoid channel

under these conditions. In addition to optimizing the acceleration of the magnet, a low-noise-amplifier (LNA) and a digital signal processor are utilized to minimize the noise produced while amplifying the induced signal for high sensitivity when detecting the antigens. The team proposes to improve the LNA by adding more paralleled op amps to reduce the noise by a factor of 2 instead of the original √2. An LNA output replication algorithm was developed to avoid direct use of the LNA during DSP filter prototyping. The algorithm was used in Matlab and Simulink to develop an adaptive IIR lowpass filter for the dsPIC33FJ12MC-202 which counted simulated tagged beads accurately.

Integrating Wireless Mesh Networking and Object-Oriented Semantic Mapping into UAVs

Oral Presentation (Microsoft Teams)
Friday, April 18, 3:30pm - 3:45pm
Undergraduate Student(s): Danny Tram & Mit Piyush Patel
Research Mentor(s): Sumit Chakravarty

Unmanned Aerial Vehicles (UAVs) are becoming increasingly utilized in applications such as disaster response, surveillance, and extending connectivity. However, reliance on human operators and centralized communication systems introduces risks of human errors, and miscommunication, which has led to serious accidents such as the aircraft collision in DC. Ensuring reliable communication and collision avoidance among UAVs is a major factor in operational success. This research explores how Wireless Mesh Networking (WMN), and Object-Oriented Semantic Mapping could be implemented with UAVs to improve wireless communication and collision avoidance. WMNs are a type of network topology which allows for scalable, decentralized communication with adaptive routing. Object-Oriented Semantic Mapping creates 3D maps providing object-specific data, improving environmental awareness. WMNs enhance UAVs by providing decentralized communication paired with robust connectivity and adaptive routing, allowing UAVs to effectively communicate and maintain connectivity in dynamic environments. Choosing routing and distributed MAC protocols such as AODV and CSMA/CA respectively or others, creates a robust communication network and improves efficiency. Object-Oriented Semantic Mapping enhances UAV navigation by providing object detection and probabilistic mapping, allowing for UAVs to interpret and respond to obstacles effectively. By integrating YOLOv8-based real-time object detection and probabilistic SLAM techniques, UAVs can create detailed maps that can identify obstacles and improve navigation decisions. The integration of these technologies allows for the creation of a UAV network capable of real-time collaboration, and obstacle avoidance. The adjustments prove Wireless Mesh Networking together with Object-Oriented Semantic Mapping enables UAVs to operate with better collision avoidance as well as robust communication. The combination of real-time object detection and probabilistic mapping with optimized data transmission enables UAVs to work better in dynamic conditions while requiring minimal human supervision. Future

research aims to perfect these technologies because their applications in self-driving cars and aircraft designs contributes to more reliable autonomous systems.

LLM-Based Semantic Alignment for Human-Robot Interaction: A Neural-Symbolic AI Approach
Poster #24 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Justin Thomas, Rufui Olasubomi, Justin Lucose, Harris Arockiaraj, Jamil Smith
Graduate Student(s): Rhimesh Lwagun
Research Mentor(s): Yan Fang

Human-robot collaboration requires a seamless understanding of human language and visual perception. This work explores a neural-symbolic AI approach to enable a humanoid robot to interpret spoken commands and align them with visual input. Using a trending light-weight large language model (LLM), DeepSeek R1 deployed on a Raspberry Pi 5 within the Tony Pi humanoid, we integrate speech recognition, symbolic AI, and computer vision to achieve semantic alignment between human instructions and perceived objects. Our current design allows the robot to process human commands and recognize objects through visual features and reasoning symbolically to determine the correct action. This research contributes to exploring and advancing multimodal human-robot interaction on the edge computing platform with limited resources, enabling more natural and efficient communication with intelligent robotic systems.

Novel Optical Sensors for Assessing the Effect of Aging on Muscle Health
Poster #13 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Aster Cheung, Jessica Mambo, & Samson Samuel
Graduate Student(s): Linh Luong
Research Mentor(s): Paul Lee & Garrett Hester

Sarcopenia is the age-related decline in muscle function and mass. This condition, exacerbated by chronic illnesses (e.g., kidney failure and heart disease), insulin resistance, prolonged immobility, and hormonal imbalances, significantly affects mobility, quality of life, and mortality in older adults. Since skeletal muscle energy production largely depends on mitochondrial capacity, understanding mitochondrial capacity is crucial for assessing skeletal muscle aging. Traditional assessment methods, such as phosphorous nuclear magnetic resonance spectroscopy, are limited to specialized facilities and specific exercises due to their bulky and expensive nature. More recently, Continuous-Wave Near Infrared Spectroscopy (CW-NIRS) combined with arterial occlusion has been adopted, but the multiple occlusions required can be uncomfortable and

unsuitable for older adults. To address this limitation, we propose utilizing Diffuse Correlation Spectroscopy (DCS) to measure oxygen delivery (i.e., muscle blood flow) alongside NIRS. In this pilot study, we evaluated a new method for assessing mitochondrial capacity using DCS and NIRS simultaneously. The MetaOx (ISS Inc., DCS + NIRS) sensor was placed on the flexor digitorum profundus of four participants. Muscle oxygenation and blood flow data were continuously acquired while participants performed dynamic exercise using a hand-grip dynamometer (two minutes of rest, three minutes of exercise, two minutes of recovery). We calculated muscle oxygen consumption from oxygenation and blood flow measurements and determined the rate of decay (i.e., mitochondrial capacity) in oxygen consumption after the exercise period. The mitochondrial capacity values (time constant = 4.30 min^{-1} ± 0.64, average ± std. dev.) from our four subjects were consistent with those reported in the literature using NIRS + arterial occlusion. Our pilot results demonstrate that this new method is a feasible, non-invasive approach to assess mitochondrial capacity without requiring arterial occlusion. Because of its non-occlusive and portable nature, this technique has the potential for wide application in home-based monitoring of older adults.

Quantum Machine Learning in Science and Cybersecurity
Poster #35 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Cliff Russell, Josiah Sado, & Hayden Agnew
Research Mentor(s): Yong Shi

Quantum machine learning has the potential to revolutionize cybersecurity by enabling more precise threat detection across massive datasets, and to explore this potential, our team—composed of Cliff Russell, Hayden Agnew, and Josiah Sado—aims to determine whether a quantum-enhanced model can more effectively detect malicious activities within IBM's Nutch logs compared to conventional approaches. By focusing on suspicious patterns in both raw and processed logs, we plan to train a quantum-based machine learning system on a carefully filtered dataset and measure its detection accuracy, speed, and scalability against established benchmarks. Preliminary results suggest that quantum methodologies may reduce false positives and uncover hidden anomalies more efficiently, thereby bridging the gap between emerging quantum science and real-world cybersecurity. Ultimately, these findings could lead to more robust and proactive threat detection strategies in both scientific and commercial domains.

Research on Brain Augmented Technology (BAT) and STEM-Peer Augmented Success & Support (STEM-PASS)
Visual Art #32 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Dylan Andersen, Liam Begley, Ololade Caulker, Janice Ryoo, & Dandre Williamson

Research Mentor(s): Cyril Okhio, Theordore Grosch, Tim Martin, & Austin Asgill

Through understanding and analyzing the electroencephalography (EEG) of attention and distraction experiments, it becomes possible to explore the effects that certain events related potentials (ERP) have on attention. Attention is essential throughout the entirety of individuals' lives, while distraction plays an equally important role in how attention is affected. The research conducted in the VIP-BAT EEG lab aims to gather, analyze and interpret data, and draw conclusions on the study of Attention and Distraction. Using volunteer participants, these experiments focus on how brain waves correlate with results from gameplay and with external factors influencing the outcomes. When gathering data on attention and distraction, participants engage in several mini-games, with their environment changing each round. Specifically, in data capturing, EMOTIV hardware and software are used for wave capturing and MATLAB is used to process the data in graphical form to identify noticeable impacts. Referring to the experimental data helps create understanding of how the brain and body react to these events simultaneously. The results of this research will help in addressing a wide range of issues, from assisting a student with studying, to potentially saving a life.

Safer, Faster, and Last Longer: Developing the Next Generation All-Solid-State Lithium Metal Batteries and Lithium-Sulfur Batteries
Poster #2 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Josue Macias, Prajesh Santhanakrishnan, & Lily Liu
Research Mentor(s): Beibei Jiang

As electronic systems become more advanced, the demand for higher performance energy storage systems grows alongside the utilization of batteries as they become more prevalent in consumer electronics and electric vehicles. Research for solid-state batteries has grown as an alternative to present day liquid-electrolyte lithium-ion batteries that struggle to combat increasing energy consumption and face safety concerns. While solid-state batteries show great potential, current solid electrolytes lack the ionic conductivity and mechanical properties needed to fully utilize the battery's potential. This research focuses on synthesizing a solid electrolyte with high ionic conductivity through a variety of methods including using ball milling method to create oxygen vacancies in LLZO (Lithium Lanthanum Zirconium Oxide), an existing solid electrolyte which shows promising potential, but still requires better ionic conductivity to be a viable option. Then a sulfur dopant is added with the aim of increasing conductivity. More methods were also researched including the optimization of the thiol-ene reaction to effectively yield a polymer electrolyte. To supplement this, COMSOL simulation was utilized to analyze the behavior of the battery material by solving complex non-linear equations, modeling battery interfaces, and providing comprehensive solutions for battery performance. By utilizing these methods this

research aims to create solid electrolyte with high ionic conductivity and reduced charge resistance that will improve performance of solid-state lithium batteries.

Sustainable Smart Farming Device with LeaFit Adaptive Growth Technology
Poster #29 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Saville Atkins, Anthony Iwejuo, Julian Pitts, Luis Mercado, & Rachnicha Rojjhanarittikorn
Research Mentor(s): Sandip Das & Hai Ho

For farmers, gardeners, and horticulture enthusiasts worldwide, one immutable reality is that maintaining a consistent physical presence to care for plants is not always feasible. In addition, different plants have unique needs for watering, nutrients, and environmental conditions to thrive. Failing to meet these specific needs can result in poor plant health, reduced yields, and inefficient resource usage. In this research project, we have designed and developed 'LeaFit' – a cutting-edge Internet of Things (IoT) device that offers a sophisticated and sustainable smart farming and gardening solution. Equipped with intelligent soil moisture, ambient temperature, humidity, and light sensors, LeaFit autonomously adapts to the specific needs of various plants, ensuring optimal growth. The LeaFit automated irrigation system reduces the need for user intervention while efficiently maintaining plant health and optimizing water usage, promoting water conservation and sustainable farming practices. Additionally, LeaFit devices integrate small, efficient solar cells, allowing for extended operational lifespan. Each device is equipped with an RFM95W LoRa chip, enabling long-distance sensor data transmission (>2 km) without the need for internet or Wi-Fi. A central LoRa gateway collects data from multiple field-deployed devices and uploads it to an IoT cloud platform for processing and storage. In addition to hardware, we have developed an open-source mobile application that provides an interactive interface for users to observe sensor data and get a holistic view of the entire farming field, displaying various critical parameters using color-coded graphs overlaid on a farm map. Our system employs IoT cloud technology to collect data from the on-field sensors and display them on the mobile app, which processes and securely stores data and allows real-time access to the user. By offering a user-friendly, remote, and autonomous solution for smart farming and gardening, LeaFit empowers farmers and gardeners to grow high-quality products while using water resources efficiently.

UAV Assisted Sustainable Data Gathering Techniques in Internet of Remote Things
Oral Presentation (Microsoft Teams)
Friday, April 18, 4:00pm – 4:15pm
Undergraduate Student(s): Drew Haase

Research Mentor(s): Sumit Chakravarty

UAV-IoRT (Unmanned Aerial Vehicle—Internet of Remote Things) is Kennesaw State's project for the 2024-2025 AFRL (Air Force Laboratory) Design Radio (SDR) Challenge. The goal of the project is to create a system designed to gather data from IoT devices in remote areas lacking access to the internet. Our approach employs UAVs to retrieve data from IoT clusters and relay it to a server to be uploaded to the cloud. Currently, we are working on key components of our system, including decoding a proprietary LoRa frame format, creating a MAC protocol, and implementing distributed transmit beamforming. Moving forward, we are transitioning from the design and development phase to the optimization and field testing phase, which focuses on improving performance.

Using RF Hardware Technologies to Counteract Interference within DSRC Caused by Adjacent Unlicensed Bands
Poster #3 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Grayson Hatcher, Nathan Kirkwood, & Marco Tello
Research Mentor(s): Billy Kihei

In recent years, competition within Radio Frequency (RF) communication bands has led to an overlap between the U-NII-4 band used by low-cost consumer devices, and the Dedicated Short Communication Band (DSRC) used by the Georgia Department of Transportation. Past research con- firmed that this interference leads to drastic reduction in Packet Reception Rate (PRR) for Roadside Units (RSUs) and On- Board Units (OBUs) throughout the country, resulting in a reduction of stability between different components of the Intelligent Transportation System (ITS). Our research team set a goal to prove that a low-cost and simple modification can be made to RSUs currently in use that could increase PRR, by developing and testing RF technologies, primarily attenuators available on the market currently. These solutions could be easily adapted to infrastructure systems, and only require they run in-line with the stock antennas already in use. We were able to accomplish this goal, as well as made findings that may be beneficial within the world of RF communications for RSU devices.

Engineering Technology

The Impact Strength of Parts Created Using Fused Deposition Modeling
Poster #25 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Eric Miller & Luke Whitcomb
Research Mentor(s): Aaron Adams

Additive manufacturing (AM) has been increasingly popular in today's industries, and a popular method within the AM sector is Fused Deposition Modeling (FDM) or commonly known as 3D printing. Despite many benefits offered through this process, issues with mechanical performance, optimization, and inability to predict failure of the manufactured parts are preventing FDM from being widely used. Raster angle and infill density are two of the most important variables in influencing the mechanical strength of components that are subjected to impact loads. This study aims to examine how the above two factors affect the impact of resistance of parts made of polylactic acid (PLA) and polyethylene terephthalate glycol (PETG). Specimens were produced with different infill densities of 25, 50, 75, and 100%, while the raster angle was varied across 0-90°, 30-60°, and 45-45°, resulting in a total of 12 unique arrangements. The impact strength of each sample was tested to analyze the relationship between infill density, raster angle, and material performance under impact conditions. The preliminary results indicate that an increase in infill density correlates with higher impact resistance, as specimens with higher infill density demonstrate better fracture behavior. Furthermore, among specimens with the same infill density, those manufactured with a raster angle of 30-60° exhibited better impact resistance. This indicates that optimizing the raster angle and choosing the right infill density could improve the energy absorption and stress distribution for parts produced using FDM. This result provides important understanding regarding the mechanical enhancement of FDM components, which may enhance their usability in sectors that demand durable, impact resistant materials. Future studies will investigate the fabrication and optimization of powder-based feedstocks for metal and ceramic additive manufacturing, focusing on compounding techniques, particle size distribution, and material characterization.

Mechanical Testing of Additively Manufactured Polymers
Poster #28 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Preston Coutinho & Keily Zendejas
Research Mentor(s): David Stollberg & Aaron Adams

Additive manufacturing (AM) is a manufacturing method that fabricates parts in a layer-by-layer process. AM has gained popularity due to its inherent ability to create less material waste. However, the layer-by-layer manufacturing process generates parts with properties that are challenging to predict. This anisotropic nature results from the different directions and printing parameters in which parts can be manufactured. This research aims to advance the understanding of the mechanical behavior of additively manufactured parts. To accomplish this, mechanical test samples were manufactured using material extrusion and tested in tension according to ASTM standards. Material extrusion is defined as an additive manufacturing process in which material is selectively dispensed through a nozzle or orifice according to ASTM standards. The variables modified during testing were the infill density and raster angle. Infill

density is a measure of how much internal volume of a solid is printed; this can be decreased to save money on material. However, the strength of the part will decrease. The raster angle is the angle at which the infill was printed. The infill density varied incrementally between 25%, 50%, 75%, and 100%, while the raster angle varied between 0°-90°, 30°-60°, and 45°-45°. For each of these specimens, the effect of raster angle and infill density was studied and compared to identify optimal tradeoffs between the mechanical properties and different material parameters. Preliminary testing showed that as the infill density increased, the Young's Modulus and Ultimate Tensile Strength also increased. The 45°-45° raster angle showed the highest Young's Modulus and Ultimate Tensile Strength. The results of these experiments will provide engineers with a valuable tool for analyzing parts prior to manufacture, thereby enhancing the efficiency and reliability of the manufacturing process.

Probeless Measurement of Solar Photovoltaic Modules
Poster #25 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Colby Baldwin & Pavan Kannan
Graduate Student(s): Teja Venkata Sai Naveen Vuddagiri
Research Mentor(s): Sandip Das

Solar power has emerged as a potential renewable and sustainable energy source. Measurement, testing, and evaluation of solar panels are important for power management, industrial quality control, and research. Commercial instruments available for this purpose are expensive and bulky. In addition, they are not suitable to deploy in a solar power field. Such limitations pose a barrier to continuous monitoring of solar panels' health after production when they are commissioned outdoor in a solar power plant. In this project, we have developed an innovative solution to address these challenges. We have designed and fabricated a low-cost device for remote monitoring of solar panels. Our device can measure solar panel's current, voltage and power with up to 2% accuracy compared to typical commercial instruments. Our device integrates a microcontroller, a capacitive load, a voltage/current measurement circuit, an energy harvesting circuit, electronically controllable switches, and a temperature sensor circuit. The device can measure the electrical parameters of a solar module even under 30% of STC light intensity. The integrated Wi-Fi of the microcontroller allows remote measurement without any probes. In addition to the hardware, we have also created a python program that can analyze the electrical parameters and performance of a solar panel and evaluate its health. It can also alert the maintenance personnel in case of any faults or malfunctioning. In addition, our device promises the application of new techniques to attain higher operating efficiency of a solar plant, thus producing additional carbon-free energy for a more sustainable world.

Industrial and Systems Engineering

Bridging the Gap: Care Team's Perspectives on Technology and AI Integration in Healthcare
Poster #31 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Sarah Fernandes & Mohammad Naser
Recent Graduate(s): Pranathi Boyina
Research Mentor(s): Awatef Ergai & Sylvia Bhattacharya

As healthcare systems increasingly integrate digital solutions, understanding the perspectives of frontline healthcare workers on technology adoption is critical. This study explores how Registered Nurses (RNs), Licensed Practical Nurses (LPNs), and Certified Nursing Assistants (CNAs), collectively referred to as the Care Team, interact with existing and emerging healthcare technologies, including artificial intelligence (AI). Given the growing reliance on digital tools for clinical and administrative tasks, this research examines the challenges and benefits perceived by healthcare professionals when incorporating AI-driven solutions into their workflows. A cross-sectional research design was employed, involving 30 semi-structured interviews with Care Team members from an Intensive Medical Care Unit (IMCU), of which 24 interviews were analyzed. The study assessed their experiences with technologies such as electronic patient records and appointment systems while gauging their comfort levels and concerns regarding AI-driven tools. Additionally, the study explored how AI could assist in both clinical support (e.g., reducing documentation burdens) and patient care (e.g., providing emotional and educational support). Findings suggest that while technological tools have streamlined certain tasks, challenges remain in terms of usability, training, and workflow integration. Many participants expressed interest in AI applications that can actively listen to patients, provide empathetic responses, and reduce workload stress, yet concerns regarding AI reliability and implementation remain. The study highlights the need for collaborative development between healthcare professionals and developers to ensure AI tools effectively enhance patient care without disrupting workflows. By addressing Care Team concerns, future healthcare AI solutions can increase efficiency, improve patient satisfaction, and reduce burnout. This research underscores the importance of aligning technological advancements with user needs to foster a more effective and supportive healthcare environment.

Design and Development of Bat-Inspired Unmanned Aerial System for Mapping and Navigation
Poster #3 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Arvind Balakrishnan, Elijah Jones, & Lauren Nunez

Research Mentor(s): Adeel Khalid

The goal of this project is to develop a sonar-based Unmanned Aerial System (UAS) that mimics bat behavior using ultrasonic waves and reflections to form a spatial map to navigate and avoid obstacles. While using a quadcopter design, two overlapping carbon fiber plates make up the center frame, and four booms extend from its corners to hold the propulsion system. The foremost compartment resembles the head of a Grey Long-Eared Bat, which houses a 400EP125-NBWN speaker in the mouth to emit ultrasonic pulses, which are reflected and detected by two SO.2 Ultrasonic Omni Lapel Lav Microphones placed inside the bat ears, to facilitate the mapping and navigating. The microphones connect to a microcontroller for signal processing through an ADC if needed, and the speaker is controlled with PWM and an amplifier. Custom 3D-printed components, printed using a Stratasys F170 FDM printer, include ESC housings, a modular battery box, a sliding door mechanism, and the bat-shaped head and ears. These components were designed in SolidWorks and ensure compatibility with the UAS while utilizing modularity, reducing weight, and minimizing drag. Finite Element Analysis (FEA) was performed to simulate stress distribution and strength of 3D-printed components under operational loads. After integrating flight-critical electronics, the UAS successfully flew a hover test at five feet, performing controlled roll, pitch, and yaw movements, successfully executing 90-degree and 180-degree turns, forward-backward, and side-to-side transitions. The UAS experienced minimal drift, smooth response times, and a controlled landing. The total flight was approximately one minute, but further testing is needed to ensure that the UAs complies with every design requirement.

Diabetes Self-Management Tools: A Literature Review on the Current Challenges
Poster #11 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Joselin Reyes
Research Mentor(s): Luisa Valentina Nino de Valladares

Diabetes self-management is crucial for maintaining blood glucose levels and preventing complications. While both digital and traditional self-management tools are available, many patients continue to face challenges with usability, accessibility, and consistency, limiting their effectiveness. This study focuses on older patients, aiming to identify gaps in these tools to improve health outcomes. The literature review aims to answer the following questions: a) What technological advancements have been integrated into diabetes self-management (e.g., mobile apps, continuous glucose monitoring, AI-driven decision support)? b) What are the current gaps regarding the effectiveness of different self-management strategies? c) How effective are digital tools and telehealth interventions in improving diabetes self-management outcomes? and d)

What are the barriers or facilitators to adopting new technologies for diabetes self-management among older adults?. The literature review followed the PRISMA methodology. Relevant studies on diabetes self-management tools were sourced from ProQuest, with a focus on articles evaluating their effectiveness. The selected articles were chosen based on the inclusion and exclusion criteria and their availability to answer our research questions. Initially, the search returned 720 results. Applying filters gradually reduced this number until 29 relevant studies were identified. Upon further analysis, several key gaps were found in diabetes management tools. Older adults and individuals with low technological literacy often struggle with these digital tools. Many apps do not integrate with healthcare providers. Few apps address the stress and emotional challenges of managing diabetes and only a few offers comprehensive lifestyle management. There were also a lot of complaints about confusing features on the mobile apps. Lastly, privacy concerns are not well addressed, and some tools are difficult to access due to high costs. By addressing these challenges, the study aims to provide valuable information to make these tools more user-friendly, accessible, and effective, ultimately leading to better health outcomes.

The Emergence of Artificial Intelligence in Supply Chain Management
Poster #20 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Joe Johnson & Eli Hampton
Research Mentor(s): Parisa Pooyan

Supply chain management is the backbone of our economy, supporting nearly 500,000 jobs in Georgia alone—that's 1 in 10 jobs in the state. Whether it's overseeing the delivery of essential goods or maintaining the flow of materials across industries, supply chain professionals play a huge role in economic stability. As sustainability becomes a driving force in supply chain management, companies are constantly looking for ways to reduce their carbon footprint, minimize waste, and create more sustainable transportation solutions. With its vast highway network and one of the busiest ports and airports in the nation, Georgia serves as a critical hub for logistics and transportation, offering significant opportunities for innovation. At the same time, one of the biggest challenges in supply chain is risk management where unexpected disruptions such as natural disasters or geopolitical events can completely throw off global supply chains. The emergence of Artificial Intelligence (AI) presents an innovative opportunity to address these challenges. AI-driven analytics can enhance decision-making process by using historical and real-time data to predict demand, optimize logistics, and improve resource allocation. This allows businesses to prevent overstocking, reduce waste, and streamline operations while mitigating risks through predictive modeling and automated response strategies. This research paper explores the integration of AI in supply chain management with a focus on sustainability and risk mitigation. The findings highlight how AI adoption leads to

increased efficiency, cost savings, and reduced environmental impact. As industries continue to evolve, AI-driven supply chains will not only enhance resilience but also pave the way for a more sustainable and adaptive global economy.

Enhancing Nursing Lab Efficiency Through Industrial Engineering Tools
Poster #34 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Angeline Harris & Farah Talib
Graduate Student(s): Aquib Irteza Reshad
Research Mentor(s): Valentina Nino & Robert Keyser

The rapid growth of the nursing program at Kennesaw State University has led to a substantial increase in student enrollment, posing challenges in operational efficiency, resource allocation, and the delivery of quality education. One major issue is the limited space, time, and resources available in student nursing labs, where only two classrooms with sixteen beds must accommodate a growing number of students. Overcrowding and restricted practice opportunities hinder skill development, yet students are still expected to demonstrate proficiency in course exams and clinical practice. Addressing these challenges is critical to ensuring that nursing students receive the hands-on training necessary to develop competency and confidence in real-world healthcare settings. This study applies industrial engineering tools to optimize nursing lab processes, addressing inefficiencies in space utilization, time allocation, and resource management. Process mapping and time-motion studies will identify non-value-added activities within lab sessions, leading to a standardized workflow that streamlines skill station transitions. Facility layout analysis will assess space utilization, ensuring optimal student distribution across available stations, while simulation modeling will test proposed scheduling strategies that group similar lab sessions together to minimize bottlenecks and improve accessibility. Additionally, inventory management techniques, such as an automated audit system with predefined reorder points, will enhance the tracking and replenishment of nursing supplies. Observations have revealed variability in how lab activities are structured, leading to inconsistent station utilization and underutilization of lab time. Likewise, the lack of an efficient and standardized inventory management and tracking system has led to inconsistent supply availability often resulting in shortages of essential materials or surplus stock that goes unused. By implementing structured guidelines for lab organization, resource allocation, and course scheduling, this study aims to improve nursing students' learning experiences, ensuring more effective skill acquisition and better preparedness for professional practice.

Enhancing Patient Safety: Exploring Virtual Sitters' Role in Fall Prevention Through Remote Virtual Monitoring
Poster #3 (Siegel Student Recreation and Activities Center)

Thursday, April 17, 11:00am – 11:45am
Graduate Student(s): Adama Diallo
Research Mentor(s): Awatef Ergai

Remote Virtual Monitoring (RVM) technology enhances safety for both patients and care teams by reducing falls, improving the efficiency and effectiveness of continuous patient observation, and lowering costs associated with falls and staff support. The success of fall reduction efforts largely depends on the role of virtual sitters, individuals who remotely monitor high-risk patients to prevent falls. This study aims to explore the experiences of virtual sitters, identifying key themes, challenges, and opportunities to improve the intervention. Specifically, the research investigates how technology, work shifts, and institutional support impact the effectiveness and job satisfaction of virtual sitters.

Exploring the Blood Donation Problem in the U.S. and the Use of Emergent and Disruptive Technologies to Attract New Donors
Poster (Microsoft Teams)
Friday, April 18, 4:30pm – 4:45pm
Undergraduate Student(s): Kimberly Kaleta & Fardus Kazi
Research Mentor(s): Robert Keyser & Lin Li

The continued development of emerging and disruptive technologies, such as ubiquitous computing smartphones, social media, blood mobile apps, virtual reality, blockchain technology, neural networks, and artificial intelligence affords alternative approaches in attracting new blood donors versus traditional means. Virtual reality headsets can enhance the blood donation experience by alleviating fear and encouraging future donations through interactive, one-handed games. Mobile applications can facilitate donor engagement by providing real-time information on nearby donation centers, sending reminders to donate, and offering educational resources. Additionally, blockchain technology presents an opportunity to improve transparency in the donation process by enabling real-time tracking of blood supply distribution and usage, fostering greater trust between donors and collection agencies. These technologies could be used to address various barriers currently preventing new potential donors from their first donation.

Generative AI in Engineering Education: Insights from Students
Poster #27 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Mika Ann Maas, Violet Huggins, Sai Siddarth Dara, & Aziriah Martin
Research Mentor(s): Awatef Ergai & Brayden Milam

The rapid advancement of artificial intelligence (AI), particularly generative AI, is transforming engineering education and practice. This study explores engineering students' interactions with and attitudes toward generative AI, focusing on perceptions, usage patterns, benefits, challenges, and career impact. A 33-item survey was completed by 79 engineering students, providing insights into AI's role in academic and professional development. Results indicate that while many students find AI beneficial for learning and creativity, its integration into coursework remains inconsistent. Forty-two percent of students reported that none of their professors assigned projects involving generative AI, while 32 percent had at least one professor who did. This suggests limited formal exposure to AI-driven assignments. Additionally, students primarily leverage generative AI for brainstorming and writing assistance, with text-based tools being the most used. Confidence in AI technology varies, with many students expressing neutral or slight confidence in their abilities. Ethical concerns persist, particularly regarding academic integrity. Students hold diverse opinions on whether AI use constitutes cheating. While some believe using AI tools for coursework is a legitimate aid, others view it as an unfair advantage or a violation of academic policies. Additionally, concerns about AI reliability, data privacy, and ethical considerations are widespread. Despite these challenges, most students believe AI will positively impact their careers, citing its role in enhancing adaptability, technical skills, and digital literacy. Students highlight the importance of structured learning resources, identifying webinars, workshops, and coursework as key aids in AI skill development. Social media has also emerged as an unconventional but influential learning tool. Addressing technical and ethical challenges in AI integration is essential in engineering education. By tailoring AI integration strategies and addressing students' specific needs and concerns, educational institutions can better align AI's role with students' academic and professional goals, preparing them for a workforce increasingly shaped by artificial intelligence.

Latinx Participation in Blood Donation Survey
Poster #33 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 9:00am – 9:45am
Undergraduate Student(s): Emma De Leon Navarro
Research Mentor(s): Lin Li & Robert Keyser

Blood donation is an essential component of the healthcare system, with millions of people needing blood transfusions each year. In the last few decades there has been a decrease in blood donation in the United States among young adults. Due to the growing gap between supply and demand, the nation is facing a blood shortage, putting patients' lives at risk. The purpose of this research project is to identify the barriers to blood donation among young adults in the Latinx community and explore strategies to increase their participation, as this group is underrepresented in blood donation. We are conducting an online survey targeting the Latinx

community aged 18-39 in collaboration with local non-profit organizations mainly in the Atlanta metro area. The survey responses are still being collected, and preliminary analysis will be shared in order to highlight early trends.

Machine Learning Approaches in Sustainable Maintenance Practices
Poster #27 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Eli Hampton & Joe Johnson
Research Mentor(s): Parissa Pooyan

The cost of maintenance activities generally accounts for the second largest portion of the operational budget after energy costs in an industrial ecosystem. The significant reason behind the continuing rise of maintenance costs reflects on the application of highly automated and technologically complex machineries involved in the manufacturing process. As such, the implementation of sustainable maintenance practices, in the realm of Industry 5.0 and the integration of Machine Learning (ML)/Artificial intelligence (AI) methodologies, is essential more than ever for enterprises to predict and avoid system failures and to subsequently save cost and sustain in the business. In this work, we investigated the ML/AI approaches and the importance of holistic human-machine integration in industrial facilities. Additionally, we will create a framework for human-centric methods of integrating automation into sustainable maintenance practices where human intervention remains crucial in interpreting complex data, making judgment calls in uncertain scenarios, and applying context-specific knowledge that machines alone cannot provide. By placing humans at the center of our framework, businesses can ensure a more holistic approach to maintenance that accounts for both technological advancements and the irreplaceable value of human ingenuity while still taking full advantage of the remarkable potential of ML methodologies and AI-driven technologies as a viable process for achieving reliability and productivity. In the next step, we intend to offer such a designed framework to local manufacturing facilities in Georgia, and to analyze the responses from a pilot test conducted in that environment.

Patients' Perspectives on Technology and Digital Solutions in Hospital Care
Poster #2 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Neha Ahmed, Hadi Quddoos & Sarah Fernandes
Research Mentor(s): Awatef Ergai

The integration of generative AI in healthcare necessitates a comprehensive understanding of patient perspectives to ensure that these innovative technologies align with their needs and

preferences. Actively gathering patient input not only enhances the effectiveness of AI implementations but also fosters trust and transparency in the healthcare system, ultimately leading to improved patient outcomes. This study examines the role of technology in enhancing the hospital experience for IMCU and oncology patients, focusing on their engagement with digital tools and perspectives on AI-driven solutions. A qualitative study was conducted with (30) hospitalized patients from the IMC and Oncology units, who participated in semi-structured interviews about their technology use and perspectives on AI-driven solutions. Data was analyzed using thematic analysis to identify key patterns. Initial findings suggest that patients demonstrated varying levels of technological comfort, with some actively using smartphones for communication, medical research, and entertainment, while others preferred minimal digital interaction. Although a few patients were familiar with AI tools such as ChatGPT and voice assistants, direct input on the use of generative AI in their care was limited. Key technological needs identified include improved access to personal medical records through QR codes, integration of personal streaming services with hospital entertainment systems, and AI-driven solutions for relaxation and emotional support. While some patients recognized AI's potential benefits in retrieving medical information and assisting with daily tasks, concerns about accuracy, misuse, and overreliance persisted. Findings suggest that hospitals could enhance patient experience by implementing personalized digital solutions that align with individual preferences and comfort levels. However, the limited patient input on generative AI in clinical care indicates a need for further exploration and education on its potential role. Future research should investigate patient perceptions, usability, and trust in AI-driven healthcare tools while addressing concerns about transparency, accessibility, and ethical implications.

Preparing Students for the Quantum Era: QML Training and Applications
Poster #12 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Graduate Student(s): Triveni Kandimalla
Research Mentor(s): Luisa Valentina Nino de Valladares

Quantum Machine Learning (QML) emerges as a transformative approach to addressing the growing complexities of modern data processing and computational challenges. Classical machine learning (CML) techniques, while powerful, face limitations in handling vast amounts of high-dimensional data and solving complex optimization problems efficiently. Despite its potential, QML remains underrepresented in academia, highlighting the need for accessible, hands-on learning experiences and knowledgeable faculty. This project seeks to advance QML education by incorporating it into diverse curricula, creating practical learning materials, and fostering workforce readiness. Using Google Colab, an open source labware has been designed to provide interactive learning modules (M0 to M8), each addressing specific computational and industrial challenges. These modules cover key QML concepts, including Quantum Support Vector Machines (QSVM), Quantum Neural Networks (QNNs), and comparisons between

QML and CML. Additionally, select modules demonstrate real-world applications of QML algorithms in areas such as predicting product back-orders, quality inspection in manufacturing, patient flow analysis in healthcare, and predictive maintenance for operational efficiency. To support the adoption of QML in academia, a faculty workshop was recently held with participants from universities in Georgia, Florida, and Missouri, representing fields such as Industrial and Systems Engineering, Computer Science, and Electrical Engineering. This workshop provided faculty with the tools and knowledge needed to integrate QML modules into their courses. A student workshop is scheduled for the end of March, offering hands-on experience and engagement with QML concepts. This project is shaping the future of QML education by providing accessible, hands-on learning experiences and fostering interdisciplinary collaboration. Through faculty and student workshops, it equips the next generation of professionals with the skills needed to drive advancements in QML across academia and industry.

A Systematic Review of Cognitive Workload, Biomechanical Responses, and Psychosocial Factors in Occupational and Experimental Settings
Poster #26 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Graduate Student(s): Aquib Irteza Reshad
Research Mentor(s): Valentina Nino

This systematic review investigates the impact of cognitive workload and psychosocial factors on biomechanical responses in occupational and experimental settings. A comprehensive literature search was conducted using PubMed, Web of Science, and Scopus, yielding 1,328 papers. Following the PRISMA guidelines, duplicates were removed, and studies were screened based on language (English), peer-reviewed status, and inclusion criteria—excluding studies that only reviewed previous papers, classified postures without experimental evaluation, or focused solely on exoskeleton assessments—resulting in 25 final studies. Then the 25studies were assessed for quality using the Joanna Briggs Institute (JBI) critical appraisal tool. Data collected for review included publication years, participant demographics, task characteristics, measured outcomes, assessment tools, and statistical methods used for analysis. The review highlights that cognitive workload, and psychosocial stressors significantly influence biomechanical responses, affecting postural stability, muscle activity, and the risk of musculoskeletal disorders. However, key gaps remain: many studies used tasks that differed from real-life activities, limiting ecological validity; most did not incorporate biological measurements of workload, reducing physiological insight; and several used equipment that constrained natural movement. To address these gaps, future research should prioritize task designs that closely resemble real-world conditions, integrate physiological workload measures such as heart rate variability or cortisol analysis, and employ minimally restrictive motion-tracking technologies. These strategies will improve the accuracy

and applicability of findings, leading to better workplace safety interventions and ergonomic solutions.

Mechanical Engineering

A Case Study in Improvements to the Aerodynamic Efficiency of the Boeing 777-300 Empennage
Poster #2 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Phoenix Davis
Research Mentor(s): Adeel Khalid

Background: In aircraft design considerable weight is placed on aircraft efficiency. The aerodynamic efficiency of an aircraft can increase aircraft range and fuel efficiency while reducing environmental aircraft. A large focus on aircraft efficiency has focused on the aircraft wings, resulting in aircraft tail efficiency less researched than other parts of aircraft efficiency. The Boeing 777-300 is a high-capacity transonic commercial aircraft. The purpose of this case study will demonstrate the impact of geometric changes on a transonic commercial aircraft's empennage by modifying the geometry of the Boeing 777-300's empennage and testing how the modifications impacted empennage efficiency. Methods: A baseline model of the Boeing 777-300's airframe will be reverse engineered from available data on the aircraft. The geometry of the aircraft's tail will then be modified to create alternative models. The models will then be tested using Computational Flow Dynamics. The results of this analysis will be compared to the baseline model and the percent change in control authority, stability, and efficiency will be calculated. Results: The results will include the modification and its effect in percent change relative to the baseline model. This data will be compiled and presented in order to disseminate the results of the case study. The conclusions of the study will include how and to what degree certain geometric modifications of the aircraft empennage impact the ability and efficiency of the empennage. As such in early stages of airframe design the results can be used to determine to what degree to modify empennage geometry to achieve necessary design specifications.

Assessment of Background Noise in a Classroom and Potential Solutions
Poster #31 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Chiajen Tang, Breanna Kozusko & Robert Burns
Research Mentor(s): Richard Ruhala

The intent of this research is to provide an understanding of the effects that classroom acoustics and noise pollution have on students' ability to comprehend and receive information audibly

shared in a classroom. According to ANSI/ASA S12.60-2010/Part 1, the limit for A-weighted decibels (dBA) in a classroom that is less than 20000 ft3 is 35 dBA. For classrooms larger than 20000ft3, the limit is 40 dBA. To ensure the above standards are met, data will be recorded from room D-117 in Kennesaw State University's Marietta Campus. The main source of noise for this study will be the HVAC system. The data will be obtained using a PCB Piezotronics ½" microphone. The microphone will record the instantaneous decibel level of the classroom while the HVAC system is active. Multiple data sets will be recorded at varying distances from the HVAC system. Once the data are recorded, the information will be uploaded to the BK Connect software through the Brüel & Kjær LAN-XI Module to be processed, providing detailed frequency information of the noise. Given a previous study conducted, it became known that the standards in the specific classroom are not being met; therefore, the researchers are attempting to create possible solutions to resolve this issue. Some possible solutions include the installation of HVAC silencers, reducing the speed of the fan on the HVAC system, and installing acoustical tiling.

Automated Bruise Detection in Fruits Using AI-Driven Instance Segmentation for Enhanced Quality Control

Poster #29 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Moneesh Rajaram & Bao Nguyen
Research Mentor(s): Sathish Kumar Gurupatham

Effective quality control is essential in agriculture to reduce fruit loss, with bruise detection being critical to ensure product integrity from farm to market. This research introduces an advanced AI-driven system that leverages convolutional neural networks (CNNs) to automate bruise detection in fruits. By utilizing Detectron2's instance segmentation and object detection capabilities with a ResNest-50 backbone, our system accurately identifies bruised areas on fruit surfaces, addressing a key need in post-harvest processes. Bruising in fruits often arises from increased metabolic and physiological changes as they ripen, making them susceptible to damage even from minor external forces. Detecting bruising early can significantly reduce post-harvest losses. Our method relies on a dataset of 100 annotated high-resolution images, developed with the help of RoboFlow and tailored to capture bruising variations across fruit types like apples and pears. The dataset was divided into training, validation, and testing sets, with 70 images used for training, 20 for validation, and 10 for testing. The model was trained using augmented images to enhance generalization and evaluated on the validation set to tune its parameters. Final testing on a separate test set demonstrated the model's high recall and precision, proving effective in consistently detecting and segmenting bruised regions. This automated approach reduces dependency on manual inspection, minimizes human error, and is scalable for large-scale operations, making it suitable for integration into commercial sorting systems. In addition to enhancing operational efficiency, this solution reduces labor costs, minimizes waste associated

with undetected bruises, and promotes sustainable practices by extending produce shelf life. The proposed solution reflects a forward step in precision agriculture, marking a significant advancement toward data-driven, modernized quality control in the fruit industry.

Biomimetic Gait Modeling from Small Walking Creatures in Nature Using Motion Compensator
Poster #14 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Jonathan Jackson, Robert Henderson, & Josephine Phillips
Research Mentor(s): Dal Hyung Kim

There is a lot to learn from the world of insects. Their ability to continue moving despite losing limbs can help advance the future of robotics by inspiring the creation of adaptable robots capable of functioning even after losing legs. The main goal of our project is to develop a locomotion compensator for the position without controlling the orientation of the insect and to use machine learning software called DeepLabCut (DLC) to track its gait pattern. This data can be utilized for future applications, such as in robotics. The developed system allows insects to move freely without restraint, enabling us to obtain accurate gait patterns from the motion modeling software. Using past projects with a smaller locomotion compensator, we reverse-engineer and redesign the system to create a larger, more robust version that can support greater mass and track data for larger insects. The previous design used three omni-wheels, whereas our system employs two omni-wheels and a trackball for position control. The trackball provides additional sensory information, which we use to move the motor more accurately in response to data from a camera mounted on top of the system. We use DLC to accurately capture the insect's movement from a video of it moving on the sphere. We labeled body parts of the insect in images to create a training dataset. The machine learning model is then trained on this dataset and used to evaluate the entire video to identify the gait patterns. With these advancements, we aim to develop more robust and adaptive robotic systems and enhance the understanding of insect locomotion.

Bi-modal Unmanned Remote Amphibian Craft: Design and Analysis of an In-Ground-Effect Drone
Poster #5 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Mouhamadou Diop
Research Mentor(s): Adeel Khalid

This research focuses on the design and development of BURAC, a compact, amphibious ground-effect drone tailored for oil rig and coastal surveillance. The drone leverages ground-effect aerodynamics to achieve enhanced lift and fuel efficiency during low-altitude flight over water,

while its tri-propeller propulsion system ensures maneuverability and stability in dynamic coastal environments. The design incorporates three wide-angle FPV cameras for panoramic surveillance and a FLIR Lepton 3.5 thermal camera for detecting heat signatures, enabling effective monitoring of oil rig infrastructure and personnel. Additionally, the drone features a hydrodynamic underbelly and Ping Sonar for obstacle avoidance during submerged operations, ensuring seamless transitions between aerial and aquatic modes. The 3D-printed body provides durability and corrosion resistance, while the NACA 4412 airfoil wing optimizes lift in ground-effect conditions. Experimental validation will focus on the drone's ability to operate efficiently at altitudes below 1 meter, with expected flight endurance of 45 minutes and a range of 10 kilometers. This project aims to advance the field of unmanned aerial systems by integrating ground-effect principles with amphibious capabilities, offering a potential solution for coastal and offshore surveillance missions.

Campus Navigator: A Mobile App for Seamless University Navigation
Oral Presentation (Prillaman Hall)
Wednesday, April 16, 1:00pm – 1:50pm
Undergraduate Student(s): Hafsa Mohammed, Ali Rahimzadehfard, Mathias Rossi & Rachab Wilson
Research Mentor(s): Turaj Ashuri & Amir Ali Amiri Moghadam

Navigation services play a big role in everyone's daily lives, from directing them on new roads to guiding them through buildings. Outdoor navigation services have evolved from physical maps to digital ones like Google Maps for ease of use and accessibility. Upon conducting literature research, the team found that many navigation apps lack clear and accurate instructions for how to navigate university campuses such as Marietta campus. Due to the size of KSU's Marietta campus and its buildings, effortless navigation has been a common challenge for students, faculty, and visitors alike. Additionally, all buildings are referred to by letters, numbers, and official titles, and keeping track of these different names has been a challenge. We hypothesize that by developing a navigation app for KSU's Marietta campus, ease of navigation will increase for its users. We developed our navigation app using the Flutter framework, built on Dart (programming language), with Google Maps as the foundation. We collected the coordinates of each building on campus and organized them in an SQLite database. When a user selects a destination via the search menu or the marker, the navigation app will pull the coordinates from the user's current location and the SQLite database to find the shortest path between them. We successfully tested the app for outdoor campus navigation and work is in progress for an indoor algorithm to facilitate inside building navigation. We use A algorithm, which is an efficient pathfinding technique, along a gridded floor plan to map a clear path from the user's starting point to their destination. Our goal is to continue creating indoor navigation for more buildings*

in the Marietta campus. We expect the final product of this app, OwlTrails, to make the Marietta campus simpler to navigate for students, faculty, and visitors.

Characterization of Bio-Inspired and Variable Stiffness Compliant Joints
Poster #1 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Sabrina Scarpinato
Graduate Student(s): Connor Talley & Vanessa Young
Research Mentor(s): Ayse Tekes

Compliant mechanisms gain their mobility through the deformation of flexible (bendable) parts rather than the relative motion generated through neighboring links. Traditionally designed mechanism consists of rigid links connected with revolute joints. However, when we look at nature, we see an entirely different approach. All the systems in nature are bendable and flexible, but still strong. This study presents the design, development, and characterization of a variable stiffness joint that can be utilized as a knee joint in bipedal robots, or an ankle/knee joint in assistive exoskeletons. We manufactured the prototypes by 3D printing the parts in polylactic acid and thermoplastic polyurethane so that the flexible joints are enclosed between an inner and outer PLA ring when subjected to internal torque. The testing was conducted using universal machine testing equipment. We also analyzed the motion deformation in Ansys for material characterization.

Creating a Digital Twin of the Human Heart Using Machine Learning
Oral Presentation (Prillaman Hall)
Wednesday, April 16, 1:00pm – 1:50pm
Undergraduate Student(s): Anshu Rao, Yusuf Al Kadi, & Josiah Ware
Research Mentor(s): Lei Shi

Personalized simulations of the left atrium enable professionals to create patient-specific models that replicate the electrophysiological and biomechanical behavior of the atrium. Patient-specific CT/MRI data is segmented to create finite element analysis (FEA) meshes, which enable precise modeling. However, manual segmentation is time-consuming and prone to errors. Additionally, existing neural network-based tools fail to capture detailed anatomical features limiting their use for FEA simulations and personalized treatment planning. This research aims to develop an automated neural network-based tool to accurately segment the left atrium and create a ready-to-use FEA mesh for left atrium simulations, or a digital twin of the human heart. To address these challenges, the focus was on the intricate anatomy of the left atrium, including the appendage and trabeculations, to improve both segmentation accuracy and simulation quality. To achieve this, a neural network will be trained using 120 3D CT/MRI images from public datasets and

100 CT images from Emory University collaborators. The images are then manually segmented to render a replica of the left atrium through the SimVascular workflow. The segmentation is then smoothed using the software tool Meshmixer to create high-quality training datasets. Data augmentation will enhance the dataset. A HeartDeformNet-derived neural network will be implemented for segmentation, using 150 images for training, 20 for validation, and 50 for testing. The predicted meshes will be compared with manually segmented ones using the DICE score and other quality metrics. Based on the quality metrics, necessary adjustments will be made to the results. The predicted FEA mesh will be integrated with a 0D lumped-parameter model to simulate full-cycle left atrium function based on patient-specific inputs such as ECG signals and pressure measurements. This tool is expected to reduce segmentation time and errors while improving simulation accuracy, contributing to better pre-surgical planning and personalized cardiovascular treatments.

Design and Development of a Portable Mannequin
Poster #3 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Nylah Mack, Carlos Mendoza, Andrew Parella, Isaiah Iwayemi & Harshaa Balaji
Research Mentor(s): Ayse Tekes

Traditionally, researchers use specific mannequins having similar mobility to the human upper body to test the validity of their exoskeleton designs. However, most of the mannequins available in the market are expensive, heavy, and not portable. This project focuses on designing and developing a portable mannequin that can be used in upper body exoskeleton design projects. The vast majority of the exoskeletons utilize two pancake motors to replicate the shoulder motion and an additional motor to actuate the elbow joint. Since these motors are heavy, the mannequin is designed to support the weight of these motors and any other device that is attached to the exoskeleton. The arms are built by two rigid bodies that are connected by revolute joints. The shoulder joint consists of a 3D-printed ball and socket, and the elbow joint consists of a ball-bearing hinge design. The torso was designed to be rigid, low-cost, and simple enough to replicate. To ensure that the mannequin's weight would not affect portability, most of the assembly is 3D printed using Polylactic acid (PLA). The designs for the 3D printed models are also simple enough to be replicated by other research teams who need a setup for testing. This project was successful in finding methods to design and create an exoskeleton that would be viable for exoskeleton teams. Further research into this project could lead to greater improvements that would increase the likelihood of success for exoskeleton teams.

Embracing AI in Nuclear Engineering Education
Poster #8 (Siegel Student Recreation and Activities Center)

Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Johnny DeMont, Luke Ponsell, Eli Musgrave, & James Zurawski
Research Mentor(s): Eduardo Farfan

Artificial intelligence (AI) is rapidly transforming education, and nuclear engineering must adapt to stay at the forefront of innovation. This study explores how AI can be integrated into course material development, including quizzes, lectures, and presentation slides. By leveraging AI tools, educators can enhance efficiency, maintain consistency, and provide dynamic, personalized learning experiences. Rather than resisting AI, we must embrace it wherever possible. AI-generated lecture content, quiz questions, and PowerPoint materials can streamline course preparation, allowing instructors to focus on deeper engagement with students. Automated tools can generate structured outlines, simplify complex nuclear concepts, and create compelling presentations, making learning more interactive and accessible. Our project compares AI-generated materials with traditional content, evaluating accuracy and time efficiency. It is shown that AI significantly reduces the time required to develop educational materials while maintaining high quality. However, human oversight remains crucial to ensure precision in technical subjects like nuclear engineering. This study advocates for a shift in mindset, AI is not a replacement but an indispensable tool that should be integrated into every aspect of education. The nuclear field cannot afford to lag behind. By adapting to AI and leveraging its capabilities, we can improve learning outcomes, enhance efficiency, and prepare students for an increasingly AI-driven world.

Finite Element Analysis of Seismic Response in Structural Models with and without Fluid Viscous Dampers, Using a New Viscoelastic Model, Phase II
Poster #31 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Syler Church, Abigail Ramirez, Erick Aranda-Urquia, & Ethan Carroll
Graduate Student(s): Salim Kortobi
Research Mentor(s): Simin Nasseri & Mohammad Jonaidi

This research uses finite element analysis (FEA) to explore the dynamic response of composite buildings under seismic loading, focusing on optimizing damper configurations to enhance energy dissipation and reduce structural damage. The study examines various structural configurations, analyzing how fluid viscous dampers (FVDs) mitigate stress, displacement, and vibrations during dynamic events. Proper damper placement, including direction and location, is tailored to address specific structural vulnerabilities, significantly reducing inter-story drifts,

improving force distribution, and ensuring safety. Strategic damper placement, considering building height and inter-story behavior, maximizes performance, with systems like Toggle-Brace-Damper, Eccentric Lever-Arm, and Viscous Wall Dampers offering targeted solutions for efficient energy dissipation. The addition of FVDs results in a significant reduction in vibrations, enhancing resilience and minimizing structural fatigue. In the configuration selected in this work, dampers are placed horizontally and connected to a near-rigid chevron frame. This approach maximizes energy dissipation by injecting the full movement into the damper's horizontal orientation, though some motion may be lost due to the frame's stiffness constraints. The findings bridge the gap between theoretical modeling and practical application, providing insights for designing real-world experimental models to test vibration control strategies. The outcomes offer innovative solutions for improving the safety and stability of structures in seismically active regions, advancing both structural and mechanical engineering.

KWAD III- KSU all Weather Autonomous Drone
Poster #4 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Presleigh Porter, Cole Taylor, & David Moore
Research Mentor(s): Adeel Khalid

The KSU all Weather Autonomous Drone III or "KWAD III" is created as part of a research project to design and develop a water-resistant Unmanned Aircraft System (UAS). It is the third rendition of the Kennesaw all Weather Drone projects. This research is in collaboration with Ultool, LLC and contracted by the Department of Defense. The capabilities of KWAD III allow it to travel up to a range of 15km with the use of GPS navigation while carrying a payload of 2kg. The UAS's eight powerful motors and sturdy frame have allowed it to carry the Federal Aviation Administration's payload limit of over 22kg. It's intended flight is a straight line beyond the line of sight. In order to increase efficiency and range, KWAD III has a water-resistant aerodynamic housing nicknamed "Aeroshell." Team members have conducted several Computational Fluid Dynamics (CFD) analyses to continue to optimize the Aeroshell and reduce drag. The Aeroshell along with KWAD III component mounts utilize 3D printed parts to test and finalize these parts. The customizations made to the frame of KWAD III allow it to fit components in the most optimal manner to minimize weight and drag. The simulation and flight tests of this UAS have proved that it will be capable of its mission and more.

Metal Oxide-Based Electrode Development for Electrochemical Energy Storage Devices
Poster #1 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Elliott Yancey, Davis Pham, Levi Brigham, Shubhan Deshmukh, Jake Irvin, & Ben McKinney
Graduate Student(s): Duy Pham

Research Mentor(s): Ashish Aphale

Electrodes utilizing metal oxides have become increasingly popular in energy storage devices such as supercapacitors and batteries, due to metal oxide's increased surface area for high density storage and long-term stability. This research explores the fabrication of metal oxides, testing for their effectiveness via specific capacity in various conditions through collecting CV (cyclic voltammetry) and GCD (Galvanostatic charge-discharge) data. The research will investigate electrode performance, long-term stability, and the role of electrolytes using three-electrode setups. Metal oxides such as iron (Fe), copper (Cu), and select steel alloys are being studied, and these samples would be put through a variety of high temperature (> 400 °C) processes to study the impact of oxidation over prolonged periods. The research will reveal the metal oxide-based electrode's capabilities of utilizing as electrode materials for high performance energy storage systems and be able to meet the ever-increasing needs of reliable energy storage.

Modular 3D-Printed Translational Spring System for Engineering Education
Poster #34 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Audiel Cambron
Research Mentor(s): Ayse Tekes & Tris Utschig

The high cost and limited availability of laboratory equipment restrict hands-on learning opportunities for engineering students. The research question being addressed here is: Can a fully 3D-printed, modular translational spring system provide an accessible and cost-effective tool for teaching vibrations and dynamics? This project focuses on designing and prototyping a device that demonstrates translational forces using an interchangeable, pegboard-mounted system. The modular design features magnetic connections between springs, carts, and stoppers, allowing for easy assembly, disassembly, and customization of different spring lengths. By integrating these adaptable components, the system aims to provide a flexible learning tool that can be adjusted to suit different experimental needs. The design process involved iterative sketching, SolidWorks modeling, and 3D printing to refine tolerances and determine suitable materials. The expected outcome is a functional, scalable educational tool that enables universities to teach core engineering concepts without significant financial investment. This system has the potential to enhance visual and hands-on learning, making complex concepts more accessible to students. Future work includes finalizing the build setup with defined tolerances for pegboard integration and optimizing the spring and rail system for better performance and ease of use.

Nuclear Energy: The Key to Sustainable Power for AI and Emerging Technologies

Poster #9 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Joshua Luke Ponsell, James Zurawski, Eli Musgrave, & Johnny Demont
Research Mentor(s): Eduardo Farfan

Skeptics question whether Artificial Intelligence (AI) can be powered sustainably. Nuclear may just be the best option. AI is transforming various spaces, from cybersecurity to accessibility, by enhancing the detection and prevention of fraud and phishing attacks to improving real-time services like subtitle generation, and supporting language translation. AI's impact also extends to applications like handwriting and speech recognition, streamlining processes and increasing accessibility for individuals with disabilities. As AI becomes more integrated into everyday life, the increasing demand for its computational power raises concerns about energy consumption. By researching datacenter power demands empirically and comparing nuclear options as opposed to traditional power solutions, we can determine appropriate solutions poised towards the future. For example, approximating current energy cost (wherever it may come from) versus nuclear energy as a primary energy source. In recent events, many companies have inquired to purchase and refurbish nuclear facilities to enable their AI to the fullest with Constellation partnering with Microsoft in purchasing Three Mile Island Unit 1 for AI. Addressing these challenges requires sustainable and cost-effective solutions. The Stargate Project aims to invest 500-billion-dollars into AI, and TSMC is investing a total of 165-billion-dollars in domestic chip manufacturing further accelerating AI at the forefront. Through our findings, it is believed that nuclear power is the solution for powering the future of this industry. By choosing nuclear, it will provide a higher energy density than traditional renewable sources such as solar and wind energy. Nuclear power also can generate more power in a smaller footprint especially with Small Modular Reactors (SMRs). This approach offers an opportunity to balance technological progress with environmental sustainability by reducing dependence on inefficient and intermittent energy sources. The end goal is to bolster nuclear energy and enhance industries with better power solutions and ultimately improve everyday people's lives.

Numerical Analysis of Wing Vortex Interaction in Tandem Wing Configuration
Poster (Microsoft Teams)
Friday, April 18, 2:00pm – 2:15pm
Undergraduate Student(s): Lea Scott
Research Mentor(s): Gaurav Sharma

This research investigates the aerodynamic performance of a tandem wing configuration, specifically analyzing angle of attack variations, as well as stagger distance and gap adjustments. The central research question focuses on optimizing the relative placement of the front (NACA 2412) and rear (NACA 0012) airfoils to maximize aerodynamic efficiency. Understanding these

interactions is crucial for improving the design of unmanned aerial vehicles (UAVs) and other experimental aerospace applications where tandem wing configurations offer potential advantages over conventional single-wing designs. For results, Computational Fluid Dynamics (CFD) simulations are conducted using ANSYS Fluent. The k-ω SST turbulence model is used to efficiently capture flow separation and wake interactions. Multiple rear airfoil positions and angles of attack are tested to determine their impact on aerodynamic efficiency, specifically the lift-to-drag ratio (L/D) and wake formation. Results so far indicate that a moderate stagger distance (1.0–2.0x the airfoil chord) and a slightly higher rear wing AoA optimize the lift-to-drag ratio (L/D). Analysis of wake interactions revealed that improper rear wing positioning leads to increased flow separation and turbulence, reducing overall efficiency. With optimal positioning, the rear wing may partially recover energy from the front wing's downwash, improving lift generation without excessive drag penalties.

Numerical Analysis of Wing Vortex Interaction in Tandem Wing Configuration
Poster #18 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 10:00am – 10:45am
Undergraduate Student(s): Abdullah Quadri
Research Mentor(s): Gaurav Sharma

Unmanned aerial vehicles (UAVs) are increasingly shaping the future of aviation, with many nations prioritizing their development. Among various configurations, tandem-wing designs have been widely explored for UAV applications due to their advantages in stability, payload capacity, and aerodynamic efficiency. Similar to conventional wings, each wing in a tandem configuration generates leading-edge vortices, which, in turn, influence the vortex formation on the trailing wing. This interaction can enhance aerodynamic efficiency but may also contribute to increased drag. This study investigates the aerodynamic effects of vortex interactions in tandem-wing configurations through numerical simulations. The analysis focuses on the NACA 2412 airfoil with a chord length of C = 1 meter, examining variations in horizontal (x) and vertical (y) spacing between the leading and trailing wings, angles of attack (α), and Mach numbers (M). The parametric ranges include x = [1C, 3C], y = [0.5C, 2C], α = [0°, 15°], and M = [0.4, 0.6]. Given that Mach numbers exceed 0.3, all simulations account for compressibility effects. To accurately capture vortex propagation and unsteady shedding dynamics, the study employs Unsteady Reynolds-averaged Navier–Stokes (URANS) equations, using the SST k-ω turbulence model. The findings contribute to a deeper understanding of vortex behavior in tandem-wing configurations, offering insights for optimizing UAV aerodynamic performance.

Numerical Study of Transonic Flow Characteristics Around a Compound Delta Wing
Poster #5 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Andrew Marion

Research Mentor(s): Gaurav Sharma

This study numerically investigates the aerodynamic performance of a compound delta wing featuring multiple leading-edge sweep angles to optimize transonic flight characteristics. Inspired by the HAL Tejas wing design, the compound leading-edge configuration is designed to reduce wave drag while maintaining lift across a broad flight envelope. Computational fluid dynamics (CFD) simulations were performed at Mach numbers 0.75, 0.85, 0.95, 1.0, and 1.1, with angles of attack ranging from 0° to 55°. The unsteady Reynolds-averaged Navier–Stokes (URANS) approach, coupled with the Spalart–Allmaras turbulence model, was employed for its accuracy in resolving transonic aerodynamic flows at a reasonable computational cost. The numerical methodology was validated against experimental data through comparisons of surface pressure distributions and lift coefficients of delta wings. The aerodynamic performance of the compound delta wing was benchmarked against a baseline single-sweep delta wing to evaluate improvements in efficiency. Results reveal a notable reduction in drag, particularly at Mach 1, with decreases of 17.38%, 12.50%, and 13.25% at angles of attack of 5°, 30°, and 55°, respectively. While the maximum lift coefficient exhibited a slight reduction of 3.58%, the lift-to-drag ratio improved by 11.10%, 14.89%, and 7.24% at the same angles, demonstrating enhanced aerodynamic efficiency in the transonic regime. These findings highlight the potential of the compound delta wing configuration to improve transonic aircraft performance by mitigating drag penalties while preserving favorable lift characteristics.

Preliminary Work on The Design and Development of Biomimetic Upper-Body Exoskeleton for Stroke Patients

Poster #4 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Aaron Grann & William Thompson
Graduate Student(s): Connor Talley & Vanessa Young
Research Mentor(s): Ayse Tekes

This study presents the preliminary design and development of a biomimetic upper-body exoskeleton aimed at assisting individuals with impaired arm function. The exoskeleton consists of a three degrees of freedom shoulder design controlled by two pancake motors, and a biomimetic and tendon-driven elbow joint controlled by a servo motor. To optimize weight distribution, the servo motor is housed at the back of the waist, shifting the load toward the shoulder for improved user comfort. Motion replication is achieved using inertial measurement unit (IMU) sensors placed on the upper and lower arms to capture the healthy arm's movements. The sensor data is wirelessly transmitted to a Raspberry Pi, where it is processed as quaternion inputs to represent the arm's motion. The exoskeleton, controlled via CAN communication, is attached to the injured arm and actuated to mirror the movements of the healthy arm. The Raspberry Pi and motor controllers are integrated into a compact backpack worn by the user. Additionally, the

MATLAB Simscape model is created to simulate the motion of the exoskeleton which provides a framework for refining future iterations of the compliant and biomimetic joints.

Re-Entry of a Space Capsule in a Martian Atmosphere
Poster #5 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): James Grayson Banks
Research Mentor(s): Gaurav Sharma

The aerodynamic performance of space reentry capsules plays a critical role in ensuring safe and efficient atmospheric descent. This study focuses on the computational fluid dynamics (CFD) simulation of airflow around a blunt-body reentry capsule designed for descent into the Martian atmosphere. The objective is to analyze aerodynamic properties such as drag, heat transfer, and flow separation under Martian atmospheric conditions. The investigation will be conducted using ANSYS Fluent, leveraging turbulence models and heat transfer equations to capture key flow characteristics specific to Mars' thin atmosphere.

The Siemens - Software and Hardware Setup Package
Poster #35 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Omar Gervacio-Pedraza
Research Mentor(s): Mehdi Sarmast

Our research project, "The Siemens - Software and Hardware Setup Package," focuses on performing a simple modal analysis of a cantilever beam using Siemens' Simtester software and SCADAS acquisition hardware. The primary objective is to identify the beam's mode shapes, first few natural frequencies, and key system identification parameters, including mass, damping, and stiffness constants. The study involves setting up the beam in a controlled environment, exciting it with a programmable shaker, and collecting response data using Simtester. To ensure accurate results, we verify the beam's linear behavior through homogeneity and reciprocity tests. By analyzing the data collected, we aim to gain insight into the beam's vibrational behavior under specific conditions, determining its mode shapes and natural frequencies. Additionally, system identification techniques will help estimate the beam's structural properties. This research serves as an introductory exploration of modal analysis principles, providing hands-on experience in data acquisition and dynamic system analysis. The findings are expected to offer a fundamental understanding of cantilever beam vibrations and lay the groundwork for future structural analysis within the program.

Thermal Transport Properties of Hexagonal Boron Nitride Under Mechanical Strain
Oral Presentation (Microsoft Teams)

Friday, April 18, 3:00pm – 3:15pm
Undergraduate Student(s): Joshua Ellison
Research Mentor(s): Jungkyu Park

This research is intended to test if a hexagonal boron-nitride compound is a suitable replacement for carbon-based nanomaterials such as graphene as well as other nanomaterials. This research tries to understand the thermal properties of a hexagonal boron-nitride (hBN) junction while deformed and under mechanical strain. In this study we generate hBN sheets and nano tubes with the molecular graphics software VMD, then using MATLAB we code a junction made of these sheets and nano tubes for our research purposes. Once a simulation of this hBN structure is completed, we take the code and use a molecular dynamics software known as LAMMPS, and stretch the structure along the z-axis. While this structure is being stretched, we test the thermal conductivity of the junctions between the hBN nano tubes and the hBN sheets. Expected results based off previous studies on thermal capabilities of hBN are that the thermal conductivity of the junction will decrease a consistent amount proportional to the amount of strain that the structure is subject to.

Robotics and Mechatronics Engineering

DGAA*: A Dynamically Repaired Double-Strand Break Genetic Algorithm with Pheromone Guided A*
Poster #31 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Jonathan Ridley, Arielle Charles, Rohan Ahmed, & Obaid Irfan
Research Mentor(s): Muhammad Tanveer, Razvan Voicu, & Cary Chun

Path planning is an integral part of robotics that enhances their function: Mobile robots have an increased range of utility as compared to their stationary counterparts, but what good is their mobility if it is found to be inefficient? A algorithm is a traversal method in which the immediate best position from the current spot is chosen without regard for the global configuration of the map, ensuring a fast path creation yet not the shortest path. Ant Colony Optimization (ACO) uses multiple agents, known as ants, to traverse the map to look for the best path, leaving pheromone trails whose influence depends on how many times said path is traveled. Genetic Algorithm (GA) is inspired from the biological processes of crossovers, mutations, and selection: an initial set of paths are produced, being subjected to mutations and combining with others to produce offspring with the hope the offspring is better than either of its parents. The best paths from the batch are then taken into the next generation, and this process repeats until either the maximum number of generations are met or the desired result is attained.*

This project introduces a method that combines the decisiveness of A, the exploration factor of ACO, and the refinement of a more biologically accurate GA to procure a more structurally sound path planning method. DGAA*, the algorithm in question, is compared with the aforementioned three methods in environments of varying complexity to see if it is a viable alternative to other traversal algorithms. Results show that DGAA*, with the base of GA, both escapes the suboptimal routes A* gets trapped in and has a controlled global exploration factor, to reduce needless searches, guaranteeing that mobile robots using this technique travel efficiently.*

Artificial General Intelligence - Control of Real-time Entity (AGI CORE)
Poster #23 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Preston Brantley
Research Mentor(s): Razvan Voicu

The "Artificial General Intelligence—Control of Real-time Entities" (AGI CORE) project seeks to revolutionize real-time control systems by integrating local AI systems with cloud-based large language models (LLMs) within a hybrid framework. This approach leverages a mixed modality that combines distributed local processing with centralized computation, effectively addressing critical challenges in communication, processing delays, and real-time reaction capabilities. At the core of AGI CORE is an artificial general intelligence model designed to comprehend complex contextual inputs and generate human-like, adaptive responses. By utilizing a dual-architecture—where local systems handle immediate, low-latency tasks while centralized models provide deeper analytical support—the framework achieves processing times of less than a second without sacrificing precision or accuracy. This balance between speed and depth is particularly beneficial in environments that demand rapid decision-making. The system demonstrates significant potential across a wide range of applications, including robotics, military operations, automotive control systems, and medical diagnostics. Early results indicate that the integration of distributed local systems with centralized LLMs not only mitigates common bottlenecks in communication and data processing but also enhances the system's ability to react in real time. This duality facilitates rapid recognition of visual inputs, robust image analysis, and contextual problem-solving, thereby optimizing performance in dynamic and unpredictable settings. Moreover, the AGI CORE project addresses operational disparities by establishing a versatile and adaptive platform that can seamlessly adjust to varying environmental conditions. By laying a solid foundation for an AGI model that combines adaptive reasoning, critical thinking, and rapid responsiveness, this research advances both the theoretical framework and practical applications of real-time intelligent systems. The outcomes of this study pave the way for next-generation AI control systems that are not only efficient and accurate but also resilient in the face of evolving technological challenges.

Autonomous Concrete Crack Detection and 3D Analysis Using Husky AGV
Poster #16 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Sama Abbadi & Matthew Jones
Research Mentor(s): Muhammad Hassan Tanveer

Several studies have been conducted in the field of automated concrete crack detection using different analysis methods and robotic vehicles; however, successful 3D crack analysis using a movable camera mount remains to be accomplished. Our research aims to streamline the current concrete crack analysis process to determine the severity of the crack using manual crack length and depth inspection. For this research, a RealSense depth camera will be attached to the robot arm on the front of a Husky AGV to inspect a crack in concrete from multiple angles. A LiDAR unit, using a YOLO machine learning model, will also assist an operator in finding cracks. The additional scans from the different camera angles will be used to create a depth model of the crack using a cloud point grid, which will be computed on a Raspberry Pi 4. The success of the LiDAR and machine learning model will be measured using the percentage of positive results, false positive results, and negative results compared to the total amount of detections. The camera scans will be compared to manually collected results and examined for similar measurements.

Development of a Walking Robot as a Personal Assistant
Oral Presentation (Microsoft Teams)
Friday, April 18, 12:00pm – 12:15pm
Undergraduate Student(s): Maharshi Naik & Navaneeth Jayakanth
Research Mentor(s): Amir Ali Amiri Moghadam & Turaj Ashuri

The personal assistant robot market is growing, yet most of the current models are either too complicated, expensive, or too simplistic to be practical. This study aims to create a low-cost and efficient tripedal robot by reducing mechanical complexity without sacrificing the stability of motion. Unlike conventional designs using numerous actuators and complex control systems, this project aims at efficiency and cost-effectiveness. It aims to develop a user-friendly and stable robot system designed to aid individuals in an indoor setting. Through the creation of locomotion mechanisms and motion optimization, this study enables the development of practical and usable assistive robotic devices. The researchers initially designed the robot model using SolidWorks, conducting simulations using SolidWorks Motion Analysis and MATLAB Simulink to analyze movement dynamics. The early prototypes were unstable, with the back leg lacking sufficient weight to facilitate front-leg lifting, resulting in a caterpillar-like gait. To address this, weight was added to the back leg, which improved front-leg lift and produced a gait pattern that resembled a crutch-assisted gait. Though this revision has increased mobility, friction is still a significant obstacle. Future iterations will continue weight distribution optimization and minimize forces of friction. Additionally, the design team will move away from entirely 3D-

printed components to VEX Robotics parts to increase durability and simplify the prototyping process. Recent enhancements have drastically improved the locomotion function of the robot from caterpillar-like to a more stable gait. Nevertheless, additional modifications are required to minimize friction and improve the consistency of the movement. The anticipated outcome of the study is to create a foundation for a cost-effective and efficient robotic solution that can be utilized for multiple assistive functions.

Healing Hands
Oral Presentation (Prillaman Hall)
Wednesday, April 16, 1:00pm - 1:50pm
Undergraduate Student(s): J.R. Johnson
Research Mentor(s): Razvan Voicu & Amir Ali Amiri Moghadam

Continuous and noninvasive patient monitoring is needed in healthcare and ER settings to make sure solutions to problems are addressed quickly and correctly. However, existing monitoring systems often rely on multiple discrete devices, resulting in fragmented data collection and increased complexity for patients and healthcare providers such as nurses or doctors. This project addresses the need for an integrated, intelligent monitoring solution by developing "Healing Hands," a pair of robotic end effector hands designed to seamlessly incorporate various patient monitoring technologies and novel sensors. Healing Hands seek to integrate a comprehensive array of advanced sensors for thorough patient monitoring. These include sensitive ECG pads and custom-developed sensors for precise cardiac monitoring, photonic-based oxygen meters and heart rate. The fingertips will equip ultrasound transducers for non-invasive diagnostic imaging. This seamless integration of diverse sensing technologies ensures a holistic approach to continuous patient health monitoring. These hands are designed to attach to an existing humanoid robot unit, which utilizes artificial intelligence systems, including large language models (LLMs), to interpret and validate the collected data, providing real-time analysis and alerts. The proposed solution offers a unified platform for continuous patient monitoring, reducing the need for multiple devices and simplifying the monitoring process. By leveraging AI-driven data analysis, Healing Hands can infer critical health indicators, detect anomalies, and facilitate proactive healthcare interventions. The expected outcome of this research is the development of fully functional holistic sensing Healing Hands capable of providing comprehensive and continuous monitoring to enhance patient care through integrated, real-time data collection and intelligent analysis, ultimately contributing to improved healthcare outcomes and operational efficiency in medical settings.

Low Cost Additive Manufacturing of Segmented Stator Composite Polymer Permanent Magnet DC Motors
Poster #15 (Siegel Student Recreation and Activities Center)

Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Ben Goldberg, Jordan Bailey, Connor Hawkins, & Colin Haskins
Research Mentor(s): Razvan Voicu

This study presents a novel approach to the design, manufacture, and optimization of segmented stators for composite construction axial flux permanent magnet DC motors. Traditional axial flux stator manufacturing is both challenging and expensive, creating a bottleneck in rapid prototyping and innovation. To overcome these limitations, the stator is divided into individually fabricated segments using advanced composite polymer materials and low-cost additive manufacturing techniques. This segmentation not only drastically reduces production complexity and cost but also allows for customized coil geometries that maximize the surface area for improved heat dissipation. A key innovation of our design is the integration of a dielectric ferrofluid cooling system that addresses the thermal management challenges inherent in non-iron core stators. This system efficiently transfers heat from the electromagnets to the rotor, preventing thermal buildup and maintaining optimal operating conditions under load. Preliminary experimental results indicate significant enhancements in thermal efficiency and power output, demonstrating that the segmented design not only sustains higher performance under continuous operation but also improves overall motor stability and reliability. These early findings highlight the great application and implementation capabilities of this novel approach, marking a scalable pathway for the development of high-performance axial flux motors. The flexibility offered by segmented construction paves the way for rapid design iterations and bespoke modifications, making this method particularly attractive for both academic research and industrial applications. Future work will focus on further optimizing the cooling system and segment geometries to fully exploit the benefits of additive manufacturing in motor design.

Modeling and Control of an Innovative Soft Robotic Ultrasound System
Oral Presentation (Microsoft Teams)
Friday, April 18, 3:30pm – 3:45pm
Undergraduate Student(s): Stephan Sellers & Kyra Magee
Research Mentor(s): Amir Ali Amiri Moghadam

This paper aims to develop a framework for modeling and control of a novel ultrasound robotic system. In this study, our focus will be on modeling, controlling, and characterizing this system. To model this robot, we will employ the method of rigid finite elements to accurately capture the nonlinear large deformations of the soft robot. Using this technique, we will discretize the structure of the robot into a series of rigid elements connected by rotary springs. The stiffness of these springs can be determined experimentally by utilizing a force sensor. For position control, we will implement a PID controller and utilize an electromagnetic position sensor to gather data on the end- effector position. We will use serial communication and microcontroller to

communicate between the robot, computer, and sensors. The PID gains will be adjusted experimentally through trial-and-error method and the performance of the controller will be tested in tracking of different trajectories.

UAV-Deployable Dart Soil Monitoring System for Agriculture in Remote Areas
Poster #11 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Sheraz Saudagar & Lakshay Battu
Graduate Student: Cary Chun
Research Mentor(s): Muhammad Tanveer

Optimizing agricultural productivity requires accurate and up-to-date soil data, but many farmers continue to measure important soil parameters like pH, moisture, temperature, and salinity using outdated methods. Regular soil monitoring is impractical in remote or difficult-to-reach farming areas, making this challenge especially severe. With the global population expected to exceed 9.7 billion by 2050, precision agriculture using IoT technology is essential for ensuring long-term food security and efficient resource management. This project presents a cutting-edge IoT-enabled soil monitoring system that collects data in real-time using sensors deployed by drones. The proposed system consists of a 3D-printed aerodynamic casing with an integrated soil sensor probe, onboard microcontroller, communication module, and power supply. Similar to lawn darts, the sensors are launched from unmanned aerial vehicles (UAVs), stabilize in flight, and embed themselves into the soil upon impact. When deployed from an optimal altitude, the sensors acquire enough momentum to penetrate the ground without the need for human intervention. Once embedded, these IoT sensors wirelessly transmit soil data to a local server via MQTT for real-time analysis. This allows farmers to access critical soil information remotely, enabling data-driven decisions for improved soil management and sustainable agricultural practices. By automating soil monitoring, this system reduces labor costs, improves efficiency, and promotes sustainable farming practices. The integration of IoT and UAV technology in soil monitoring offers a cost-effective and scalable solution, particularly for large or inaccessible farmlands. The proposed approach provides an innovative and practical solution to modern agricultural challenges, enabling farmers to maximize yield while conserving resources.

Uncovering Genetic Patterns in Salmonella enterica using K-Means Clustering
Poster #32 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Sean Haque, Luke Wharton & Ming Yulin
Research Mentor(s): Razvan Voicu & Muhammad Hassan Tanveer

Clustering techniques play a crucial role in genomic data analysis by uncovering hidden patterns and relationships within large datasets. This study applies k-means clustering to

Salmonella Enterica genomic data to classify and analyze genetic variations among different strains. Salmonella Enterica is a significant pathogen responsible for foodborne illnesses worldwide, and understanding its genetic diversity can aid in tracking outbreaks and improving public health responses. Our approach involves preprocessing genomic sequence data, extracting relevant features, and applying k-means clustering to group similar strains based on genetic similarity. The results reveal distinct groupings that may correspond to variations in virulence, antibiotic resistance, or geographic origin. These insights contribute to a deeper understanding of Salmonella Enterica population structures and could enhance epidemiological surveillance efforts. This mentored research leverages unsupervised machine learning to generate new knowledge in bacterial genomics. By applying computational clustering methods to pathogen data, this study provides an innovative approach to classifying Salmonella Enterica strains, which may have implications for public health monitoring and outbreak prevention.

WellStar College of Health and Human Services

Exercise Science and Sport Management

Acute Effect of Contraction Speed During Motor Imagery on Corticospinal Excitability
Oral Presentation (Prillaman Hall)
Wednesday, April 16, 10:00am – 10:50am
Undergraduate Student(s): Kayla Anderson, Kaden Buford, Rachel Carlstrom & Caleb Offutt
Graduate Student(s): Anna Acosta
Recent Graduate(s): Lacey Harper
Research Mentor(s): Garrett Hester

Research indicates that a single session of imaginary muscle contractions (aka motor imagery; MI) acutely increases strength. This work is limited to generic instructions, so it is unclear whether speed (i.e., fast vs. slow) of imagined contractions affects acute muscle function responses. Purpose: To determine the acute effects of fast and slow imagined muscle contractions on maximal and rapid muscle force production. Methods: As part of an ongoing study, seven young (18-30 yrs) adults completed 3 experimental visits in randomized order after completing a familiarization visit. Experimental visits included a control (seated quietly), fast MI condition, and slow MI condition. During fast MI, subjects were instructed to imagine pulling with their bicep "as fast and hard as possible, whereas the instruction was to imagine "gradually increasing force for 3 sec until you are pulling as hard as possible" for the slow condition. Two blocks of 25 imagined muscle contractions separated by 1 min of rest were completed. Before and after each condition, subjects performed rapid, maximal isometric contractions of the elbow flexors with a dynamometer. Peak torque (maximal strength) and rate of torque development (explosiveness) were calculated from the torque-time curve data. Peak torque was considered the highest rolling 500 ms average, whereas RTD was determined from the slope of the torque-time curve from contraction onset to 50, 100, and 200 ms. A Wilcoxon test was used to examine changes within each condition. Results: Peak torque (p=0.63 – 0.612) nor any RTD outcomes (p=0.091- 0.866) changed following either condition. Conclusions: Our preliminary results suggest a potential small effect of fast MI on PT (+4%; p = 0.063), albeit not statistically significant, whereas RTD outcomes remained constant. As we recruit a larger sample size, a more powerful analysis will yield stronger evidence regarding the effects, if any, of different types of MI on acute muscle function.

Acute Effects of Shorter Blood Flow Restriction Cycles on the Microvasculature
Poster #6 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm

Undergraduate Student(s): Kayla Davis, Sydnei Alcorn, Alyssa C. Baban, Rachel A. Bacchus, & David Ganley
Graduate Student(s): Hana Abouward
Research Mentor(s): Daphney Carter

PURPOSE: To determine whether shorter and more frequent cuff inflations are a preferable alternative to the 5-min blood flow restriction (BFR) protocol, specifically looking at the microvasculature and tissue saturation index (TSI). METHODS: Using a within-subject design, participants completed 4 visits. Visit 1 included familiarization. For visits 2-4, participants had 1 of 3 conditions on the dominant arm while supine: 5-min (BFR5, 5 cycles), 3-min (BFR3, 7 cycles), or 0-min (CON, 7 cycles) of cuff inflation at 80% arterial occlusion pressure (AOP). AOP was measured with an automated device, following an initial 5-min rest with the dominant arm abducted 90 degrees. Heme levels were measured using near-infrared spectroscopy (NIRS) at 1/3 the distance from the lateral epicondyle of the humerus to the styloid process of the radius and adjusted to encompass the wrist flexors. During cuff inflation, the TSI initial slope (S1) and minimum were considered the stimulus. Following deflation, the initial slope (S2) and maximum were considered the microvascular response. For statistical analysis, the 5th cycle was compared across conditions with one-way Bayesian Repeated Measures ANOVAs. Data reported as mean±standard deviation. RESULTS: 10 participants (3 female, 23±3 yr, 78.7±12.2 kg, 171.3±12.5 cm) have completed this study. S1 (BF10=641346.397) was similar between BFR5 (-0.058±0.031) and BFR3 (-0.066±0.017, BF10=0.406). CON (0.001±0.006) was less than BFR5 (BF10=118.281) and BFR3 (BF10=18252.619). S2 (BF10=229.343) was similar between BFR5 (1.088±0.904) and BFR3 (0.810±0.317, BF10=0.479). CON (0.006±0.038) was lower than BFR5 (BF10=12.382) and BFR3 (BF10=997.479). Minimum (BF10=103.155) was lower in BFR5 (48.071±17.174) than BFR3 (52.849±14.810, BF10=2.427) and CON (66.701±5.389, BF10=12.058). CON was higher than BFR3 (BF10=9.897). Maximum (BF10=0.672) was similar across BFR5 (75.940±11.887), BFR3 (74.263±6.393), and CON (69.493±4.681). CONCLUSION: Our preliminary findings suggest that shorter cuff inflations elicit similar changes to microvascular response from a lesser stimulus due to a shorter time under restriction.

Associations Between Free-living Stair Use in Pregnancy and Maternal Metabolic Health
Poster #26 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Najah Reed, Georgia McDuffie, & Isabelle Boughadou
Research Mentor(s): Janeen Amason & Katherine Ingram

Gestational diabetes (GDM) is a serious condition, affecting up to 12% of pregnancies, and is associated with obesity and inactivity. During late pregnancy, women normally become insulin

resistant and develop GDM, however physical activity has been shown to mitigate the onset of GDM. Stair climbing is a safe and effective aerobic exercise recommended for pregnant women. The purpose of this study is to test the hypothesis that free-living stair use in pregnancy is associated with insulin resistance. To perform this study, twenty-four participants (mean age = 27.2± 5.1; BMI = 30.85± 7.4) visited the KSU Exercise Science Physiology laboratory during each trimester of pregnancy. Survey questions were administered at Visit 1 (12-15 weeks) and Visit 2 (17-20 weeks) regarding frequency of using stairs versus elevator, the number of flights of stairs in the home, and average flights taken per day at home, work, and elsewhere. Homeostasis assessment model of insulin resistance (HOMA-IR) was calculated from fasting glucose and insulin at both visits. HOMA-IR required log-transformation for normality. HOMA-IR at Visit 1 was associated with the self-reported frequency of stair use at home (r= -0.571, p= 0.042), while HOMA-IR at Visit 2 was strongly associated with the number of flights of stairs within the home at both Visits 1 and 2 (r = -0.896, p<0.001 and –0.885, p = 0.008). HOMA-IR was not associated with frequency of using stairs versus elevator (r = 0.302, p= 0.317), or questions regarding stair use outside of the home. Self-reported free-living use of stairs at home was strongly and negatively associated with gestational insulin resistance. These data underscore the importance of non-exercise physical activity in the maintenance of maternal metabolic health and suggest that activity should be encouraged for individuals who are pregnant.

The Association Between Gestational Cortisol & Maternal Metabolic Health
Poster #30 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Zabiullah Katawazai
Graduate Student(s): Isabelle Boughadou
Recent Graduate(s): Ami Eho
Research Mentor(s): Katherine H. Ingram, Maria Valero, Janeen S. Amason, & Brian Kliszczewicz

Background: Cortisol is a stress hormone produced by the adrenal gland. Excess cortisol is associated with poor metabolic health, including insulin resistance and abdominal adiposity. Maternal cortisol levels increase three-fold to support fetal growth and development, however excess cortisol production is linked with adverse offspring outcomes. Objectives: This study tests the associations between cortisol, abdominal fat, and insulin resistance in pregnancy. Methods: Twenty-three participants (BMI = 30.85 ± 7.4, age = 27 ± 5) visited the KSU Exercise Science Physiology laboratory in early pregnancy (V1, 12-15 weeks) and late pregnancy (V2, 24-28 weeks). Blood samples were collected during each trimester, and body-fat percentage was assessed using bioelectrical impedance analysis. HOMA-IR was used for insulin resistance. Intra-abdominal-adipose-tissue (IAAT) and subcutaneous1 (SAT1) thicknesses were collected by ultrasound 1cm above the umbilicus. Preperitoneal-adipose (PPAT) and subcutaneous2 (SAT2) were collected immediately below the xiphoid process. Correlations were used to determine

differences in SPSS, and body fat was controlled. Results: HOMA-IR in early pregnancy was strongly and positively associated with SAT1 and SAT2 in visit one ($p<0.05$). Cortisol on visit three is strongly and negatively associated with HOMA in early pregnancy ($p<0.05$). Conclusion: As expected, HOMA-IR and SAT1 and SAT2 were strongly and positively associated; contradistinctly, late pregnancy cortisol was negatively associated with early pregnancy HOMA-IR.

Associations Between Physical Function and Skeletal Muscle Size and Quality in Older Women

Poster #7 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Rachel Carlstrom, Kayla Anderson, & Kaden Buford
Graduate Student(s): William Reed, Lacey Harper, & Anna Acosta
Research Mentor(s): Garrett Hester, Jacob Grazer, Robert Buresh, & Tim Martin

Introduction: Previous research indicates that muscle size is at least moderately associated with strength, indicating that other factors such as muscle quality may be a correlate. However, far less work has examined the relationship between muscle quality and muscle strength or physical function. Purpose: To examine the relationship between muscle size and quality with muscle strength and physical function in older women. Methods: Thirty-two older women (70 ± 4 yrs) attended one visit where ultrasound images of the vastus lateralis and rectus femoris (quadriceps) and bicep brachii (BB) were obtained. Muscle size was determined as cross-sectional area (CSA) and muscle quality as echo intensity (EI), which is indicative of composition of the muscle. Additionally, maximal strength of the elbow flexors and quadriceps were determined from maximal voluntary isometric contractions using a dynamometer. To assess physical function, subjects completed as many chair rises (CR) as possible within 30 seconds. Pearson's correlation coefficients were computed to examine relationships amongst CSA and EI of the quadriceps and BB with maximal strength and CR. Results: CSA was significantly correlated with maximal strength of both BB ($r = 0.67$, $p < 0.0001$) and quadriceps ($r = 0.80$, $p < 0.001$). There was no correlation between EI and maximal strength for the BB or quadriceps ($p > 0.05$). CR was not correlated with CSA or EI of the quadriceps ($p > 0.05$). Discussion: Our findings support previous research indicating that muscle size is positively associated with muscle strength, though it was not correlated with physical function. Muscle quality was not associated with muscle strength or physical function, which may have been partially due to the homogenous sample and limited age range.

Comparing Crawling Development in Children with Limb Loss/Limb Difference to Typically Developing Children

Oral Presentation (Prillaman Hall)
Wednesday, April 16, 10:00am - 10:50am
Undergraduate Student(s): Larissa Brehm, Analise Oliver, Maya Tulchinsky & Diana Mansouri
Research Mentor(s): Mark Geil

The CDC removed crawling as a milestone for children developing as of 2022[1], due to insufficient data and definitions. The purpose of this study was to collect data using a pressure mat and quadrupedal gait software on infant crawling patterns in children with limb loss or limb difference (LLD) and typically developing (TD) children in order to understand both how children with LLD crawl, and which parameters detect differences. The data collected was then converted into measurable outcomes such as cadence, velocity, weight distribution, and stance support. The long-term objective of this study is to understand the quantitative parameters that are sensitive to known atypical development in order to inform identification and treatment strategies at an earlier age. Participants: This analysis is a subset of a larger study and focused on 13 subjects: 7 in the LLD group and 6 mass-matched children in the TD group (one TD subject matched the mass of two LLD subjects). IRB approval was obtained and parents provided permission/consent for participation. Apparatus: ASQ-3 form to determine typically developing status; PKMAS Zeno Walkway Pressure Mat, PKMAS4 analysis software. Procedures: Infants were encouraged to crawl on the Zeno Walkway Mat for at least 3 passes of 5 or more crawling steps. Body mass and length were collected following crawling trials. Data Analysis: Data were analyzed by a linear regression interaction model to compare the eight spatiotemporal and kinetic outcome measures between the mass-matched infant pairs. When comparing mass-matched infants between groups there was a statistically significant difference (p Among the 7 outcomes measured, three showed significantly significant differences. The study provides insight into strategies used by LLD when crawling. Understanding crawling strategies used by infants with LLD can inform approaches to prosthetic prescription to assist with motor development. REFERENCES [1] Zubler, J.M. Pediatrics 149(3), e2021052138, 2022.

Does the Imagined Contraction Speed During Motor Imagery Affect Acute Muscle Function?
Poster #10 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Caleb Offutt, Kayla Anderson, Lacey Harper, Kaden Buford, & Rachel Carlstrom
Graduate Student(s): Anna Acosta
Research Mentor(s): Garrett Hester

Research indicates that a single session of imaginary muscle contractions (aka motor imagery; MI) acutely increases strength. This work is limited to generic instructions, so it is unclear

whether speed (i.e., fast vs. slow) of imagined contractions affects acute muscle function responses. Purpose: To determine the acute effects of fast and slow imagined muscle contractions on maximal and rapid muscle force production. Methods: As part of an ongoing study, seven young (18-30 yrs) adults completed 3 experimental visits in randomized order after completing a familiarization visit. Experimental visits included a control (seated quietly), fast MI condition, and slow MI condition. During fast MI, subjects were instructed to imagine pulling with their bicep "as fast and hard as possible, whereas the instruction was to imagine "gradually increasing force for 3 sec until you are pulling as hard as possible" for the slow condition. Two blocks of 25 imagined muscle contractions separated by 1 min of rest were completed. Before and after each condition, subjects performed rapid, maximal isometric contractions of the elbow flexors with a dynamometer. Peak torque (maximal strength) and rate of torque development (explosiveness) were calculated from the torque-time curve data. Peak torque was considered the highest rolling 500 ms average, whereas RTD was determined from the slope of the torque-time curve from contraction onset to 50, 100, and 200 ms. A Wilcoxon test was used to examine changes within each condition. Results: Peak torque (p=0.63 – 0.612) nor any RTD outcomes (p=0.091- 0.866) changed following either condition. Conclusions: Our preliminary results suggest a potential small effect of fast MI on PT (+4%; p = 0.063), albeit not statistically significant, whereas RTD outcomes remained constant. As we recruit a larger sample size, a more powerful analysis will yield stronger evidence regarding the effects, if any, of different types of MI on acute muscle function.

Effect of Volume on Pacing During High Intensity Functional Training
Poster #35 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Haja Kabba & Caralynn Doese
Research Mentor(s): Gerald Mangine

Each high-intensity functional training (HIFT) workout may vary its structural design, incorporate different exercises, and prescribe different intensities and volumes. This creates infinite possible combinations, and with so many dynamic factors, it is unclear how each change alters how one completes a workout. The purpose of this study was to examine the effect of altering volume only on HIFT pacing. Ten men and nine women (27.0 ± 7.6 yrs, 173 ± 8 cm, 79.3 ± 11.0 kg) with ≥6 months of HIFT experience completed two experimental workouts that differed in volume. Participants completed five rounds of power cleans (men: 52.2 kg; women: 34.0 kg), toes-to-bar, and wall balls (men: 9.1 kg medicine ball to a 3.1-m target; women: 6.4 kg medicine ball to a 2.7-m target) at either a lower (LV: 5, 10, and 15 repetitions) or higher-volume (HV: 10, 15, and 20 repetitions) prescription. Workouts were recorded to quantify average repetition completion rate, number and duration of breaks, and average transition times. The standard deviation across rounds was quantified and divided by the average to calculate a coefficient of variation (CV, %). Wilcoxon signed-rank tests revealed overall repetition rate was

faster in LV (15.7 ± 5.5 reps·min-1) compared to HV (11.8 ± 4 reps·min-1), as were the completion rates of each exercise ($p < 0.001$). Breaks were fewer (n = 0.6-1.8) and shorter during LV (9.1 – 17.1 seconds), and transitions were quicker (4.8 – 11.7 seconds). Consistency in power clean rates and breaks was better during LV (CV:15.8 – 42.8%, $p < 0.05$). Lower workout volume led to consistently faster repetition rates, shorter breaks, and quicker transitions. The data may help coaches and athletes better understand how altering a single workout variable (i.e., repetition volume) might affect effort, and thus, the training stimulus and remaining workouts in the training week.

Effects of Shorter Blood Flow Restriction Cycles on Perceptual and Cardiovascular Responses

Poster #7 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 4:00pm – 4:45pm
Undergraduate Student(s): Sydnei L. Alcorn, Alyssa C. Baban, David N. Ganley, Rachel Bacchus, & Kayla K.A. Davis
Graduate Student(s): Hana Abouward
Research Mentor(s): Daphney M. Carter

A typical 5-min blood flow restriction (BFR) protocol has been reported as painful, which may limit adherence. PURPOSE: To determine whether shorter and more frequent cuff inflations are preferable to the 5-min BFR protocol. METHODS: Using a within-subject design, participants completed 4 visits. Visit 1 included familiarization. For visits 2-4, participants had 1 of 3 conditions applied on the dominant arm while supine: 5-min (BFR5, 5 cycles), 3-min (BFR3, 7 cycles), or 0-min (CON, 7 cycles) of cuff inflation at 80% arterial occlusion pressure (AOP). After a 5-min rest with the dominant arm abducted 90 degrees, AOP was measured with an automated device. Ratings of pain and perceived discomfort were reported with separate 10-point scales. Heart rate (HR) and oxygen saturation (OSat) were measured with pulse oximetry. At baseline, and in the last 60 seconds of cuff inflation, perceived pain, discomfort, HR, and OSat were recorded. For statistical analysis, change scores (Δ, last cycle-baseline) were compared using one-way Bayesian Repeated Measures ANOVAs. Data reported as mean±standard deviation. RESULTS: 17 participants (22±3yr, 78.0±12.7kg, 171.2±11.7cm) completed this study. ΔPain (A.U., BF10=8.341) was higher in BFR5 (1±2) than both BFR3 (1±1, BF10=2.430) and CON (0±0, BF10=2.700). BFR3 was higher than CON (BF10=1.163). ΔDiscomfort (A.U., BF10=23432.433) was higher for BFR5 (2±2) than BFR3 (1±1, BF10=11.268) and CON (0±0, BF10=3044.322). CON was lower than BFR3 (BF10=5.298). ΔHR (bpm, BF10=1.012) had anecdotal evidence for a difference across BFR5 (4±9), BFR3 (-1±4), and CON (-1±5). ΔOSat (%, BF10=15.700) was similar between BFR5 (-10.750±11.498) and BFR3 (-6.500±8.827, BF10=0.487). CON (0.500±1.624) was higher than BFR5 (BF10=11.393) and BFR3 (BF10=4.160). ΔAOP (mm Hg, BF10=0.296 was similar across BFR5 (-1.375±5.795), BFR3 (1.688±12.552), and CON (1.625±4.843). CONCLUSION: Shorter cuff inflations with

additional cycles may improve perceptions, and 3- or 5-min cycles elicit similar changes to the cardiovascular response.

Relationships Between Relative Strength and Endurance on Pacing Strategy in a Low- and High-Volume High-Intensity Functional Training Workout
Poster #7 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Wil King, Mac Burgess, Tanner Martin, Caralynn Doese, & Shawn Coleman
Graduate Student(s): James Henley & Kristyn McGeehan
Research Mentor(s): Gerald Mangine

High intensity functional training (HIFT) workouts often challenge trainees to complete workloads as fast as possible. Although some studies have identified absolute pacing as a metric of HIFT intensity, none have viewed it as a relative measure, nor have comparisons been made between it and more traditional forms of describing intensity. Our purpose was to relate relative pace employed for each exercise and round of low- (LV) and high-volume (HV) versions of the same HIFT circuit with relative strength and muscle endurance. Nineteen experienced men and women (26.7±7.6 years; 173±8cm; 79.3±11.2kg) completed one baseline and two randomized experimental visits. Baseline assessments included one-repetition maximum (1-RM) power clean and RM toes-to-bar (TTB) and wall ball shots (WB). Experimental visits had participants complete five repetitions of PC (men=52.2kg; women=34.0kg), TTB and WB as fast as possible, as well as one round (RD) of either a LV (5xPC, 10xTTB, 15xWB) or HV (10xPC, 15xTTB, 20xWB) workout to determine maximal pace in each. Participants then completed five rounds of LV or HV for time. Pearson correlation coefficients were used to determine relationships between traditional measures of intensity and intensity based on pace for LV and HV. Positive relationships ($p<0.001$) were observed with TTB performance (between %RM and % max pace) during both workouts ($r =0.76–0.77$). The % max RD pace was related to both %RM of TTB ($r =0.68$, $p <0.001$) and WB ($r =0.65$, $p =0.002$) during LV, but only to WB ($r =0.55$, $p =0.016$) during HV. Average relative TTB pace was related to the number of repetitions prescribed to TTB and WB, relative to the individual's endurance in each for both LV and HV. WB endurance was also related to RD pace in both workout volumes, whereas TTB endurance was only related to RD pace during LV.

Health Promotion and Physical Education

Assessing Moral Distress in Social Workers: A Systematic Review of the Literature
Poster #16 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am

Undergraduate Student(s): Jada Brown, Bryce Greeson, Paige Lazere, Amari Sims, Malaysia Keel, Malk Almimar, & Matab Ali
Research Mentor(s): Matthew Lyons

Introduction/background: Moral distress is a form of psychological distress caused by experiences which are in violation of a person's deeply held moral beliefs. This may include situations where the individual acts in a way that is in violation of their moral beliefs, but also situations where they witness and do not stop such actions. The topic has been studied in first responders and military populations (often under the term moral injury) and in nurses (as moral distress). Social workers likely experience moral distress; however, it has been understudied in that population. Given the unique context of social work and the negative effects of moral distress, the experiential dimensions and etiologies of moral distress in social work require further study. We therefore undertook a systematic review of the literature on moral distress in social workers, focusing on the definitions of moral distress used in the field. Method: Our initial data extraction included 1,074 articles from databases such as Psychinfo, Applied Social Sciences Index & Abstracts (ASSIA), Social Services Abstracts, International Bibliography of the Social Sciences (IBSS), Social Sciences Citation Index (SSCI), Google Scholar, and Web of Science (WOS). Results: After deduplication and exclusion processes, 54 articles were included for full text review. 10 different definitions were employed, primarily drawing from the definitions given by Jameton and Weinberg. Conclusion: The generally shared definitions present across the literature indicate that the field of social work is beginning to coalesce on a shared understanding of this key construct, but there is still some definitional variability. Given the complexities of measuring moral distress and distinguishing it from other psychological distress constructs in social workers, developing a clear, shared definition of this key construct is a matter of both scientific and practical urgency for the field of social work.

Culturally Adapting Health Promotion Programs to Latino Families to Counter Child Injury
Poster #33 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Javier Haro
Research Mentor(s): Melissa Osborne & Tatiana Villarreal-Otalora

Unintentional injuries are the leading cause of death among children 0-5 years in the U.S. (Centers for Disease Control and Prevention [CDC]). Prevention initiatives, especially those for parents, are a driving force in public health to tackle this issue. However, despite current ongoing education and health prevention programs, disparities between different racial/ethnic groups exist. Within the Hispanic/Latino population, the data show preventable injuries making up three of the top four causes of death among children 0-5 years (CDC, 2025). The step of health promotion which is absent in prevention strategies to parents is examining differences to identify

potential disparities and needs. The first aim of this research is to examine the differences between Hispanic/Latino and non-Hispanic/Latino families to identify potential disparities in injury types and rates. The second aim is to identify current culturally tailored home safety programs for Latino/Hispanic families. Data were analyzed descriptively using publicly available U.S. vital statistics and surveillance data 2018-2023; a literature review was conducted using PubMed, PsycINFO, and Google Scholar to identify current home safety/child injury prevention strategies for Hispanic/Latino families. Results of data analysis indicated that 2,913 Hispanic/Latino children 0-5 years died from injuries between 2018 and 2023 (CDC, 2025). Common ground was found in leading cause of death being suffocation among Hispanic/Latino and non-Hispanic/Latino children. The findings from the literature review demonstrated a lack of proper frameworks for cultural adaptations in most public health programs. This research emphasizes the importance of integrating cultural adaptations into existing or new home safety programs for Latino/Hispanic families, as prevention efforts can be more impactful when cultural and linguistic considerations are implemented into programs. Strengthening public health initiatives through cultural adaptations can be utilized to maximize understanding, adaptation, and effectiveness within Latino and Hispanic populations.

Identifying Psychosocial Factors Influencing Fluid Intake in Underhydrated College Students to Inform a Targeted Intervention

Poster #21 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 2:00pm – 2:45pm
Undergraduate Student(s): Lauren McSpadden, Harshaa B. Rajarajan, Vanessa Michelle Moreno Ruiz, Essence Jisele Respress, & Braden J. Smith
Research Mentor(s): Mitchell E. Zaplatosch

*Maintaining adequate hydration is essential for overall health and cognitive function, yet many college students fail to meet daily fluid intake recommendations. Thus, it is imperative to identify appropriate intervention strategies to improve fluid intake in this population. This study aimed to recruit underhydrated college students for a fluid intake intervention and to identify the primary factors influencing fluid consumption in this population. Twenty-three participants (11 females) (mean ±SD; age, 22.9 ± 2.1 y; height, 163.6 ± 35.9cm; weight, 71.5 ± 14.2 kg; body fat, 26.0 ± 9.0%) completed the study. To qualify, males reported consuming Knowledge, Attitudes, and Behaviors (KAB) survey to evaluate psychosocial factors contributing to fluid intake. Participants collected 24-hour urine samples for three consecutive days to assess hydration as urinary specific gravity, urinary osmolality, urine color, and urine volume. Mean hydration biomarkers indicated our participants were underhydrated (mean ± SD; urine volume 1.1209 ± 0.5796L, urine standard gravity (USG) 1.018 ± 0.006, urine color 3.8 ± 1.4) Comparing the average urine osmolality of our sample to the standard cutoff for health of 500mOsm*kg-1 yielded a significantly greater urine osmolality in our sample (671.519 ± 234.7481; t(20) = 3.3483, and p = 0.0016). Of the components of the KAB, participants scored lowest on the fluid*

behavior index at 44.3%, hydration knowledge scale scored at 59.1%, and hydration facilitator and barriers averaged 7.8 for physical barriers, 8.4 for lack of effort, 13 for social facilitators, and 11.7 for monitoring facilitators. Our study thus far has been effective at recruiting underhydrated college students who would seek to benefit from a fluid intake intervention. Subsequent analyses will determine the efficacy of a specific fluid intake intervention on these hydration biomarkers, specifically targeting hydration monitoring.

Investigating Contemporary Medical Apartheid: A Content Analysis
Poster #6 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Hodan Adan
Research Mentor(s): Evelina Sterling

This study employs content analysis to examine contemporary examples of medical apartheid, using Harriet A. Washington's seminal book Medical Apartheid: The Dark History of Medical Experimentation on Black Americans from Colonial Times to Present as a foundational framework. Medical apartheid refers to the historical and ongoing systemic racial disparities in medical treatment, research, and healthcare access. While Washington's work primarily explores past abuses, this research investigates whether similar patterns persist today. By analyzing recent news articles, medical case studies, and policy reports, this study identifies recurring themes of racial discrimination in healthcare, including unequal access to treatment, medical neglect, and exploitative research practices. The research follows a grounded theory methodology, including coding selected sources for key themes such as institutional bias, medical experimentation, and healthcare inequities. Using Washingtons categories of medical exploitation, such as non-consensual experimentation, inadequate treatment, and racialized medical myths, this study further assesses the extent to which contemporary healthcare practices mirror historical injustices. By systematically examining media and scholarly reports from the past decade, this study aims to determine whether racial disparities in healthcare today constitute a modern form of medical apartheid. Findings from this study will contribute to ongoing discussions about health equity and racial justice in medicine. Understanding the structural connections between historical and contemporary medical racism is essential for advocating systemic reforms. This research highlights the need for greater accountability, ethical medical practices, and policies that address racial disparities in healthcare access and treatment. Ultimately, this project underscores the importance of acknowledging and addressing medical apartheid in order to promote equitable healthcare for all.

I Want to Show that there are Drunkards in our Community: Young Women's Lived Experiences with the Alcohol Environment and Associated Harms in the Kampala Slums
Oral Presentation (Prillaman Hall)

Wednesday, April 16, 10:00am - 10:50am
Undergraduate Student(s): Allisa George
Research Mentor(s): Monica Swahn

Photovoice is a qualitative research method that uses visual storytelling to explore complex issues and research questions. As part of the TOPOWA Project, it was utilized to examine environmental stressors impacting the mental health of young women aged 18 to 24 living in three urban slums in Kampala, Uganda. This method encouraged active participation, empowering young women to share their experiences and perspectives on key community challenges. By focusing on "environmental stressors" and "mental health," the project aimed to shed light on the social determinants influencing mental health and well-being. In 2022, 15 young women took part in the Photovoice project, which involved capturing photographs, participating in group discussions, analyzing themes, and engaging in a validation session to finalize the findings. Through photography, participants documented aspects of their daily lives that shaped their mental health and well-being. In this paper, we focus on a subset of the analyses reflecting photographs and discussions regarding the alcohol environment. Participants highlighted the pervasive availability and accessibility of alcohol within their communities, often noting its normalization and promotion through marketing and local social norms. The findings indicate that the alcohol environment contributes to adverse social and health outcomes, including interpersonal violence, economic strain, and neglect of family responsibilities, all of which disproportionately affect women. Furthermore, the presence of alcohol outlets and associated behaviors in public spaces creates environments that can feel unsafe and exclusionary for women, limiting their participation in community life. These insights underscore the urgent need for interventions addressing the alcohol environment to mitigate its negative impact on mental health and social equity.

Modeling Homelessness: An Agent-Based Simulation of Social Dynamics and Housing Instability
Poster #17 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 11:00am – 11:45am
Undergraduate Student(s): Sarah Macke & Arafat Okino Sadiq
Research Mentor(s): Matthew Lyons & Monica Swahn

Homelessness is a pressing social issue with implications for public health, social cohesion, and economic stability. Poverty and homelessness have a direct negative relationship with community health outcomes, making it critical to implement preventative measures that reduce homelessness. This project develops an agent-based model (ABM) to simulate homelessness in a community, incorporating economic factors as well as social network structures that influence housing stability. The model is built using NetLogo, a multi-agent programmable modeling environment. In this framework, households are represented as agents ("turtles"), social

connections as links, and the environment as patches. Each household is assigned a randomized income and rental cost, drawn from a power-law distribution to reflect real-world income disparities. Rent burden is calculated as a function of income, and households are categorized into groups based on their probability of becoming homeless. A Bernoulli trial determines whether a household transitions into homelessness over time, influenced by economic shocks and social ties. Additionally, the model explores the role of systemic factors, including racial disparities and policy interventions, in homelessness trends. By incorporating social ties, the model examines how homelessness weakens community networks, making it more difficult for affected individuals to regain stability. The simulation can test policy interventions such as rent control, income subsidies, and emergency housing assistance, allowing researchers and policymakers to evaluate their potential impact on homelessness rates. This model serves both short and long term research objectives. In the short term, it aims to challenge misconceptions about homelessness, identify data gaps, and highlight policy areas requiring intervention. In the long term, it can inform local, state, and federal policies, drive data-driven decision making, and enhance research on structural inequalities that contribute to housing instability. Through this work, we seek to advance understanding of homelessness as a systemic issue and provide effective policy changes.

Nursing

Cultural Competency in Nursing Education: Assessing Knowledge Among Nurse Educators in Northwest Georgia's Nursing School
Poster #9 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Madeline Mendoza
Research Mentor(s): Kawther Hamash

Background: Nurses encounter diverse cultures and ethnicities throughout their careers. Cultural competence, defined as a necessary component of quality care, encompasses the attitudes, knowledge, and skills of providers (California Endowment, 2003). Ensuring an appropriate level of cultural competency among nurse educators can positively influence educational settings, helping students thrive both in class and in the field (Armour, 2004). Aim: This study aims to explore the level of cultural competency knowledge among nurse educators at a nursing school in northwest Georgia. Method: A descriptive exploratory study was conducted with 22 nurse educators from a nursing school in northwest Georgia, who completed an online anonymous survey. The survey included demographic factors and utilized the Cultural Competency Self-Assessment Checklist to assess knowledge levels. Descriptive analysis of percentages and frequencies was used to describe the study sample and their cultural competence knowledge. Results: A total of 22 participants completed the survey, aged between 47-57 years. The majority held a master's degree, and 52.4% were doctorally prepared. More

than half (61.9%) were white, and 71% had graduated more than six years ago. All participants had experience working with patients or students of minority origin. Half (52.4%) considered themselves minorities based on religion, origin, or color. Knowledge scores ranged from 8-28 out of a maximum of 130, with most scores in the middle range. Conclusion: This study highlights a lack of cultural competency knowledge among nurse educators despite the recent advances in nursing education and workplace settings, indicating a need for workshop training programs to increase their knowledge levels. Limited cultural knowledge among educators can result in lower student success and retention rates, as well as a decrease in the quality of care provided by the nursing workforce. Future studies should explore cultural competency training programs to enhance knowledge among a broader scope of nursing professionals and examine the long-term effects on student performance, retention rates, success, and healthcare disparities.

Evaluating the Impact of a Mentorship Program on Stress Levels and Transition to Practice Readiness in Nurse Practitioner Students
Poster #18 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): William Nickerson, Ash Smith, Dorniyah Powers, Michelle Olah-Anguiano, Brittney Chhieng, & Oluwaseyifunmi Odufejo
Research Mentor(s): Roxanne Bennett

Nurse Practitioners (NPs) transitioning from registered nurses to autonomous practice face numerous challenges, including lack of confidence, job dissatisfaction, high stress, and burnout. Research indicates that mentorship offers crucial guidance, support, and skill development; however, structured programs for NP students remain scarce. A regional NP organization, including both NP students and experienced NPs, presents an ideal setting for a structured mentorship program. The purpose of this study is to develop and implement a mentorship program for NP students through a regional organization and evaluate the effectiveness in reducing stress levels and improving readiness for practice. Participants were recruited from a convenience sample of regional NP organization members as either mentors (NPs with >1 year experience) or mentees (in NP school). After considering inclusion and exclusion criteria, fifteen mentors and fifteen mentees were selected and paired based on mutual interests. For training, participants completed an online "Mentorship Nursing CE Course" and attended virtual orientation. For the 12-week program, mentors were instructed to communicate with mentees online at least weekly and to meet in-person at least monthly to offer guidance and support. Participants completed pre- and post-program PSS and Casey-Fink surveys depending on their role. Quantitative data will be analyzed to compare pre- and post-intervention results. Qualitative data will be gathered through focus interviews and analyzed using thematic analysis. Results are pending program completion. It is hypothesized that participation will

reduce stress levels for both roles. Additionally, mentees are expected to show improved readiness for clinical practice, based on Casey-Fink survey scores for role transition experience. The study aims to demonstrate the value of structured mentorship programs in supporting the transition from education to practice for NPs. The findings could inform future initiatives to develop programs to improve NP transition and professional growth, fostering a culture of support and collaboration in practice.

Exploring Technology-Aided Education in Dementia Care
Poster #27 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 3:00pm – 3:45pm
Undergraduate Student(s): Ifeoma Britany Ohaya, Foluwake Timothy, Dandre Williamson, Kemberly Isabel Suazo, Magdalene Boadu, Toi-Ann Kingsby, & Benjamin Karanja
Graduate Student(s): Venkata Sasidhar Reddy Palagundla
Research Mentor(s): Modupe Akintomide & Joy Li

Background: Healthcare and allied professionals (HAP) play an important role in providing quality care for persons living with Alzheimer's and related dementias (ADRD) and their families. With over 6.9 million Americans aged 65 and older living with ADRD, it is imperative that HAP students are properly educated in dementia care prior to graduating from their programs. Examples, registered nurses play an essential role in providing quality care to persons living with dementia, which is why it is important for nursing students to be given an education on ADRD-related care. Objective: To explore the experience of HAP students in learning about dementia care and their use of educational technology in developing related competence. Methods: This research used secondary analysis of qualitative and quantitative data from a larger study to explore the targeted populations' experience and analyze the use of gamified virtual reality applications 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 then conducted through advertisements in student organizations using flyers and email correspondence with student groups. Three focus group sessions were conducted, lasting between 60-90 minutes and analyzed using a thematic approach. Socio-demographic data were collected. Preliminary findings: 18 final-year HAP students from diverse programs participated in the study, aged over 18 years old. Two main themes were revealed: (1) Limited dementia educational apps available for students and (2) Lack of dementia care experiential learning opportunities. Conclusions: This study identified the limitations of the current pedagogical methodologies and the availability of technologies-aided teaching/learning apps about dementia care for HAP students.

Reflections of Prelicensure Nursing Students in a Novel Oncology Elective
Poster #23 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Natalia Palma Alarcon
Research Mentor(s): Tracy Ruegg

Despite significant advancements in oncological diagnostics and care, the nursing shortage has placed a heavy burden on oncology nurses, leading to high turnover rates that can affect patient treatment. As key providers of cancer care, oncology nurses play a critical role in patient outcomes, yet the shortage significantly impacts the quality of care and the time available for each patient. Lack of exposure and interest in oncology nursing are key reasons as to why nursing students are vastly avoiding the specialty. An elective oncology course was designed to provide students with hands-on experience caring for patients with cancer, aiming to inspire them to specialize in oncology. This research aimed to examine students' experiences in an elective oncology course and identify key factors that may influence new nursing graduates to pursue the oncology practice setting. A focus group consisting of nine nursing students enrolled in an oncology elective was conducted to meet the study aim. The audio transcript of the focus group was analyzed via qualitative content analysis, where the responses were coded into distinct categories, subcategories, and themes. Four categorical themes with accompanying sub-categories emerged from the data analysis: "Unit Shadowing Reflections," which includes detailed experiences from partnering with various oncology departments; "Pragmatic Learning," encompassing the experiential aspects of coursework; "Course Structure," highlighting the class atmosphere and hands-on learning; and "Diverse Assignment Perspectives," reflecting varied opinions on in-class assignments. Finding from this pilot study underscores the value of incorporating oncology-specific education into prelicensure nursing programs to enhance awareness of the specialty and inspire interest in oncology nursing. Through thoughtfully designed experiential learning experiences in both classroom and clinical settings, students engaged with diverse patient populations, treatment approaches, and nursing roles, broadening their understanding and enthusiasm for oncology care. Further large-scale research is necessary.

Patterns and Predictors of Colorectal Cancer Screening Behaviors Among African Immigrants in the United States: An Integrative Review
Poster #4 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 1:00pm – 1:45pm
Undergraduate Student(s): Diana Baidoo, Janet Konneh, Ogechi Eke, Aniyah Mays, Glenkeith Phillip, Emilio Meza Ortiz, Diamond Ogletree, & Isaac Kuhn
Research Mentor(s): Chinomso Nwozichi

Colorectal cancer (CRC) is a leading cause of cancer-related morbidity and mortality in the United States. Early detection through routine screening significantly improves survival rates. However, African immigrants often exhibit lower CRC screening rates compared to other populations due to unique cultural, socioeconomic, and systemic factors. Understanding both the patterns and predictors of screening behaviors within this population is vital for reducing disparities. This integrative review aims to explore the patterns and predictors of CRC screening behaviors among African immigrants in the United States to identify barriers, facilitators, and opportunities for intervention. An integrative review framework was used to synthesize quantitative and qualitative research studies. Databases such as PubMed, CINAHL, PsycINFO, and Embase were systematically searched for studies published between 2010 and 2024. Search terms included "colorectal cancer screening," "African immigrants," "predictors," "screening behaviors," and "United States." Articles were included if they focused on CRC screening in African immigrants, identified factors influencing screening behaviors, and were peer-reviewed. A thematic analysis was conducted to extract and categorize key patterns and predictors. The review identified low CRC screening rates among African immigrants, often influenced by factors such as limited awareness, healthcare access, cultural beliefs, and language barriers. Predictors of screening included higher socioeconomic status, health insurance coverage, regular interaction with healthcare providers, and acculturation. Facilitators such as culturally tailored interventions, faith-based initiatives, and community health outreach programs showed promise in promoting screening. Gender and educational attainment were also significant predictors, with women and individuals with higher education levels more likely to engage in CRC screening. The findings suggest a need for comprehensive strategies addressing both systemic and individual-level barriers to CRC screening. Healthcare providers should prioritize culturally sensitive communication, expand access to affordable screening services, and collaborate with community organizations to enhance awareness. Future interventions should leverage identified predictors to develop targeted education and outreach programs. Understanding the patterns and predictors of CRC screening behaviors among African immigrants is critical for designing effective interventions. By addressing specific barriers and leveraging facilitators, healthcare systems can improve CRC screening uptake, ultimately reducing disparities and advancing health equity within this underserved population.

Using a Structural Equation Model to Predict Colorectal Cancer Screening Behaviors Among African Immigrants in the United States

Oral Presentation (Prillaman Hall)
Wednesday, April 16, 10:00am - 10:50am
Undergraduate Student(s): Ogechi Eke, Diamond Ogletree, Isaac Kuhn, Aniyah Mays, Emilio Meza Ortiz, Janet Konneh, Diane Baidoo & Glenkeith Phillip.
Research Mentor(s): Chinomso Nwozichi

Colorectal cancer (CRC) remains the third most common cancer worldwide and the second leading cause of cancer-related deaths. Despite its significance, CRC screening uptake among African immigrants in the United States remains disproportionately low. This study aimed to examine the predictors of CRC screening behaviors in this population using the Health Belief Model (HBM). A cross-sectional survey was conducted with 236 African immigrants aged 45 and above across multiple U.S. states. An online questionnaire assessed sociodemographic characteristics, CRC knowledge, screening behaviors, and HBM constructs. Data were analyzed using IBM SPSS Statistics 29 and AMOS for Structural Equation Modeling (SEM) at a 0.05 significance level. Findings revealed that 67.37% of participants had very low knowledge of CRC, with 75.85% never having undergone any form of CRC screening. Among them, 46.61% were unsure about screening in the next 1–3 years. SEM analysis identified self-efficacy (β = 0.27, p = 0.001) and cues to action (β = 0.19, p = 0.009) as the most significant positive predictors of screening behavior. In contrast, perceived barriers (β = -0.22, p = 0.004) emerged as the strongest negative predictor. Key barriers included financial constraints, fear of abnormal results, limited healthcare access, and discomfort with screening procedures. A moderate positive correlation between knowledge and screening behavior (r = 0.429, p = 0.021) suggests that greater awareness significantly enhances screening participation. These findings highlight the critical need for culturally tailored education programs to increase CRC knowledge and awareness among African immigrants. Addressing perceived barriers through affordable screening options, enhanced healthcare access, and improved physician-patient communication is essential. Interventions focusing on building self-efficacy and leveraging external motivators such as physician recommendations and community support can significantly improve CRC screening uptake. Ultimately, comprehensive strategies targeting these factors are vital for promoting early detection, reducing health disparities, and improving health outcomes in this underserved population.

Social Work & Human Services

The Catholic Church's Role in Shaping Health and Medicine: Historical and Contemporary Perspectives

Poster #3 (Siegel Student Recreation and Activities Center)
Thursday, April 17, 12:00pm – 12:45pm
Undergraduate Student(s): Aylin Diaz
Research Mentor(s): Evelina Sterling

The overall purpose of this research is to explore the influence of the Catholic Church on health and medicine, focusing on historical contributions, ethical frameworks, and contemporary healthcare practices. The Catholic Church has played a pivotal role in shaping the development of health and medicine, both historically and in contemporary contexts. Through this mixed methods approach combining literature reviews, case studies and interviews with healthcare

professionals in Catholic settings, this research provides a comprehensive view of the Church's dual role as a moral authority and a practical provider of medical services. Through a combination of historical analyses, case studies, and ethical reviews, results explain the Church's foundational role in establishing hospitals during the medieval period, its development of medical education through monastic and missionary work, and its responses to public health crises throughout history. More specifically, this research examines key doctrinal teachings, such as those articulated in the Theology of the Body, Human Vitae, and Evangelium Vitae to understand how Catholic ethics inform decisions on controversial medical issues, including abortion, euthanasia, and reproductive health. Furthermore, findings describe the impact of Catholic healthcare institutions, which collectively represent one of the largest non-profit health systems globally, on the accessibility and quality of care. This study also evaluates the integration of religious values within modern medicine, particularly in the policies and practices of Catholic-affiliated hospitals and clinics. The findings highlight the enduring influence of Catholic principles on global health ethics, the significant contributions of Catholic-run institutions to underserved communities, and the challenges of balancing religious doctrine with secular medical advancements. This study contributes to the intersection between faith and medicine, offering insights into how religious institutions shape healthcare delivery and ethical discourse in diverse cultural and socio-political contexts.