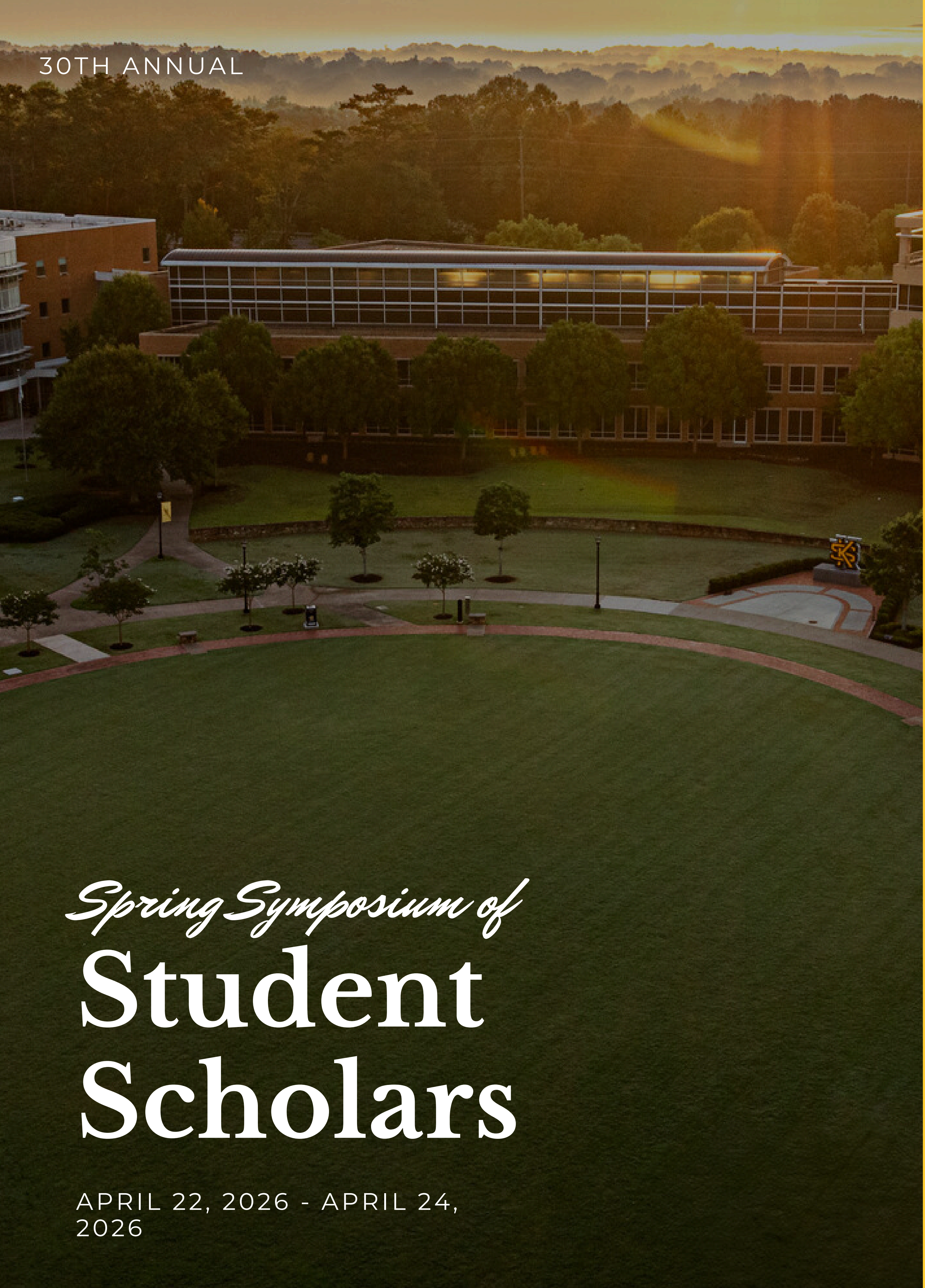

30TH ANNUAL

Spring Symposium of Student Scholars

APRIL 22, 2026 - APRIL 24, 2026

CONGRATULATIONS

Dr. Carl Saint-Louis

Department of Chemistry and Biochemistry

2026 Outstanding Undergraduate Research Mentor Award Winner

CONGRATULATIONS

Thais Russo Goncalves

UNDERGRADUATE RESEARCH AWARD WINNER

for her article
"Bridging the Divide: Class Appeals in the Clarkson-Ramsay Abolitionist Philosophy"

mentored by
Dr. Amy Dunagin

As the winner, Thais will receive $500 and publication in the Kennesaw Journal of Undergraduate Research (KJUR).

Program

Wednesday, April 22: Poster and Visual Displays

9:00 am - 5:00pm: Poster and Visual Displays*

Thursday, April 23: 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)

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

5:00pm – 5:50pm: Coles College of Business (CCOB)

Friday, April 24: Virtual Presentations

12:00pm - 5:00pm: Virtual Presentations*

*Timeslot assignments are noted in the program

Bagwell College of Education

Elementary & Early Childhood Education

Becoming Teachers in the New Latinx South: A Qualitative Study of Latinx Pre-Service Teachers' Experiences in Georgia Colleges of Education
Poster #51 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Alyssa Baltierra & Brissia Aguilar
Research Mentor(s): Sanjuana Rodriguez

This qualitative study examines the experiences of Latinx Pre-service teachers in colleges of education in the state of Georgia, a state in considered to be part of the New Latinx South. Aligned with critical scholarship, this study seeks to learn about what support pre-service teachers are receiving, what they need, and what barriers they encounter in their journey to becoming teachers. Data sources for this study include interviews with pre-service teachers in the state of Georgia during the 2024-2025 academic year. This interview protocol seeks to learn and understand these implications through the firsthand experiences and stories of Latinx pre-service teachers. Results from this study suggest Latinx pre-service teachers experience lack of representation, have a sense of cultural pride, and often take on additional responsibilities as mostly first-generation college students. This study is significant because it centers the experiences of Latinx pre-service teachers in Georgia, illuminating the supports, barriers, and institutional conditions that shape their pathways into the teaching profession.

Education for Liberation in K-12 Schools
Virtual Presentation (Microsoft Teams)
Session 1 at 3:00pm – 4:00pm
Undergraduate Student(s): Isabel James, Eniola Olaoye, & Aaliyah Williams
Research Mentor(s): Scott Ritchie

Primary and secondary education in the United States has the potential to help students become critical and creative thinkers with a sense of self in order to solve problems so they may be active participants in a democracy. However, schools often serve a limiting rather than liberating function. This manifests in the instructional practices that teachers use as well as the school curriculum. Many times, schools stifle students' curiosity and creativity. Rather than listening to students, teachers frequently use a "banking" approach where they fill students' empty heads with "deposits" of pre-packaged knowledge that is not relevant to students' lives (Freire, 2018). Students rarely have a say in their education. The curriculum is determined by adults, many of whom are politicians and not educators. In this online group presentation, three first-year *scholars will share preliminary empirical data from a qualitative interview study (IRB-FY26-336; Bhattacharya, 2017) in which they worked with their PI to interview established scholars and public intellectuals about their K-12 educational experiences. By learning about participants' strengths and needs in their educational experiences growing up, the PI and research team will use the data as a springboard for developing new teacher education curricula and instructional materials.*

More Than a Meal: A Study on the Role of Food in Asian and Asian American Children's Books
Poster #29 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Emily Ly
Research Mentor(s): Jinhee Kim

This study explores the role of food in Asian and Asian American children's literature, focusing on how food-related interactions shape family dynamics such as gender roles and the intergenerational relationships. For this study, 55 picture books published in the 2000s were collected and analyzed through content analysis. The study shows that female characters are often depicted preparing food, reinforcing domestic gender roles. In addition, elders use food-related activities to share knowledge and pass down cultural traditions. Food acts as a catalyst for closeness, often bringing family members together. This study provides implications for teachers and parents in that food-centered children's books can be used to support discussions about family roles, gender expectations, and cultural values.

Peer Mentors: Pre-Service Teachers Growing Their Math Teaching Skills Together
Poster #34 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Chasade Norris
Research Mentor(s): Paula Guerra

Transforming practice through undergraduate research in math ed. In this poster presentation the authors will share 4 different experiences where Latinx preservice teachers (PSTs) engaged in math teaching and undergraduate research focusing on culturally relevant mathematics, while working at a summer camp with Latinx children. The presenters, will share the content, the PSTs' reflections, and their growth in terms of their knowledge of culturally relevant mathematics. They will also discuss how the children in the camp received the instruction, the positives, and the areas of growth. The poster engages directly with culturally relevant mathematics (CRM) (Gutstein, Lipman, Hernandez, & de los Reyes, 1997), key for culturally sustaining pedagogy. It also presents four different actionable experiences. All of those are centered in the identity of the students and their funds of knowledge for teaching (Moll, Amanti, *Neff, & Gonzalez, 2006), so through them we were fostering and cultivating positive mathematics identities as valuable tools for learning (Goffney, Gutiérrez, & Boston, 2018). These experiences also place emphasis in different forms of Latinx teacher development, showcasing methods to train to practice equitable instruction, using the cultural tools they know so well. We have found that both the Latinx children engaged in the camp the last four years, and the Latinx PSTs involved in the project, shared positive reflections on the experiences. Children demonstrated a high level of engagement in the math class, in some occasions sharing they didn't realize they were doing mathematics, when the problems and tasks were culturally relevant. Also, all Latinx PSTs grew their knowledge of culturally relevant mathematics from an academic level, to a more practical level. In addition to that, they claimed to gain confidence in their mathematics teaching, something that on occasions they had shared they lacked.*

Teaching Young Children About Contemporary Cherokee Culture in Georgia
Poster #45 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Aiza Waqar & Carly Mac Helms
Research Mentor(s): Jennifer Hauver & Ethel King-McKenzie

Too often, Indigenous history is relegated to the past, with little attention paid to how people and cultures persist today. As a team, our goal was to understand and make Cherokee culture and history accessible and meaningful to young children. We began by reading a variety of historical sources to build a timeline of events. We then explored Cherokee folklore, poetry, and music and identified themes evident across them. We visited the Funk Heritage Center at Reinhardt University to speak with local experts. We connected with Paul Brannen, a member of the Tribal Council of the Cherokee of Georgia, to better understand how Cherokee culture persists in Indigenous families today. Through an oral interview, we received insight on important values (often tied to nature), expression of Cherokee identity in the modern-day, sociopolitical issues that come up on the council, the significance of the Cherokee Phoenix newspaper, and both open and closed rituals that occur within the community. We also discussed the incorporation of various art media into the lesson plans. We then explored the Georgia Social Studies Standards and developed age-appropriate lessons for 2nd and 3rd graders. We developed two lesson plans, both using the "5 E" format, to teach students about present-day Cherokee culture and to help students understand similarities and differences between their own cultures and those of Cherokee heritage in their community. Our first lesson focuses on the phoenix as a symbol of hope and renewal for the Cherokee people today. It introduces children to the Cherokee Phoenix. Our second lesson idea invites children to explore Cherokee folklore, which teaches lessons and highlights valued traits in Cherokee culture. We will present these lessons at the annual meeting of the National Council of History Education in Montgomery, Alabama, March 26-28, 2026.

Understanding the Reading Lives of Educators: Foundations for Creating Classroom Reading Cultures
Oral Presentation (Prillaman Hall, Indoor Plaza)
4:00pm – 4:50pm
Undergraduate Student(s): Myra Langley
Research Mentor(s): Roberta Gardner

Using portraiture and lived-experience research (Lawrence-Lightfoot & Davis, 1997; Van Manen, 1990), this study explores the personal reading histories of teachers and how these lived experiences shape their literacy perceptions and classroom practices. As reading remains at the forefront of education reform in response to stagnant national scores (NAEP, 2024), teachers must constantly navigate shifting instructional mandates and socio-political landscapes. Drawing on Jackson et al. (2024) which emphasizes the need to broaden literacy reform debates through humanizing supports, we argue that centering a teacher's lived experience can deeply inform and enrich reading instruction. Our preliminary findings suggest that teachers' reading lives are primarily shaped by a recognition of the environmental, emotional, and identity-related dynamics of literacy, alongside the strategic use of teacher modeling and culture as a tool for comprehension.

Educational Leadership

Belonging on Campus: Students' Insights and Experiences
Poster #11 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Alanna Edge, Taniyah Puckett, Jakeria Mays, & Isabelle Layng
Research Mentor(s): Jennifer Wells

This poster session, developed collaboratively with four first-year undergraduate research scholars, discusses how college students develop a sense of belonging and why it matters for engagement, persistence, and well-being. Sense of belonging is a fundamental human need and refers to students' perceptions of being valued, accepted, and connected within the campus community across social, academic, environmental, and institutional contexts. When students experience belonging, they are more likely to thrive and remain enrolled; when they do not, they face increased risks of loneliness, stress, academic disengagement, and attrition. Through a collective autoethnography, we explored what it means to experience belonging as students, both individually and as a team, to create shared meaning and mutual respect as we prepare for the next stage of the research project. Preliminary results indicate the importance of finding and joining student organizations to meet others with similar interests. Furthermore, many students come to Kennesaw State University with existing friendships, making it difficult for those *without pre-existing connections. Finally, students who have a lack of sense of belonging experience academic (e.g. grades) and psychological consequences (e.g. loneliness and depression). There are individual and institutional factors that help create a sense of belonging, such as stepping outside of one's comfort zone and ensuring orientation and other early interventions focus on ways to connect with others. This poster presentation will showcase these preliminary findings, recommendations for improving sense of belonging, and suggestions for future research.*

Grief in the Margins: How Veteran Students Navigate Loss, Belonging, and Campus Support

Poster #22 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Soleis Ohonde & Trinity Porter
Research Mentor(s): Chinasa Elue & Emily Scheinfeld

Colleges and universities increasingly acknowledge the emotional dimensions of student success, yet grief often falls outside traditional mental health frameworks and remains under addressed in institutional responses. While research suggests that many college students experience bereavement during their studies, less is known about how grief is experienced and navigated by nontraditional populations, particularly veteran students whose academic pathways are shaped by military-to-civilian transition, identity shifts, and exposure to trauma and loss. This qualitative single-case study explores how veteran students define loss and grief and how these experiences shape their academic engagement and sense of belonging. Using purposeful sampling, we conducted one-on-one semi-structured interviews with self-identified veteran students enrolled at a public institution in the southeastern United States. Interviews (40–75 minutes) were conducted virtually to support privacy and comfort. Data were analyzed using a deductive qualitative content analysis approach, attending to both manifest and latent meaning. Five themes emerged: (1) Grief as private and death-centered, reflecting narrow definitions and constrained emotional expression; (2) Goal-oriented academic engagement, positioning college as a means to an end rather than a social rite of passage; (3) Social distance from traditional students, shaped by age, military culture, and disruptions to connection; (4) Hesitation to seek support and mismatch with institutional resources, including uncertainty navigating systems and perceiving services as insufficiently tailored; and (5) Layered losses beneath narrow definitions, revealing multiple overlapping disruptions (identity, connection, opportunity) even when grief was explicitly reserved for death-related loss. Findings underscore the need for grief-responsive, veteran-informed campus practices that address both visible and invisible losses and strengthen pathways to belonging and support.

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

Poster #32 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Anna Mittal, Lauren Sanchez, & Jada Elias
Research Mentor(s): Michael Ota

Autistic students have historically faced significant barriers in higher education that limit academic success and social inclusion. Our project aims to address these inequities through a peer-based mentorship model. Grounded in critical disability theory and action research methodology, the initiative pairs autistic undergraduate and graduate students with trained student research mentors - Registered Behavioral Technicians - who act as liaisons to build skills with participants. We focus on strengthening executive functioning (such as planning and organization), socialization, and communication skills through weekly hour-long sessions designed to reduce the risks of social isolation and academic regression. Utilizing a mixed-methods approach and a single-case research design, the study incorporates standardized assessments, such as the social responsiveness scale (SRS-2), alongside qualitative semi-structured interviews to evaluate student outcomes, using an applied behavioral analysis (ABA) methodology. Preliminary results from 2 cohorts of students (approx. 15 participants) indicate measurable improvements in participants' goals. This model, at a cost of approximately $250 per student, represents a low-cost but high impact intervention that has the potential to be implemented into other academic institutions. Future phases will scale this framework to support at least 100 students over the program's three-year duration, expanding its reach to the broader neurodiverse population on campus, such as students with ADHD. Furthermore, the project will expand into local high schools to mentor juniors and seniors, creating a critical bridge for the transition from K-12 special education services into college-level accommodations.

Inclusive Education

Forming Connections: The Cultural and Linguistic Experiences of Multilingual Youth in Atlanta and South Korea
Poster #3 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Brianna Arias Cabrera
Research Mentor(s): Jayoung Choi

The common struggle that most immigrant families face is the marginalization of their heritage language (HL) in ideologically monolingual and monocultural societies. For instance, the U.S. does not prioritize supporting HLs, leading immigrant children to weaken the link to their cultural knowledge and HL proficiency. Similarly, in South Korea with a longer history of monolingualism and monoculturalism, many immigrant families avoid using their HLs due to negative social stigmas, generating similar results. Both contexts can benefit from a better *system and environment to support immigration youth's linguistic and cultural dexterity as well as identity development. Such a small initiative was intentionally designed and implemented to connect 8 multilingual youth pairs to virtually engage with each other in their commonly shared HL. 8 university mentors paired with 4 middle and high school mentees based in the U.S. and 4 in South Korea recorded their exchanges for over two to four months. They shared linguistic and cultural backgrounds, as well as interests, in their common HL, including Russian, Korean, Tamil, Farsi, Spanish, and more. Each pair also created a collaborative digital story about their linguistic and cultural journeys. Drawing on the translanguaging framework that values multilingual youth's multilingualism, this presentation focuses on eight multilingual pairs' experiences with this research project. The qualitative analysis of the various artifacts and individual interviews revealed that this project triggered the youth to delve deeper into their cultural and ethnic identities. They also fluidly used all their linguistic repertoires to better connect to their pair.*

Instructional Technology and Innovation

Elementary Music Teachers' Perspectives and Uses of a Scaffolded Music Notation Tool to Support Elementary Student Learners

Virtual Presentation (Microsoft Teams)
Session 1 at 3:00pm – 4:00pm
Undergraduate Student(s): Laurin McCoy
Research Mentor(s): Tiffany Roman

Reeves and Lin (2020) urged educational researchers to pursue socially responsible questions and collaborate with practitioners to address critical issues in teaching and learning. In response, an educational researcher and an elementary music teacher partnered with Georgia-based music educators to co-design a scaffolded music notation tool that supports students with special needs in independent music play. Elementary music classrooms are among the few fully inclusive K–5 settings (Adamek & Darrow, 2018), yet music educators often receive limited training in differentiation for students with disabilities (Heller, 1995; Thompson, 2000). Building on research from Spring 2025, this study explores teachers' perspectives on the tool's usability in elementary music classrooms. The central research question is: How do teachers perceive a scaffolded music notation tool to support music literacy in the general music classroom? This qualitative case study (Yin, 2014), guided by sociotechnical pedagogical systems theory (Schmidt et al., 2024), examined how teachers facilitated learner interactions with the technology (technological), achieved learning goals (pedagogical), and had students engage with others (socio-cultural). Data collection occurred in Spring 2024 with grades 1–4 across multiple public elementary schools in a large Southeastern U.S. district. Teacher perceptions were gathered in Spring 2025. Methods included classroom observations, teacher interviews, and survey data. Observations focused on student engagement, tool interaction, and challenges. Descriptive and *reflexive field notes were used. Teacher interviews and survey data triangulated findings. Spring 2025 findings revealed that participating spring teachers from 2024 determined how the tool was implemented and how students engaged with it. Teachers' needs and perspectives related to learning technologies for music learning will be highlighted, as well as their technology-based strategies for supporting learners with special needs.*

Secondary and Middle Grades Education

(Dis)Respect in the School Context: Adolescent Perspectives
Poster #38 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Campbell Salmon, Libby Hornor, Evita Doga, Timya Benjamin, & Shamitha John
Research Mentor(s): Johari Harris

Research has found that respect is a central part of building healthy relationships within secondary schools. For example, scholarship has found that adolescents who reported feeling respected in the school environment had higher levels of belonging and engagement and better academic performance than peers who reported lower levels of respect. Despite current research that highlights the importance and value of respect in schools, there have been limited investigations of adolescents' thoughts and feelings regarding respect and disrespect. Additionally, there is limited conversation around how macro-level forces (e.g. racism, classism, sexism) inform adolescents' understanding of (dis)respect and the way they show (dis)respect to people around them. Therefore, this research project investigates the ways adolescents conceptualize (dis)respect in schools. This work is framed by a theoretical model that claims that (dis)respect is informed by macro-level processes (Harris et al., 2025). This is a qualitative study that uses focus groups to learn about students' perspectives. The research was collected at two Boys and Girls afterschool Clubs located in the Southeast region of the United States, with approximately 25 participants at each site (N=50). Participants are between 6th and 12th grade. At this point of the research, 2 focus groups have been conducted. Preliminary data has been analyzed using the constant comparison method. Within this data, two preliminary themes have emerged. First, 8th and 9th grade participants talked about how stereotypes were the utmost form of disrespect, while 6th and 7th grade students focused more on interpersonal interactions. Second, male and female participants reported having different expectations on how they should or could respond to (dis)respect in schools. These findings will highlight the factors that can create a culture of mutual respect among teachers, students, and administrators to create safer and more inclusive school environments.

Coles College of Business

Economics, Finance, and Quantitative Analysis

AI Budgeting Tools and College Students' Financial Decisions
Poster #23 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Skylar Kitaveelaih
Research Mentor(s): Lucy Ackert

Personal financial decisions are increasingly aided by the use of artificial intelligence-based budgeting applications. However, it is not clear whether the use of AI-based budgeting applications enhances the financial self-regulation capacity of the individual or rather develops dependence on the guidance provided. This project aims to investigate the impact of varying types of AI-based financial nudges on the financial decision-making capacity of college students and their financial self-regulation. A pre-test/manipulation/post-test research design is used, where the participants are required to complete the Brief Self-Control Scale, interact with varying types of AI-based financial nudges, and then make financial decisions before finally completing the scale. Data have been gathered for participants randomized to a no-nudge baseline condition or to one of two AI Nudge conditions, facilitating a comparison of the outcomes of the participants' decisions. Preliminary results indicate the AI nudges have the greatest impact when the context of the purchase decision is for online purchases, as the participants in the AI Nudge conditions tend to be less likely to make impulsive purchases. This study contributes to the body of research on AI-based financial tools and the role of behavioral nudges by helping to shed light on the role of AI-based messages and their impact on the financial autonomy of young adults.

Communication and Trust: A Look at AI's Effect on Provider-Patient Relationships in Diabetes Care
Poster #22 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Graduate Student(s): Claude Kamgna
Research Mentor(s): Govind Hariharan

This work analyzes three connected areas: (1) how trust impacts provider-patient communication in diabetes care, (2) how communication impacts trust, with a focus on the patient portal MyChart, and (3) comparisons between human and AI communication approaches. Recent research highlights the growing use of patient portals and AI tools in chronic disease care, while also pointing to the need for deeper understanding of how these technologies *shape communication and relationships between patients and providers. Diabetes is a long-term condition that requires continuous monitoring, consistent follow-through with treatment as well as shared decision-making between provider and patient. Communication and trust are both central in its care. At the same time, AI features within the patient portal reshape that communication dynamic and raise important questions about trust and engagement. Through extensive literature review and interpretive analysis, the research examines existing findings to understand how they relate to trust and communication outcomes. Using a theoretical framework centered on communication perspectives and the ways trust is built, this work further delves into how AI-mediated versus human-to-human communication shapes provider-patient relationships in diabetes care. The goal is to demonstrate how AI changes the dynamics of trust compared to person-to-person communication and to highlight what this shift means for the quality of interactions.*

Great Smoky Mountains: The Environment vs. the Economy
Poster #26 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Allison Key
Research Mentor(s): Jesse Schwartz

During the government shutdown in October 2025, the National Parks Service was forced to close or limit their services. For some states though, the parks serve an important role in their state and local economies, and they took it upon themselves to provide the funding to keep their parks open. Most notably, local governments in Tennessee, home to the most visited National Park in the US, the Great Smoky Mountains, raised close to two million USD to keep the park fully open and staffed. While the goal of the NPS is maintaining the landscapes of the nation's parks, there is a clear economic value the NPS provides, and with the current rollbacks on environmental protections in the nation's public land, this topic is increasingly important. A traditional economic analysis relies on cost benefit analysis; however, this requires us to put values on abstract concepts—such as the value of a forest or a population of bears. We propose a utility function of T (tourism) and R (resources) to look at the measurable aspects—visitation fees, value of natural resources, spillover value, etc.—of a budget constraint to avoid these abstract values. This research is still underway. The result of which will uncover the social value of environmental conservation versus resource extraction and guide our proposed policy lever.

The Overlooked Economics of Menopause and Workplace Productivity in Midlife Women
Poster #13 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Cloe Franklin
Research Mentor(s): Weiwei Chen

Menopause is a significant yet often overlooked factor affecting women's participation and productivity in the workforce. Despite growing awareness, research on its economic implications remains limited. This study reviews current evidence on how untreated or undertreated menopause symptoms influence workplace productivity and economic outcomes for midlife women. Using a structured literature review, we extract estimates of symptom prevalence and quantify impacts on absenteeism, reduced working hours, labor force participation, and earnings. We then integrate these findings into an original cost-estimation model to approximate the economic burden of menopause-related productivity loss among working women. Preliminary results from this synthesis indicate that severe menopause symptoms may lead to substantial wage losses through missed workdays and earlier labor-force exit. This project contributes new insight by generating one of the first global economic estimates of menopause-related productivity loss. The findings highlight the need for workplace policies and health interventions that support midlife women and improve their economic well-being.

Information Systems & Security

AI Command Center

Virtual Presentation (Microsoft Teams)

Session 3 at 3:00pm – 4:00pm

Undergraduate Student(s): Deja Boney, Yecenia Hernandez, Lizbeth Garcia-Vega, & Braden Rhein

Research Mentor(s): Aaron French

The Personal AI Command Center project explores how artificial intelligence can improve individual productivity through centralized and automated system. The purpose of this research is to design and prototype an AI powered command center that delivers daily briefings, tracks important information, and supports marketing and networking efforts within one organized workflow. Instead of using multiple disconnected tools, this system combines key AI technologies to function as a smart personal assistant for busy professionals. The project focuses on four core areas including email intelligence, web-based news and business updates, professional networking, and calendar management. The research will identify AI tools that automated Gmail and Outlook summaries, extract tasks from Gmail, organize boxes, and generate personalized daily briefings, it will also evaluate AI driven news aggregation tools that track stock market activity, political developments, global events, industry trends, and other critical updates expected in a professional daily report. In addition, the project examines AI tools that support LinkedIn networking such as lead identification, contact discovery, and AI generated outreach messaging. Calendar automation and meeting summarization tools will also be analyzed to improve efficiency and daily planning. This project will also be a collaboration among four individuals to research, test, and integrate these tools into one cohesive system. Project *deliverables would ultimately include a functional prototype, AI tool research and selection analysis, system setup documentation, and a cost and scalability review. The team will also evaluate measurable time savings and overall efficiency improvements.* ***Final results would include performance comparisons, efficiency improvements, and insights gained from the prototype system, which will all be presented at the Spring Symposium.*** *In Conclusion, The Personal AI Command Center demonstrates how accessible AI tools, especially the free or low-cost options, can be strategically combined to create a practical and scalable solution that enhances organization, decision making, and professional productivity.*

AI for Mental Health: A Design Science Approach
Poster #5 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Amaya Ballard & Ewaoluwa Jaiyesimi
Research Mentor(s): Pamila Dembla & Gunjan Batra

AI-based mental health chatbots are increasingly being introduced to expand access to psychological support, especially where stigma, cost, scheduling constraints, or limited availability make traditional therapy services difficult to use. Many people are beginning to turn to these tools for immediate, low-threshold assistance when experiencing stress or emotional distress. However, we still know relatively little about the situations in which individuals feel comfortable relying on AI for support, or when they would prefer human help instead, creating uncertainty about how such systems should be designed and deployed responsibly. This study examines how users evaluate AI-based mental health support compared with human counseling across a range of common, non-crisis situations. Using a vignette-driven Design Science approach, six realistic scenarios were developed to reflect everyday experiences such as academic pressure, fear of judgment, late-night distress when services are unavailable, privacy concerns, trade-offs between AI and human support, and doubts about AI's ability to understand emotions. An initial classroom study (N = 23) was conducted with undergraduate students at a large business school in Southeastern US. Students responded to the scenarios through structured surveys and guided classroom discussion, indicating how likely they would be to use AI, which type of support they would prefer, and what factors influenced their decisions. Early findings suggest three recurring themes: students are more open to AI when distress is mild, they strongly value emotional authenticity and human empathy, and they weigh privacy concerns against the perceived safety of AI interaction. Additional data collection is underway to expand the sample and enhance the robustness of the findings. Overall, this work introduces a practical vignette instrument and a design-oriented framework for understanding when AI mental health tools are acceptable to users. The findings provide guidance for designing and evaluating systems that align with user needs, expectations, and ethical boundaries.

Artificial Intelligence as Creative Agent: Design, Deployment, and Audience Perception

Visual Display #52 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Jorden Bajnath, Alejandro Frias-Mejia, & Mohamad Dabdoub
Research Mentor(s): Soo Il Shin

Recent advances in generative artificial intelligence have significantly expanded the possibilities for digital content creation, enabling the development of virtual artists, influencers, and interactive digital personas. This project explores how AI technologies can be used to design and deploy AI-generated artists within the modern digital entertainment ecosystem. Specifically, the study investigates how AI-generated creative identities can be developed through a combination of visual generation, music production, and narrative branding strategies. Using generative image tools, AI music platforms, and large language models, the project developed multiple AI-generated artists and influencers with unique visual identities, personalities, and creative styles. These personas produce multimedia content including music, promotional visuals, and social media assets. A prototype website was also created to showcase the artists, distribute content, and simulate the structure of a digital entertainment brand. Preliminary results demonstrate that AI tools can effectively generate cohesive creative assets, including music tracks, artist visuals, branding materials, and social media-ready content. The project highlights how AI-generated creators can function as digital artifacts within entertainment platforms while maintaining recognizable identities and stylistic consistency. Future work will examine audience perceptions of authenticity, creativity, engagement, and trust toward AI-generated artists. These findings will help illuminate how audiences interpret AI-generated cultural products and how such entities may influence the future of digital entertainment and creative production.

Maritime SSLS Hardware Simulation
Visual Display #50 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Gregory Bunn, Franller Huaymacari, & Donovan Morton
Research Mentor(s): Dominic Thomas & Andrea Taylor

This project developed a modular simulation framework deployed on Raspberry Pi hardware to replicate complex maritime systems, addressing the need for a standardized system for monitoring ship systems. The research methodology involved engineering a multi-threaded software architecture capable of simulating ship components such as engines, ballast, and navigation systems and appropriate telemetry data via MQTT and UDP protocols. The framework also features a background telemetry service that cycles through booting, idle, transmitting, and failure states, coordinated with GPIO controlled LEDs to provide physical status indicators. Additionally, the team implemented a JSON-based configuration template system for deployment flexibility as well as a Flask-based web API for remote management.

Testing of the prototype validated the two-way MQTT communication link, demonstrating that external command topics can trigger simulated "failure states" mimicking the impact of equipment failures or cyber-attacks on ship systems. The implications of this work are significant for maritime operational continuity: by providing a hardware foundation that adheres to ISO 24060, this prototype allows for the refinement of standardized monitoring and logging protocols. This research delivers a robust, standardized architecture for maritime cyber-physical simulations, providing a scalable model for future implementations of vessel logging systems that prioritize standardized event reporting in maritime networks.

People, Profiles, and Perception: Demographic Traits as Determinants of User Trust in AI-Generated Outputs
Poster #20 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Destiny Hopson
Research Mentor(s): Botong Xue

Generative Artificial Intelligence (GenAI) is disrupting how we behave in our everyday lives or complete everyday activities. As we utilize GenAI, trust in outputs is a critical factor and how we may behave or interact on everyday life and may impact others. With GenAI's anthropomorphic qualities, humans' interactions with the technology have shifted trust in its outputs. Identity: demographics such as sex, race, shapes the traits individuals brings to interactions with GenAI and individuals trust in AI outputs. While existing research has explored the relationship between demographics and trust in AI outputs, the roles of identity-based traits has remained unexplored. This study investigates the relationship between users' trust in AI generated outputs and users' identity-based traits. Using a questionnaire, this study examines how personality types moderate the user's trust. The findings of this study are expected to reveal that identity-based traits influence trust in AI outputs, encouraging human-centered AI design and systems.

Ship Software Logging System (SSLS)
Virtual Presentation (Microsoft Teams)
Session 3 at 3:00pm – 4:00pm
Undergraduate Student(s): Matthew Stitt, Caleb Johnson, Nhi Vu, & Maylee Cianca
Research Mentor(s): Dominic Thomas & Andrea Taylor

This project develops a Ship Software Logging System (SSLS) to strengthen shipboard visibility and support cyber event auditing through consistent, standardized software logs. Our team's work focuses on building a PC-based logging application using Python with a Tkinter user interface, a SQLite database, and a MVC architecture to separate presentation, logic, and storage. The SSLS monitors an Ethernet interface and processes maritime-relevant traffic from *multiple sources, including UDP VER messages aligned with IEC 61162-1, TCP/IP device communications, and MQTT status/event streams. Incoming messages are validated, timestamped, parsed, and normalized into structured records that represent equipment health, connectivity, and security-relevant events, enabling reliable querying and post-incident review. Simultaneously, the application provides a real-time dashboard that surfaces up-to-date device inventory, connection state, error and fault indicators, and searchable log views suitable for demonstration during simulated ship operations. To support data integrity, the software is designed to operate under scenario-driven conditions where device behavior changes and faults occur, allowing assessment of detection for completeness, logging accuracy, and end-to-end responsiveness. The team also produces supporting deliverables such as configuration guidance, screenshots and user documentation, and where feasible, packaging for Windows deployment to streamline installation and presentation. Collectively, these software outputs establish a practical logging and visualization pipeline that can be extended to improve system compatibility and cybersecurity review processes.*

Marketing and Professional Sales

Change Management in Franchising
Oral Presentation (Prillaman Hall - Indoor Plaza)
5:00pm - 5:50pm
Undergraduate Student(s): Juan Coba Cevallos & Randy Williams
Research Mentor(s): Pramod Iyer & Nik Nikolov

Franchising has long been a cornerstone of economic growth, contributing nearly $897 billion to U.S. economic output in 2025 (IFA). Yet, one of its most pressing challenges remains understudied: how do franchisors implement change successfully? The core tension is inherent. Franchising is built on selling a proven, standardized model, but the reality of shifting customer expectations, technological disruption, and macroeconomic pressures forces franchisors to adapt. Those adaptations, whether operational, technological, or financial, often land hardest on franchisees, who face increased investment costs, short-term losses, and a skill/knowledge gap. Recent closures of nearly 80 franchised locations after litigation underscore how system-wide changes can heighten franchisor-franchisee tensions. Despite the prevalence of franchisee-franchisor conflict across industries, scant research has examined the change management process in this context. This study addresses that gap. Using a qualitative in-depth interview approach, we collect data from franchisees across multiple industries and identify key antecedents, intervening factors, and mechanisms that drive or limit effective change implementation. Central to our framework is a cost-versus-revenue scenario model that categorizes types of change franchisors most frequently initiate, and pairs them with strategies scaled to the magnitude (micro vs. macro) and orientation (tactical vs. strategic) of each change. We analyze interview transcripts, contributing to methodological innovation in qualitative *research by using Notebook LM. Interviews with franchisees point to a consistent pattern: they are more receptive to change when communication is proactive, financial support is outlined upfront, and implementation timelines are realistic. We also find that franchisees who perceive changes as franchisor-driven profit grabs rather than market-driven necessities show greater resistance across all change types. This research aims to provide franchisors, franchisees, and the industry with the tools to turn conflict into cooperation, strengthening the franchise system from the inside out.*

Dressed for Judgement: What Should Celebrities Wear in Court
Oral Presentation (Prillaman Hall - Indoor Plaza)
5:00pm - 5:50pm
Undergraduate Student(s): Emily Lesmes & Alaina Jean
Research Mentor(s): Hyunju Shin

Consumers often form strong attachments to celebrities, who function as representative figures of the human brand. Although prior literature acknowledges celebrities' influence as aspirational reference groups, celebrities are also frequently involved in negative events that attract adverse public relations attention, jeopardizing their public image and diminishing the perceived value of their brand. This research examines how celebrities' strategic courtroom self-presentation, specifically their choice of attire, interacts with their post-conviction reparative action (i.e., a philanthropic donation to a charity associated with their offense) to shape consumers' perceptions of the celebrity during a criminal proceeding. Drawing on signaling theory, we argue that traditional or professional courtroom attire (e.g., a black suit for men or a black knee-length dress for women), compared with non-traditional or casual attire (e.g., a casual shirt and sneakers), serves as a signal of competence. Because competence implies the capacity to understand institutional rules and regulate one's behavior accordingly, such attire increases perceptions that the celebrity recognizes and takes responsibility for their actions. We test these predictions in a 2 × 2 scenario-based experiment manipulating (1) courtroom attire (casual vs. formal) using a media-style image of the celebrity photographed outside the courtroom and (2) whether the celebrity makes a philanthropic donation following conviction (no vs. yes). The results show that formal attire increases perceived competence and responsibility, and philanthropic donation does not independently affect responsibility judgments. It amplifies the positive effects of formal attire. Together, these findings demonstrate that consumers' evaluations of celebrities in crisis contexts are shaped by the interaction of visual competence signals and reparative actions. This research contributes to the literature on human brand management by highlighting how strategic self-presentation in legal settings influences responsibility attribution and image restoration.

Overconsumption and the Role of the Marketer
Oral Presentation (Prillaman Hall - Indoor Plaza)

5:00pm - 5:50pm
Undergraduate Student(s): Anchiella Angelle
Research Mentor(s): Laura Boman

Consumers value ethical brands and are willing to pay more and repurchase from companies that hold similar values. Specifically, overconsumption initiatives from companies have been shown to benefit brand image and can lead to increased sales due to increased brand loyalty, especially from younger generations, Gen Z and Millennials, due to their preference for CSR and ESG claims. In the study, these initiatives are shown through firm signaling, communicating company values and ethics to reduce information asymmetry. To evaluate the effects, the research was administered to 111 participants to measure repurchase intentions given an impulse purchase from 3 company types: ethical, neutral, and unethical. From the series of questions and conditions conducted, it was shown that participants have a higher intention to repurchase a product from an ethical company, regardless of whether the product succeeded or failed, as compared to neutral and unethical companies.

Michael A. Leven School of Management, Entrepreneurship and Hospitality

Deciphering Success in Franchising: Linking Support Mechanisms to Restaurant Profitability
Poster #30 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Yadira Minaya Guerrero
Research Mentor(s): Melih Madanoglu

Franchising is a common and important business form in the restaurant industry and a major contributor to economic activity worldwide. Prior research has examined broad issues such as franchise fees, brand reputation, and expansion strategies. This project builds on that body of work by offering a fine-grained analysis of franchisor support mechanisms and their relationship to profitability. Rather than focusing on overall patterns of chain performance, the study will concentrate on the specific types of assistance franchisors provide to franchisees and evaluate how these practices influence financial outcomes. The observation period will cover 2017 through 2019. Focusing on this pre-pandemic window helps avoid the disruptions caused by Covid-19 and provides a clear perspective on franchisor operations under normal market conditions. The primary data source will be Franchise Disclosure Documents (FDDs) of restaurant chains, which franchisors in the United States are legally required to provide. These documents contain detailed descriptions of support systems such as training programs, marketing resources, site selection assistance, and operational guidance. Where possible, these materials will be supplemented with income statements and industry data to link support practices more directly with profitability. The analysis will proceed in two stages. First, thematic text analysis will *identify recurring patterns in franchisor support practices. This will highlight how chains emphasize different forms of assistance and whether certain practices are more prevalent among stronger performers. Second, Qualitative Comparative Analysis (QCA) will be applied to code and evaluate how combinations of support mechanisms are associated with profitability. To enhance the credibility of the results, a robustness test will also be conducted using data from 2022 and 2023, allowing comparison between pre-pandemic and more recent conditions. This approach will reveal which configurations of support appear necessary or sufficient for financial success across different contexts.*

Neurodiversity and Entrepreneurial Action in Populations that Stigmatize Neurodiversity

Poster #3 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Alayna Arthur
Research Mentor(s): Louis Marino & Stacey Kessler

In a society that stigmatizes neurodiversity and mental health, entrepreneurship can provide a flexible career path that aligns with individual strengths and needs. However, neurodiverse entrepreneurs may face unique challenges, particularly the pressure to "mask" their differences in professional settings. Previous research suggests that masking can create stress, reduce well-being, and limit authentic collaboration, but little is known about its impact on entrepreneurship. This study examines the effects of masking on neurodiverse individuals who start their own businesses. Initial data will be collected through interviews with ten neurodiverse college students about their experiences with masking. Expected results include evidence that masking is not an effective long-term strategy, may foster distrust between business partners, and can maintain stigma in professional environments. These findings will be discussed in the context of supporting neurodiverse entrepreneurs and identifying resources that reduce the need for masking.

College of Architecture and Construction Management

Architecture

After Ornament through the Work of Louis Sullivan, Adolf Loos, and Rem Koolhaas
Poster #14 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Kaila Hudson
Research Mentor(s): Ehsan Sheikholharam Mashhadi

What happens to ornament when it disappears? Does its absence constitute a new aesthetic, or does it migrate — burrowing into program, scale, and structure itself? The debate over ornament has long served as a proxy for anxieties about modernity, authenticity, and the moral character of architecture. From nineteenth-century eclecticism to the geometries of the International Style, the question of what a building should express — and through what means — has animated architecture's most consequential polemics. Scholars often frame this debate as a linear progression: ornament rejected, surface purified, form liberated. Yet this narrative obscures a more complicated genealogy in which ornament is never eliminated but continually displaced, absorbed, and reinvented within the formal logic that claims to expel it. This paper examines ornament's persistence through a comparative analysis of the work and writing of Louis Sullivan, Adolf Loos, and Rem Koolhaas — figures often treated as successive stages in a story of progressive reduction, but whose differences reveal something more theoretically generative. Drawing on Sullivan's "The Tall Office Building Artistically Considered," Loos's "Ornament and Crime," and Koolhaas's theory of Bigness, the paper juxtaposes their positions to reveal tensions between surface and structure, expression and restraint, ethics and aesthetics. Sullivan's organicist claim that ornament grows from structure is set against Loos's moral polemic equating ornament with degeneracy, and then against Koolhaas's reframing in which scale, program, and density become new ornamental registers. The elimination of ornament does not produce neutrality; it generates its own aesthetic identity. What Sullivan embeds in structure, Loos displaces onto ethics, and Koolhaas redistributes across program and bigness. Ornament is not suppressed — it is internalized. The building has never stopped being decorated. It has simply learned to hide it.

Anti-Gang Architecture: Youth, Labor, and Agency in Northern Mexico)
Poster #39 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Arturo Resendiz
Research Mentor(s): Ehsan Sheikholharam Mashhadi

Matamoros, Mexico, teenagers are being recruited into gang violence, drawn into a world of drug abuse and exploitation due to limited access to opportunities and safe spaces. The absence of inclusive communities fosters disconnection among youth, leaving them vulnerable to harmful influences. This research explores how architectural qualities can be leveraged to create spaces that protect, inspire, and connect with Mexican youth. In Matamoros, Tamaulipas, public spaces have lost their capacity to support safe youth development, and as architects, we have a responsibility to design spaces that function simultaneously as shelters and civic infrastructure, restoring safety and belonging to the city. This research asks how architecture can create environments that inspire youth identity, foster creativity, and offer alternatives to violence and drug culture in Mexico, positioning Matamoros as representative of northern border cities where teenagers are particularly vulnerable and the need for meaningful spatial alternatives is urgent. Drawing from Giancarlo Mazzanti's work in Colombia and other Latin American precedents, this study analyzes site conditions, community dynamics, programmatic experimentation, school typologies, and cultural language to envision a hybrid youth center integrating cultural activities, sports, and the arts, transforming unsafe areas into meaningful places of encounter and civic pride. Using a phenomenological framework to examine sensory experience within socially engaged typologies, the research builds an evidence-based foundation for design decisions. The proposed "Third Space" seeks to cultivate opportunity through architecture, developing local talent and giving visibility to the brilliance within these communities while drawing on cultural references and everyday objects embedded in Mexican and Hispanic life to evoke identity and pride. The outcome anticipates a design framework for a youth-centered community hub in Matamoros that demonstrates how architecture can reconstruct social identity and offer a meaningful alternative to violence.

Architecture of Sobriety: Redesigning Rehabilitation Centers Beyond the Institutional Framework

Oral Presentation (Prillaman Hall, Indoor Plaza)
2:00pm – 2:50pm
Undergraduate Student(s): Coraima Perez Portillo
Research Mentor(s): Ehsan Sheikholharam Mashhadi

What if alcohol relapse is not only a weakness of will, but a failure of the environment? Addiction recovery is often understood as a clinical or psychological process, yet sustained sobriety depends equally on the reorganization of daily habits. Research on alcohol use disorders demonstrates that addictive behaviors are reinforced through learned repetition, environmental cues, and embodied routine. Post-detox recovery is particularly fragile: the body is sober, but the spatial triggers that sustained addiction remain in place. The question is not only how to treat addiction, but how to design the spaces in which people learn to live without it. This thesis investigates how architecture can combat alcohol addiction by reshaping daily rituals through movement, repetition, and time. Challenging the institutional frameworks that define how *rehabilitation centers are designed and experienced, this design research proposes a 30-resident post-detox rehabilitation center in Columbus, Georgia, designed around a mapped weekday ritual organized through cultivation, craft, stewardship, hospitality, and communal gathering. Drawing on addiction neuroscience, social-model recovery frameworks including the 12-step program, and research on the neurological effects of built environments, the project translates the structure of daily time into spatial organization. Through literature review, precedent analysis, site investigation, and iterative diagrammatic modeling, programmatic relationships and movement sequences are derived directly from the rhythms of daily life, such as working, eating, making, and gathering. The design occupies the liminal space of recovery itself: neither clinical institution nor private home, but a threshold environment calibrated to the pace of behavioral change. This thesis argues that the built environment can function as a scaffold for behavioral transformation, an active agent that structures time, visibility, and collective routine. By rethinking what a rehabilitation center can be, architecture can create the conditions under which sobriety is not just treated, but practiced daily.*

Art, and the Artificial: Reclaiming Architectural Integrity through the Works of John Ruskin

Visual Display #50 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): James Mercer
Research Mentor(s): Ehsan Sheikholharam Mashhadi

The Industrial Revolution precipitated a crisis in the built environment that was as much moral as it was aesthetic. As the hand of the craftsman was replaced by the machine, the traditional definition of architectural "honesty" began to dissolve into a sea of mass-produced facade. This thesis explores the tension between "Art" and the "Artificial," tracing the evolution of architectural integrity from the Victorian reaction against industrialization to its bold reclamation in the Modern era. Historically, this conflict was defined by the 19th-century polemics of A.W.N. Pugin and John Ruskin. Pugin's "True Principles" demanded that a building's design be an honest reflection of its purpose and construction. Ruskin expanded this in The Seven Lamps of Architecture, arguing that the "Lamp of Truth" was extinguished by the deceptive use of machine-made materials. For these thinkers, the "Artificial" was a progenitor of falsehood that stripped architecture of the human spirit found in traditional craftsmanship. However, this research argues that the integrity championed by these Victorian critics was not lost to the machine, but rather liberated by it. By analyzing the philosophies of Le Corbusier and his contemporaries, this paper demonstrates how the 20th-century avant-garde adapted to the mechanization of the construction industry to create a new vernacular of honesty. Rather than viewing the machine as an enemy of the soul, Le Corbusier utilized it to achieve a synthesis of Pugin's structural logic and Ruskin's essentialism. This study concludes that by embracing the industrial reality of their time, Modernists like Le Corbusier and Frank Lloyd Wright did not *succumb to the artificial; they reclaimed architectural integrity by proving that truth in design is found in the clarity of expression, regardless of the tools employed.*

Between Anti-Imperialism: Comparing the Works of Rural Studio and Debates of 19th Century Japan
Visual Display #50 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Satta Dauda
Research Mentor(s): Ehsan Sheikholharam Mashhadi

What if architectural modernization did not require the abandonment of climate intelligence, cultural identity, or material efficiency? Following the Meiji Restoration, Japan's rapid westernization generated a wave of imported masonry and brick construction designed to visually align the nation with Euro-American models of political and technological authority. Yet many of these structures failed within Japan's seismic and humid climatic realities. As William H. Coaldrake argues in Authority and the Japanese, these state-sponsored buildings performed progress through stylistic imitation while discarding indigenous timber traditions that were structurally and environmentally suited to local conditions. This paper examines the architectural consequences of that ideological shift through a comparative analysis of Samuel Mockbee's Rural Studio and the practice of Francis Kéré. Both demonstrate alternative models of low-tech architecture grounded in climate responsiveness, local material ecologies, and participatory construction. Engaging Coaldrake's historical account of Meiji-era importation, this paper argues that Japan's adoption of foreign construction systems functioned less as a performance-driven response to environmental need and more as an instrument of nation-building. Drawing on design-build methodologies and passive environmental systems, this research analyzes how Mockbee's use of salvaged and vernacular materials in the rural American South and Kéré's earthen construction in Burkina Faso challenge dominant narratives of technological progress. Juxtaposed against the material and structural failures of Japan's early modernization, these practices reveal how dependence on unfamiliar technologies and climate-inappropriate materials produced avoidable vulnerabilities. Ultimately, this paper argues that low-tech architectural strategies offer a resilient framework for climate adaptation, cultural continuity, and long-term structural performance—and that Japan's Meiji-era transition might have looked markedly different had its architects drawn from the kind of materially grounded, contextually attuned thinking that Mockbee and Kéré would later exemplify.

Between Heaven and Earth: Emerson's Theology Based on Nature and Opposition to Christian Doctrination
Poster #47 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Alexandra Torres

Research Mentor(s): Ehsan Sheikholharam Mashhadi

What if sustainable architecture is not merely a response to climate change, but a spiritual rebellion against the very mindset that produced it? Ralph Waldo Emerson's transcendental philosophy offers precisely this radical reframing. By rejecting mediated religious authority and institutional Christian doctrine, Emerson locates the divine not in churches or creeds but within nature itself—an immanent "Over-Soul" that permeates all existence. In Self-Reliance, he urges individuals to "trust thyself" and resist imitation, criticizing cultural dependence on inherited forms and foreign models. His critique of imitation extends directly to architecture, where he calls for buildings that respond to climate, soil, and the needs of the people rather than borrowed historical styles. Similarly, in Thoughts on Art, Emerson argues that beauty arises from "fitness" and organic necessity, grounding aesthetics in purpose and the economy of nature rather than ornament. Further, in his essays from The Works of Ralph Waldo Emerson, he describes nature as a living, symbolic expression of spiritual law, asserting that all forms are manifestations of a deeper unity. Read together, these texts position architecture as a moral and spiritual act: building in imitation of industrial excess is to sever oneself from the divine order, while building organically is to participate in it. This paper argues that, viewed through Emerson's transcendentalism, sustainable architecture becomes a form of spiritual resistance to industrial alienation—restoring ecological identity by reuniting self, structure, and sacred nature.

Between Tents and Concrete: Rethinking Refugee Space In Haiti
Poster #8 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Korine Dorval
Research Mentor(s): Ehsan Sheikholharam Mashhadi

Haiti is not an anomaly; it is a case study. Since the 2010 earthquake, displacement has not resolved but compounded, layered beneath successive crises of political instability, gang violence, and natural disaster. As of 2025, 1.4 million people remain without homes, many of them inheriting a life between tents and concrete that was never meant to last this long. Yet responses remain trapped in the logic of emergency. To live between tents and concrete is to exist in suspended uncertainty where children grow up without an address and community forms despite the design, not because of it. These camps were never built for belonging. They ignore the Lakou, the traditional communal compound that has long organized Haitian domestic and social life, replacing culturally rooted space with rows of identical shelters that house bodies but not culture. Through historical and precedent research, including Berthelot's Caribbean Popular Dwelling, Khudi Bari by Marina Tabassum, and Elemental's incremental housing models, alongside case study analysis of IDP (internally displaced people) camps in Haiti, this thesis investigates how vernacular architecture and indigenous spatial logic can inform permanent *resettlement design. From this research a housing prototype was developed drawing from the Ti Kay form, with spatial diagrams informed by the Lakou typology organizing units into a collective, community-centered layout. Between Tents and Concrete: Rethinking Refugee Space in Haiti proposes that refugee settlements do not have to be spaces of pause. When designed with cultural intelligence and incremental permanence in mind, they can become platforms for full, self-determined lives where residents work, build, grow, and belong.*

Build the Transcendence: Peter Zumthor as the Architectural Expression of the Embodiment of Emerson's Philosophy
Poster #27 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Jorge Romero Garmmendia
Research Mentor(s): Ehsan Sheikholharam Mashhadi

Can architecture construct transcendence? In a time when buildings are driven by spectacle and efficiency, the work of Peter Zumthor proposes an alternative: spaces that elevate perception through material and atmosphere. This project examines the relationship between architecture and the transcendental philosophy of Ralph Waldo Emerson, who argued that truth is discovered through direct experience with nature. This research contributes to architectural theory by showing how transcendentalist ideas can be translated into built form. While Emerson expressed transcendence through writing, this study positions architecture as a medium capable of producing similar experiential effects. The methodology consists of a comparative analysis between Emerson's essays and selected works by Zumthor, using textual interpretation alongside spatial analysis of light, material, and site integration. Key themes include perception, materiality, and experiential meaning. The results indicate that Zumthor's architecture creates conditions that parallel Emerson's concept of transcendence by fostering sensory awareness, introspection, and a direct connection to environment. His use of material authenticity and controlled atmospheres allows meaning to be experienced rather than imposed. In conclusion, this study demonstrates that transcendence can be materially constructed through architectural space. By translating Emerson's philosophy into built environments, Zumthor's work reveals architecture's capacity to embody and produce philosophical experience, positioning it as a medium for engaging deeper questions of perception and meaning.

Car as Camera: Reconceptualizing the Blue Ridge Parkway as a Cinematic Experience
Poster #12 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Jacob Gonzalez Brito
Research Mentor(s): Ehsan Sheikholharam Mashhadi

David Lynch's Mulholland Drive opens not with dialogue, but with the road. The camera glides along the ridgeline as Los Angeles unfolds in fragments. Lights flicker below, the basin opens, and the skyline dissolves into haze. The car moves, but the body remains still, watching the city assemble itself through the windshield. The drive feels cinematic not because of its destination, but because of how it frames and reveals. The road edits the landscape into perception. If the road already operates as a cinematic apparatus, how might architecture intensify that condition? In the twentieth century, one typology fused automobile and cinema: the drive-in theater. At its peak, more than 4,000 drive-ins dotted the American landscape; today, fewer than 400 remain. Yet the car persists as an extension of domestic space. The drive-in merged car and screen to construct an event organized through motion and framing. Its decline raises a question: can this convergence be reimagined through movement rather than stasis? This thesis investigates that question through a design-based methodology that treats movement as a generator of architectural form. Focusing on the Blue Ridge Parkway in Little Switzerland, the project employs site mapping, sequential diagramming, and iterative physical and digital modeling to analyze vehicular perception. Cinematic techniques—montage, framing, and parallax—are translated into spatial operations through Bernard Tschumi's superimposition of points, lines, and planes, constructing a layered system of events, circulation, and architectural interventions. The results are a series of spatial sequences and design proposals that reconfigure the drive-in as a distributed system along the parkway. Architecture emerges through movement, transforming the road into an instrument of spatial editing and positioning cinematic logic as a method for designing temporal experience within car-dependent landscapes.

The Civic Suture: Reimagining the Urban Neighborhood Library as a Biophilic Sanctuary for Restoring Human Connection in San Francisco's Tenderloin Neighborhood
Poster #43 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Ahmed Shaker
Research Mentor(s): Robin Puttock

Childhood in the United States (ages 3-14) is increasingly shaped by social disconnection and digital saturation. Environmental pressures, political instability, and the pervasive presence of screens and AI tools are displacing the tactile, imaginative, and relational experiences that once fostered connection and play. Families often occupy the same physical spaces while remaining socially disconnected, reflecting a broader erosion of shared civic life. Public libraries have historically functioned as civic anchors: equitable access points for knowledge, safe gathering spaces, and trusted social infrastructure supporting community well-being. Research shows that libraries already provide resources that contribute to mental health support, social cohesion, and community resilience. Yet their spatial potential as environments that actively restore connection and well-being remains underexplored. This challenge is particularly urgent in San

Francisco's Tenderloin neighborhood, which contains one of the highest concentrations of children in the city yet offers extremely limited access to restorative environments. More than 3,500 children live within approximately 30–50 blocks (~8,400 children per square mile), while only 9.1 acres of open space serve the entire area. Combined with high noise levels, traffic injuries, and visible drug activity, these conditions create an environment of chronic overstimulation for children and families. This research investigates how the urban neighborhood library can be reimagined as a biophilic civic sanctuary that restores human connection and well-being. Using literature review, precedent analysis, and site analysis as a research framework, the project develops a design methodology in which architecture acts as a multi-scalar suture across urban, physical, and social domains. Within this framework, architectural interventions reconnect fragmented urban conditions, regulate sensory experience through biophilic spatial strategies, and foster relational engagement across generations. The resulting proposal explores how a library can evolve beyond its traditional role as a repository of knowledge to become a restorative civic infrastructure: an environment that counters digital saturation and urban stress while supporting imaginative play, community interaction, and intergenerational connection.

Cohabitation as Care: A Campus for Intergenerational Living and Experience of the Elderly and Orphan Children
Virtual Presentation (Microsoft Teams)
Session 2 at 3:00pm – 4:00pm
Undergraduate Student(s): Rachel Ayers
Research Mentor(s): Ehsan Sheikholharam Mashhadi

Fifteen cigarettes per day: research on addiction underlines the severity of social isolation. Statistics show that addiction is proven to be the only way out of loneliness and isolation. There are two groups that are at risk of being affected by this phenomenon: the elderly and the foster children. Architecture, as a spatial and social medium, has the capacity to mend these fractures. This design research explores how architecture can cultivate a sense of belonging and work against isolation through cohabitation of these two seemingly apart social groups. Social science research shows that both groups face alarming levels of loneliness, with studies revealing that nearly seventy percent of older adults and sixty percent of foster youth experience isolation. This paper starts with identifying needs for each group under examination to propose a spatial solution that incorporates their unique needs and emotional ideals. To bridge their distinct needs, this paper draws on the notion of "Third Space," understood as an intermediary zone between separate domains to in the end connect them through architectural spaces. Social connection encompasses the structure, function, and quality of relationships, directly influencing our biological, psychological, and behavioral health. When these bonds weaken, so too does our sense of self and purpose. The overlap presents design opportunities to foster mutual support between two generations; but how can architecture be the solution to this problem? This design proposal *envisions an intergenerational environment as a catalyst for human connection where the elderly may not only gather but also live, sharing daily experiences with the youth. Through intentional spatial programming and combining the wisdom of the elderly with the energy of the young, the project redefines architecture not merely as a building for human activity but as a participatory agent in the cultivation of community and the restoration of human connection.*

Comparative Argument
Poster #4 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Micah Bryant
Research Mentor(s): Ehsan Sheikholharam Mashhadi

Walking Your Own Path: What does it mean for architecture to align with nature faithfully, morally, or experientially? In the nineteenth century, John Ruskin argued that architecture should derive its beauty from a commitment to nature, craftsmanship, and moral integrity, resisting the artificiality of industrial production. He framed nature not just as inspiration but as an ethical guide, laying the groundwork for later discussions on architecture's relationship with the environment. This paper explores how Ruskin's views on nature as a moral and aesthetic authority are reinterpreted in the works of Frank Lloyd Wright and Kengo Kuma. Through a comparative analysis of their architectural philosophies and built forms, we see distinct pathways emerge. Wright extends Ruskin's ideas into his theory of organic architecture, emphasizing harmony, unity, and permanence between buildings and their landscapes. In contrast, Kuma reexamines these principles through a contemporary lens, prioritizing material softness, permeability, and sensory engagement to create architecture that seamlessly integrates with surroundings. Methodologically, this paper employs close readings of Ruskin's texts alongside critical analyses of selected works by Wright and Kuma. It focuses on shared themes of nature, material truth, and the architect's role, while also examining how each figure constructs a unique architectural "path." By comparing Wright's structured integration with the environment to Kuma's fragmented and atmospheric approach, the study highlights both continuity and transformation in the legacy of nineteenth-century thought. Ultimately, this research argues that while Ruskin positions nature as a moral standard and Wright translates this into coherent architectural unity, Kuma expands the conversation by embracing impermanence and sensory experience. This paper demonstrates that "walking your own path" in architecture is not a departure from Ruskin's ideals but an evolution of them—shifting from a strict moral fidelity to nature toward a more fluid and experiential engagement with it.

Demi-Lune
Poster #38 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Mari Sadou

Research Mentor(s): Robin Puttock

Niger is currently facing a severe food crisis worsened by climate extremes, with 80% of its population depending on rain-fed agriculture. The country ranks 19th among those affected by climate change and is the second most vulnerable nation in the world in terms of climate adaptation. It is experiencing rising temperatures and unpredictable rainfall that threaten health and food security, particularly for vulnerable groups such as children and mothers. In 2022 alone, over 4.4 million people required humanitarian assistance due to crop failures caused by drought, with nearly half of the children suffering from stunting. To tackle these challenges, a proposal has been made to establish an educational facility for farmers. This center will provide essential tools and resources to help them adapt to changing conditions. The facility will facilitate knowledge sharing in local languages and will include infrastructure such as a seed bank, research facilities, and community support areas. A strong focus on agricultural adaptation strategies—such as crop diversification and improved irrigation—will help prevent migration, create livelihoods, and enhance food security. The design of the facility will emphasize sustainability, serving as a model for how architecture can respond to climate change while minimizing environmental impact. By analyzing reports, scientific research, and case studies, this initiative aims to provide targeted support to farmers and foster a resilient community in Niger.

Designing for Neurodiversity: Exploring Spatial and Sensory Design Strategies for Elementary Students with ADHD and Autism in Downtown Woodstock
Virtual Presentation (Microsoft Teams)
Session 1 at 12:00pm – 1:00pm
Undergraduate Student(s): Alyssa Fickes
Research Mentor(s): Robin Puttock

This thesis investigates how principles of neuroarchitecture can inform the design of a public elementary school in the Woodstock area for students with ADHD and Autism, with the goal of inclusively supporting diverse learning abilities through spatial, sensory, and environmental design strategies. Many contemporary schools are not designed with neurodiversity in mind, resulting in environments where excessive sensory stimuli can negatively impact focus, emotional regulation, and learning outcomes. This research proposes a learning environment that reduces disruptive stimuli while creating adaptable spaces that support a range of cognitive and sensory needs. Drawing from interdisciplinary research in environmental psychology, neuroscience, and inclusive architecture, the study examines how physical environments influence attention, behavior, and well-being. Students with neurodevelopmental differences often experience sensory input: such as light, sound, texture, and spatial complexity, more intensely, making it essential to design spaces that balance stimulation with opportunities for calm and regulation. The methodology combines several qualitative approaches, including case *studies of architectural precedents, neuro-cross-mapping that links brain wave states to environmental conditions, previous observation studies of classroom behavior, and mood boards that synthesize sensory design principles. The expected outcome is a design framework for a neuroinclusive public elementary school in downtown Woodstock integrating sensory zoning, adaptable classrooms, biophilic elements, and passive environmental systems to support both neurodivergent and neurotypical learners.*

Disdain for the Unauthentic: Ralph Waldo Emerson and John Ruskin Foundational Views on Architecture
Poster #4 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Lana Brown
Research Mentor(s): Ehsan Sheikholharam Mashhadi

It is challenging to precisely define the term authenticity—especially in architecture. Today, the Oxford English Dictionary defines the term as "genuine; not feigned or false...having the stated or reputed origin" with its use beginning in the 14th century. Authenticity—in architecture—emerged in the mid-19th century, when John Ruskin published The Seven Lamps of Architecture (1849), establishing what an integral building should be. In the same century, Ralph Waldo Emerson published "Self-Reliance" (1841), which critiqued the lack of originality in American architecture. This multi-faceted discussion has lasted for centuries, with little mutual consensus, but is it the same for an imitation? Emerson stated that "imitation is suicide"; Ruskin called it a "violation of truth". Yet the bases of their words were rooted in opposing ideals. Emerson spoke on the authenticity of man through self-reliance, while Ruskin spoke on the authenticity of nature, anti-man. This is a comparative analysis of truths, two truths that come from writings that have shaped the modern-day perspectives on man, architecture, and nature. Two truths that share the same origins—a disdain for unauthenticity and an embracement of what's genuine. This paper dissects and aligns the words of these men to present an argument that there is a foundation for authenticity in an imitation, or lack thereof. Using their representative texts, this research argues that Emerson's critique of the Americans' lack of self-reliance can be compared to Ruskin's critiques of Victorian architects' disconnection from moral building. In today's architecture, new technologies continue to blur the guidelines for what is authentic vs an imitation. Returning to the terms' origins through two fundamental figures and articulating them into the morals of architecture will render reliable definitions. After all, a reliable—or authentic—definition is embedded in a place with a reputable origin and a strong truth.

Divergent Forms and Shared Philosophies: The Cause of Architecture
Virtual Presentation (Microsoft Teams)
Session 3 at 4:00pm – 5:00pm
Undergraduate Student(s): Denaesia Robinson

Research Mentor(s): Ehsan Sheikholharam Mashhadi

At first glance, the architecture of Frank Lloyd Wright and Renzo Piano appears to belong to two different worlds: Wright's buildings emerge from the earth with quiet permanence, while Piano's structures seem to hover lightly, defined by glass, steel, and technological precision. Yet both architects share a deeper philosophical pursuit—an architecture that restores harmony between human life and the natural environment. This comparative paper examines Wright's philosophy of organic architecture and simplicity alongside Piano's high-tech yet sustainable approach, arguing that while their exterior forms differ visually and materially, both architects design interiors that orient occupants toward nature, creating environments of harmony, sensory awareness, and ecological responsiveness. Grounded in Wright's seminal text "In the Cause of Architecture," first published in 1908 in Architectural Record, this study situates organic architecture as both a historical and theoretical framework. Wright asserted that "simplicity and repose are qualities that measure the true value of any work of art," emphasizing that architectural beauty emerges through clarity, integrity, and the elimination of meaningless form. His insistence that a building should "appear to grow easily from its site" and "bring out the nature of the materials" reflects a philosophy in which architecture is not imposed upon nature, but developed in continuity with it. Wright's exteriors emphasize horizontality, natural materials, and integration with the landscape, while his interiors foster harmony through spatial openness, natural light, and material authenticity. In contrast, Piano's architecture reinterprets these principles through contemporary technology and sustainable design. His high-tech exteriors express structural lightness and environmental responsiveness rather than grounded permanence. However, internally, Piano similarly prioritizes harmony with nature through transparency, daylight modulation, and ecological performance. Through a thematic analysis of exterior expression, material philosophy, and interior spatial experience, this paper bridges historical and theoretical discourse, demonstrating that organic architecture persists not as a fixed stylistic movement, but as an evolving philosophical approach. Ultimately, this comparison reveals that despite formal differences, both Wright and Piano create architecture that reconnects human experience with the essential rhythms and presence of nature.

DNA of Form
Poster #8 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Connor Blais
Research Mentor(s): Christopher Welty

Form in the built world dictates how we experience space. Throughout the history of architecture, the ways in which we take up space with the creation of physical form has been highly debated. The Modernist movement, gaining traction in the early 20th century, rejected ornamentation in hopes of designing pure and functional forms. The rise of this ideology *throughout the 20th century, and well into the 21st century, has affected the ways in which we organize space, use materials, and how we view architecture as a whole. Today, architectural design focuses solely on creating functional spaces which oftentimes disregards the actual users of these spaces: human beings. Form, in the built world, can be expressed and manipulated through a building's five formal components: enclosure, structure, order, scale, and modular growth behavior. The creation of form can be computationally manipulated and scripted through the creation of a matrix that affects each of these five components differently. By observing how the natural world organizes space, these components can be scripted similarly in grasshopper through processes of parametric generation. By researching how natural systems generate form, the DNA of built form can be coded to resemble the patterns of these phenomena. The goal of this research is to investigate how our built environments can be coded to become more harmonious with our natural environments through the creation of a formal matrix. The outputs produced by this generative framework can be studied to inspire new spatial experiences that better relate to our realities and foster a closer relationship between the built and natural environment.*

The Earthly Gospel: Linking Gaudí and Emerson through Transcendental Architecture
Virtual Presentation (Microsoft Teams)
[Session 3 at 4:00pm – 5:00pm]
Undergraduate Student(s): Drake Kemp
Research Mentor(s): Ehsan Sheikholharam Mashhadi

This paper argues that the organic architecture of Antoni Gaudí can be understood as a built extension of the transcendental philosophy of Ralph Waldo Emerson, in which nature operates as a living scripture revealing divine truth. Situated within the nineteenth-century debates surrounding industrialization, mechanization, and the spiritual consequences of modernity, Emerson's transcendentalism proposed an alternative to both institutional religion and emerging materialist rationalism. For Emerson, the divine was immanent within the natural world, and direct encounter with nature functioned as a form of spiritual revelation. This study contends that Gaudí's architecture materializes this philosophical position. At a moment when architecture was increasingly shaped by industrial production and structural rationalism, Gaudí rejected mechanistic abstraction in favor of organic geometries, biomorphic structures, and integrated craft. In works such as the Sagrada Família, structure behaves like growth, ornament merges with form, and material suggests internal vitality. These strategies enact Emerson's assertion that nature embodies sacred order, transforming architecture into a theological act rather than a technical exercise. By reading Gaudí through an Emersonian lens, the paper reframes organic architecture as transcendental in both theory and form. This transatlantic comparison demonstrates that transcendentalism was not confined to American literary culture but found architectural expression in Gaudí's work. Ultimately, the paper proposes transcendental architecture as an alternative paradigm within modernity—one in which building becomes an earthly gospel, articulating divine immanence through organic form.

Form as Structural Truth: From the Primitive Hut to Modern Expression
Poster #37 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Elvin Rosa
Research Mentor(s): Ehsan Sheikholharam Mashhadi

What if the most radical architectural idea of the 21st century was first sketched beneath a canopy of trees in 1755? At first glance, the serene allegorical engraving that opens Marc-Antoine Laugier's Essai sur l'architecture — a muse gesturing toward a rustic shelter of living columns and branches — seems worlds apart from Santiago Calatrava's soaring, bone-white superstructures. Yet both architects ask the same fundamental question: what is architecture, when stripped to its essence? Augier's Primitive Hut remains one of the Enlightenment's most enduring theoretical provocations. By grounding architectural beauty in structural necessity — columns, entablature, pediment, nothing more — Laugier challenged the ornamental excesses of the Baroque and proposed an architecture of rational, natural honesty. His ideas have since animated debates about authenticity, ornament, and the origins of form that extend far beyond the 19th century into the present. This paper examines the question of structural expression and architectural truth through a comparative analysis of Laugier's theoretical framework and the built work of contemporary architect Santiago Calatrava. Drawing on Laugier's Essai, Charles Eisen's allegorical frontispiece, and Calatrava's own writings on nature, movement, and engineering, this paper interrogates the tension between structural restraint and structural spectacle as competing responses to the same rationalist impulse. This research argues that while Laugier and Calatrava share a foundational conviction — that form must emerge from structure — they diverge dramatically in their conclusions. Where Laugier demands silence, Calatrava demands performance. Together, they reveal that the primitive hut is not a historical artifact but a living theoretical framework, one that continues to provoke architecture's most persistent question: when does structure become beauty, and when does beauty become excess?

Found & Forged: Rediscovering What Was Lost & Reshaping What Will Be
Virtual Presentation (Microsoft Teams)
Session 4 at 3:00pm – 4:00pm
Undergraduate Student(s): Christopher Dennis
Research Mentor(s): Ameen Farooq

This research and design thesis, Found and Forged, explores the adaptive reuse and urban regeneration of the former U.S. Steel Corporation site in Lorain, Ohio; a 650-acre post-industrial landscape along Lake Erie that once defined the city's economic, cultural, and spatial identity. Known historically as the International City, Lorain's steel mills drew successive waves of Eastern and Southern European immigrants whose labor and settlement patterns shaped lasting *urban forms. However, late twentieth-century deindustrialization led to economic decline, population loss, environmental damage, and a fractured relationship between the city and its waterfront. This project views the industrial void not as a burden but as a productive urban framework, contributing to ongoing discussions on adaptive reuse, industrial heritage, and regenerative urbanism (Bullen & Love, 2011; Loures & Panagopoulos, 2007; Storm, 2014). The project is guided by three hypotheses: first, that adaptive reuse of large-scale industrial infrastructure can catalyze economic and cultural revitalization when embedded in a phased, community-oriented strategy; second, that preserving and reinterpreting industrial heritage strengthens collective memory and reinforces identity in post-industrial cities (Rypkema, 2005; Smith, 2006); and third, that ecological restoration integrated with redevelopment enhances long-term resilience and spatial equity in waterfront contexts (Ahern, 2011; Meerow, Newell, & Stults, 2016). These are examined through three research questions: How can industrial morphology transform into mixed-use urban fabric without erasing labor histories? What spatial strategies reconnect fragmented waterfronts to downtown cores? How can phased remediation balance environmental repair with incremental economic growth? Methodologically, the thesis combines archival research, spatial mapping, environmental assessment, precedent study, and design-based research. Design iterations function as analytical tools, aligning with scholarship that positions architectural production as knowledge generation (Cross, 2006; Groat & Wang, 2013). Organized around Memory, Reconnection, and Resilience, the master plan proposes heritage reuse, multimodal reconnection, and flood-mitigating landscapes that prioritize continuity over spectacle.*

From Buildings to Belonging: Regenerative Architectural Framework in Haiti
Poster #30 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Rebeca Ortiz
Research Mentor(s): Ameen Farooq

Using a design-based, systems-oriented methodology, the research combines site-responsive architectural analysis with regenerative agricultural practices suited to resource-constrained contexts. The framework focuses on three interconnected systems: soil regeneration, water management, and energy autonomy. These systems are embedded in spatial organization, material strategies, and programmatic relationships that simultaneously perform environmental functions and encourage social interaction. Agroforestry serves as the primary productive and educational structure, complemented by intensive gardens and small-scale hydroponics to address varying ecological conditions and participation levels. Architectural configurations are evaluated based on their capacity to make ecological processes visible, support shared labor, and promote informal knowledge exchange across productive, educational, and communal spaces. Preliminary findings indicate that participatory ecological design can enhance both environmental performance and social cohesion. Integrating cultivation areas with learning and *civic spaces strengthens collective stewardship, supports intergenerational knowledge transfer, and fosters shared responsibility for land and resources. Climate-responsive strategies and locally sourced materials contribute to cultural continuity, user ownership, and long-term adaptability. By accommodating diverse users and changing environmental conditions, multiple agricultural systems increase resilience. Overall, the research proposes architecture as a regenerative, relational framework capable of mediating between ecological systems and social life, offering a transferable model for resilient and equitable development.*

From Camps to Communities - Re-envisioning Refugee Camps as Coordinated Villages
Poster #47 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Neeya Yahaya
Research Mentor(s): Robin Puttock

Every day, thousands of people are forced to flee their homes driven by war, political conflict, and climate-related disasters. According to UNHCR's Global Trends Report (2024), forced displacement has reached record levels, with the 2023 Sudan conflict alone pushing millions across borders. Climate pressures identified by the Internal Displacement Monitoring Centre (IDMC, 2023) and IOM continue to intensify these movements. Yet despite the growing scale and longevity of displacement, the global response has barely changed. Refugees are still placed in remote, temporary camps intended for short-term crises. In Ethiopia, over 4.6 million refugees remain within this system, living in camps for an average of 17 years, spaces never designed to support long-term wellbeing, community, or opportunity. This thesis argues that the problem is not only the temporariness of camps but the absence of a coordinated spatial system that supports the mental, physical, and social wellbeing of refugees during extended displacement. Centered in Akaki–Kality on the southern edge of Addis Ababa, Ethiopia the project proposes a biophilic, adaptive village model that functions as a transitional support environment not a permanent replacement for resettlement or citizenship. Through integrated program systems housing clusters paired with wellness spaces, learning centers, communal courtyards, and ecological infrastructure the design creates a web of spaces that work together to restore stability, dignity, and agency without trapping refugees in permanence. Ultimately, this thesis reimagines refugee settlements as restorative, interconnected environments that help people heal and rebuild during displacement, while maintaining pathways to urban integration, mobility, and future resettlement.

From Empire to Identity: Japanese Architecture from the Meiji Period to Kuma and Ban
Poster #23 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Jack Huang
Research Mentor(s): Ehsan Sheikholharam Mashhadi

When a nation builds in another civilization's style, whose authority do its buildings ultimately serve? In nineteenth-century Japan, the rapid adoption of Western architectural forms during the Meiji period was not merely aesthetic experimentation but a calculated political strategy shaped by imperial pressure and the desire for international legitimacy. Drawing on Architecture and Authority in Japan by William H. Coaldrake, this paper situates Meiji architecture within broader debates about modernization, sovereignty, and cultural identity, arguing that Western-style government buildings functioned as instruments of state authority as much as symbols of progress. Rather than framing this moment as simple imitation, the paper interprets it as a strategic negotiation in which architecture mediated Japan's position within a global order dominated by Western powers. Through a comparative analysis, the study then turns to contemporary architects Kengo Kuma and Shigeru Ban, whose work reengages this historical legacy by blending modernist principles with traditional materials, craft techniques, and spatial philosophies. By juxtaposing nineteenth-century state architecture with contemporary practices emphasizing timber, paper, and tectonic lightness, the paper examines how themes of authority, authenticity, and hybridity evolve across time. It argues that while Meiji architecture projected power through the visual language of the West, contemporary architects reinterpret that inheritance to redefine national identity on their own terms. Ultimately, this research demonstrates that Japan's architectural modernity is not a linear shift from tradition to Westernization, but an ongoing theoretical and material negotiation in which architecture remains central to constructing and contesting cultural authority.

From God to Grid: Competing Visions of Architectural Truth in the Works of Augustus Pugin and Mies van der Rohe
Poster #14 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Alexa Fajardo-Guzman
Research Mentor(s): Ehsan Sheikholharam Mashhadi

What does it mean for a building to tell the truth? This question sits at the heart of a tension between two of architecture's most influential theorists: Augustus Welby Northmore Pugin and Ludwig Mies van der Rohe. Though separated by nearly a century, both architects championed structural integrity as a foundational value — yet each rooted that commitment in strikingly different philosophical soil. For Pugin, architectural truth was inseparable from moral and religious conviction. In "Contrasts" and "The True Principles of Pointed or Christian Architecture", he argued that Gothic architecture gave physical form to a divinely ordered Christian society. Ornament, material, and construction were not merely aesthetic choices but ethical ones; the decline of Gothic principles reflected, for Pugin, a broader moral collapse brought on by industrialization. Architecture was a mirror of civilization's spiritual health.

Mies offered a very different answer. Rejecting historical revivalism and moral didacticism, his modernism pursued truth through formal reduction and structural legibility. "Less is more" — his enduring aphorism — signals a paradigm in which meaning is found not in symbolic reference but in the honest expression of materials, structure, and space. Where Pugin moralized, Mies rationalized. This paper argues that the shared language of "structural honesty" across both figures conceals a profound philosophical transformation. By placing Pugin and Mies in comparative dialogue, it challenges the assumption that structural integrity is a neutral or timeless value, revealing it instead as historically contingent — shaped by shifting conceptions of morality, rationalism, and modernity. Drawing on close readings of theoretical writings and built works, the paper traces architecture's movement from expressing a transcendent moral order to embodying an autonomous logic of structure and material: an epistemic shift as consequential as any change in style or form.

From Infrastructure to Inclusion: A Framework for Integrating Data Centers into Atlanta's Urban Context
Poster #24 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Connor Johnson
Research Mentor(s): Mine Hashas-Degertekin

Data centers have become one of the most critical building typologies of the 21st century, forming the physical backbone of an increasingly digital society. Atlanta, as one of the fastest-growing data center markets in North America, hosts these facilities across diverse urban, industrial, and residential contexts. Despite their technological importance, data centers are typically isolated from their context and community. Architectural elements, such as blank facades, defensive perimeters, and minimal street-level engagement, divide the communities and limit street engagement. This condition creates an oppressive urban presence, disrupting pedestrian continuity and making a minimal contribution to the public realm. This research investigates two distinct typological contexts of data centers in Atlanta: residential (West End Neighborhood) and Urban (Downtown Atlanta), to understand how their architectural and spatial characteristics shape human experience at the street level. Through building analysis, typological comparison, and formal investigation, this project identifies the shared architectural strategies between these two typologies and then proposes an alternative architectural framework in which data centers can be changed from isolated objects into integrated architecture. By rethinking facade articulation, ground plane activation, programmatic hybrids, and spatial buffers. By proposing a framework for how these buildings can maintain their functional requirements while contributing positively to their urban environments, the project reframes the data center from an isolated object to a visible and participatory component of the community's architectural and social fabric.

In Search of Design Process
Poster #45 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Mario Vaquiz
Research Mentor(s): Christopher Welty

Imagine walking through your hometown, a place where you feel proud to belong and hopeful for its progress. As the city advances, new buildings rise from the ground, yet many are indistinguishable glass boxes. They are efficient and visually neutral, but they do not reflect the resilience of the people or the depth of their culture. They exist, but they do not speak. This thesis begins from that observation. It questions whether contemporary architecture has become detached from meaningful form and investigates whether design process can restore intention to the built environment. Through the comparative study of three distinct formal logics, fluid continuity, container-based form, and systematic computation, the work analyzes the operational strategies of Zaha Hadid, Frank Gehry, and Thom Mayne. Rather than reproducing stylistic outcomes, the research extracts underlying geometric and procedural principles such as radial distribution, tangential fluidity, structural wrapping, fragmentation, grid collisions, and surface manipulation. These logics are translated through diagrammatic studies, computational synthesis, and physical modeling into rule based systems. The purpose of this investigation is to construct a disciplined design methodology capable of generating architectural form through process rather than imitation. By grounding form in extracted logic, the research seeks to produce architecture that is intentional, culturally resonant, and meaningful. The goal is not to create objects that simply occupy space, but to create architecture that speaks.

In Tsira Healing Compounds: Trauma-Informed Architecture for Survivors of Violence in Northern Nigeria
Poster #2 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Ololade Akinyemi
Research Mentor(s): Robin Puttock

Survivors of gender-based violence in Northern Nigeria face compounding barriers to recovery, including ostracization, bereavement, interrupted schooling, and complex reintegration across wide catchment areas. Yet the built environments meant to support them remain largely underexplored and unresponsive. This thesis proposes a trauma-informed, climate-responsive wellness campus for women and children survivors located in Maiduguri, Borno State, in northern Nigeria, grounded in Hausa compound typologies and cultural patterns. The central question asks how trauma-informed and sustainable design strategies can reduce re-traumatization, foster a sense of safety, and support measurable reintegration through self-supportive, educational, and communal spaces, moving architecture beyond shelter toward active *healing. The hypothesis is that culturally grounded, community-integrated environments can achieve this when trauma-informed principles and climate-responsive strategies are applied together. Some key spatial moves include legible compound sequences drawn from Hausa gida typologies, calibrated daylight and acoustic control, and user agency over light, air, and privacy. These are reinforced through biophilic patterns such as refuge and prospect, integrated with shaded courtyards, water systems, and productive gardens. The methodology combines literature review, programmatic studies, and cultural analysis to define what supports healing environments. These findings are translated into spatial strategies and design decisions, then evaluated through adjacency modeling to determine spatial relationships and environmental mapping to assess performance, using WELL Building Standards as a benchmark for health and wellness. The expected outcome is a transferable design framework organized around layered thresholds that pair care with education and livelihood, including counseling, skill training, and gardening. The contribution is both design and method, leading to a set of spatial parameters, a framework for evaluation, and a phased delivery plan, positioning architecture as a catalyst for recovery, dignity, and long-term reintegration.*

Integrating Landscape into Design: Comparing R.W. Emerson, F. L. Wright, and Tadao Ando

Poster #30 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Fernanda Lozoyo
Research Mentor(s): Ehsan Sheikholharam Mashhadi

What if the wall between the built world and the natural world was never meant to exist? In Caspar David Friedrich's Wanderer Above the Sea of Fog (1818), a solitary figure stands not apart from the sublime landscape but consumed by it — dwarfed, electrified, dissolved into something larger than himself. It is a painting about awe. It is also, quietly, an argument about how human beings ought to inhabit the world. Architecture has long wrestled with the relationship between structure and landscape — between the made and the grown, the permanent and the living. Yet the dominant discourse has too often framed this as a problem of placement: where to build, how to site, how to minimize intrusion. Less examined is a deeper and more radical proposition: that nature and architecture are not opposites to be reconciled, but expressions of the same truth, demanding not coexistence but unity. This paper locates that proposition across two centuries and three distinct voices — American transcendentalist Ralph Waldo Emerson, modernist architect Frank Lloyd Wright, and contemporary Japanese architect Tadao Ando — arguing that each, in his own register, arrives at the same conviction: that the experience of truth requires the dissolution of the boundary between the human-made and the natural world. This paper examines the question of nature, materiality, and architectural truth through a comparative analysis of the intellectual and built work of Emerson, Wright, and Ando. It investigates how each thinker moves beyond aesthetics — beyond the picturesque or the *ecological — toward a philosophy in which nature is not backdrop or ornament but the very medium through which authentic human experience becomes possible. In doing so, the paper argues that this lineage constitutes a coherent, if underexamined, theory of architecture: one that insists structure must not merely sit within nature, but speak with it. Methodologically, this paper draws on Emerson's 1841 essay Self-Reliance to establish the transcendentalist foundation — the idea that authentic selfhood is inseparable from attunement to the natural world — and on Wright's 1908 manifesto In the Cause of Architecture to trace how those philosophical convictions became structural principles. Wright's Fallingwater (1935) serves as the primary built case: a house that does not overlook a waterfall but becomes continuous with it, its cantilevered terraces rhyming with the rock ledges below. Ando's Benesse House (1992) in Naoshima, Japan, provides the contemporary counterpoint: a structure of raw concrete that does not contrast with the landscape but amplifies its weight, silence, and light. Friedrich's Wanderer anchors the theoretical opening as an image of the sublime — the moment when human scale meets natural enormity and something essential is revealed. This research argues that Emerson, Wright, and Ando share a unified architectural ethics rooted in the sublime: that the power, awe, and beauty of nature are not experiences to be framed through glass or viewed from a terrace, but forces that architecture must conduct directly into the body of the person who inhabits it. This paper shows that what begins as a 19th-century philosophical proposition in Emerson — that man and nature are not separate — becomes, across Wright and Ando, an increasingly material and spatial practice: a discipline of thresholds dissolved, of structure grown from site, of light and mass arranged so that the building does not interrupt nature but becomes its most attentive witness. To stand at the edge of Fallingwater and hear the creek beneath the floor, or to move through Benesse House into a gallery open to the Seto Inland Sea, is to understand what Friedrich's wanderer already knew: that the most profound human constructions are not those that conquer the landscape, but those that teach us, finally, how to be lost in it.*

Interweaving Cairo's Urban Fabric: The Formal, the Informal and the Contemporary
Oral Presentation (Prillaman Hall, Indoor Plaza)
2:00pm – 2:50pm
Undergraduate Student(s): Hagar Ahmed
Research Mentor(s): Ameen Farooq

Architecture is an ongoing negotiation between memory and change, preservation and erasure. In Cairo, a city layered with history, rapid development increasingly threatens both historic districts and informal settlements. While monumental heritage is institutionally protected, informal urban fabrics are largely excluded from heritage discourse and formal planning frameworks. This research investigates Manshiyat Nasser, widely known as Garbage City, an informal settlement situated between Historic Cairo and the Mokattam plateau. For over fifty years, the Zabbaleen community has developed an integrated waste collection and recycling system that processes up to 80 percent of collected materials, exceeding the performance of many *formally regulated cities. This system operates not only as economic infrastructure but also as cultural heritage, embedding labor, domestic space, and collective identity into a resilient socio-spatial ecology. Drawing on the preservation ethics of Hassan Fathy, the heritage theory of Alois Riegl, and the community-based practices of Megawra, the study reframes informality as adaptive urban intelligence rather than absence of order. Through spatial mapping, ethnographic observation, and design research, it proposes a hybrid framework that integrates formal regulation, informal practice, and contemporary systems without destabilizing existing socio-economic networks. Rather than treating Garbage City as either a relic to freeze or a blight to erase, the research positions it as a living urban organism capable of evolution through context-sensitive architectural and policy interventions. It contributes to debates on heritage, informality, and urban pedagogy by advancing a preservation model grounded in lived practice and spatial agency.*

Keeping Architecture Alive: The Beliefs of Augustus Pugin and Peter Zumthor
Poster #36 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Miguel Rojas
Research Mentor(s): Ehsan Sheikholharam Mashhadi

Throughout the years, architecture has always been admired for how expressive and full of life it is. As technology has advanced and demand has asked for the rapid construction of buildings, architecture is losing this aspect that makes it architecture. Approach a building, and what is the first thing that will be observed? That's right, the form of the building. Architecture is not like a book; people will criticize a building based on its first impression or appearance. This is the argument that Augustus Pugin and Peter Zumthor make about architecture and how its reputation is on the line. Augustus Pugin's belief is that ornamentation of a building should not only be used as aesthetically pleasing, but that it should express structure, function, and belief. He believed that Gothic style was the only true architecture as it followed these three aspects of ornamentation. Peter Zumthor had a similar belief, and his belief included having physical interaction with a building or structure. For Zumthor, in order to experience architecture, one not only had to look at it but also engage with their senses, light, sound, temperature, smell, etc. Zumthor argued that good architecture was alive in a way and that life was felt through experience. Seeing architecture through the views of Pugin and Zumthor, it is evident that modern architecture is gradually losing its life source because it is starting to lack expression, experience, and artistic values. True architecture is a combination of art, structure, functionality, and experience; the lack of one makes the building a structure of space made merely of selected materials.

Lightness Shaped by Stone
Poster #2 (Convocation Center, VyStar Arena)

4:00pm – 4:45pm
Undergraduate Student(s): Jared Arredondo
Research Mentor(s): Christopher Welty

Architectural construction methods, once grounded in the tactile, have largely shifted toward industrial standardization and digital immediacy, often distancing the discipline from material literacy. Among the materials most affected by this shift is stone, once foundational in architectural construction and ornamentation, but now frequently reduced to thin finishing surfaces such as cladding, tile, and flooring. This reduction has limited stone's broader architectural potential, particularly its capacity to perform structurally while retaining its cultural association with craft. Historical stone architecture demonstrates this potential, responding to the material's inherent qualities, such as permanence and compressive strength which shape structural and expressive form. This thesis asks: How might stone be reintroduced structurally into contemporary architecture in ways that challenge its conventional associations with weight and monumentality, while preserving the cultural continuity of craftsmanship within industrialized systems of construction. To address this question, the project examines the structural capacities of stone, particularly its performance in compression, through a series of digital and physical models, structural experiments, and architectural design studies. These investigations explore how stone assemblies can produce forms that appear light, thin, and balanced while remaining structurally stable. The project argues that stone can operate beyond its conventional use as surface finish or monumental mass, producing a contemporary structural language defined by precision, thinness, and compression. Within these systems, carved relief reemerges not as applied ornament, but as an integral relationship between material, structure, and craft. In doing so, the thesis proposes stone as both a structural medium and a cultural artifact through which contemporary architecture can reconcile technological precision with the continued presence of the human hand.

Monumentalism Reinvented: Reading Zaha Hadid's Mega Structures Through Boullée's Architecture Parlante
Virtual Presentation (Microsoft Teams)
Session 2 at 3:00pm – 4:00pm
Undergraduate Student(s): Beni Teganyi
Research Mentor(s): Ehsan Sheikholharam Mashhadi

In the revolutionary climate of the late eighteenth and early nineteenth centuries, architecture was reconceived not as an evolutionary continuation of tradition but as a radical redefinition of its principles. As discussed in course readings, figures such as Étienne-Louis Boullée challenged Vitruvius's triad—utilitas, firmitas, venustas—by redefining architectural beauty as the emotional effect of pure geometric mass and light. Rejecting the notion that architecture was merely "the art of building," Boullée pursued the sublime through abstract spheres and *monumental scale, proposing that form itself could function symbolically. His projects, including the Cenotaph for Newton, exemplify architecture parlante: buildings conceived not simply to serve function, but to express meaning through geometry. Drawing on the theoretical frameworks of John Summerson and Emil Kaufmann, who position Boullée as a precursor to modern abstraction, this paper argues that Zaha Hadid's mega-structures reanimate this revolutionary monumentalism under contemporary technological conditions. Where Boullée sought sublimity through static, symmetrical solids, Hadid achieves a comparable effect through curvature, fragmentation, and spatial dynamism. Her architecture prioritizes immersive spatial experience—what Sigfried Giedion later identifies as a new consciousness of space—over strict functional legibility. Through a comparative analysis of aesthetics, symbolism, and spatial theory, this paper contends that Hadid does not abandon function but subordinates it to experiential intensity, much as Boullée subordinated conventional utility to expressive form. By reading Hadid through Boullée's architecture parlante, this paper argues that monumentalism is not stylistic exaggeration but a theoretical position—one that continually re-emerges when architecture seeks to redefine its own foundations beyond mere construction.*

No Copy Craps: Emersonian Self-Reliance in the Architecture of Frank Lloyd Wright
Virtual Presentation (Microsoft Teams)
Session 4 at 3:00pm – 4:00pm
Undergraduate Student(s): Landon Bryant
Research Mentor(s): Ehsan Sheikholharam Mashhadi

No Copy Craps: Emersonian Self-Reliance in Frank Lloyd Wright's WorksAI USEDAt the turn of the twentieth century, a young architect from Wisconsin declared war on imitation. Frank Lloyd Wright, writing in Architectural Record in 1908, insisted that a building must grow naturally from its site, its materials, and the inner conviction of its designer — not from borrowed European ornament or historical pastiche. Decades earlier, Ralph Waldo Emerson had issued a nearly identical challenge to American intellectual life: "Imitation is suicide," he wrote in Self-Reliance (1841), urging every thinking person to trust the genius stirring within them rather than genuflect before tradition. On the surface, a New England transcendentalist philosopher and a Prairie-style architect seem to share little more than a contempt for conformity. It is only when their ideas are placed in dialogue that Emerson's philosophy reveals itself as the philosophical skeleton beneath Wright's architectural flesh.This paper explores the relationship between Emersonian transcendentalism and Wrightian architectural individualism through a comparative analysis of their shared intellectual commitments. Drawing on Wright's "In the Cause of Architecture" (1908) alongside Emerson's Self-Reliance and "Thoughts on Art" (both 1841), it reads these texts as parallel manifestos. Emerson's conception of art as the expression of an individual soul in harmony with nature provides a theoretical lens through which Wright's organic architecture — buildings emerging from landscape, material, and individual vision rather than stylistic convention — becomes legible as a built *transcendentalism. This research argues that Wright's architectural individualism is not merely a formal innovation but a philosophical one, rooted in the same revolt against imitation that Emerson launched onto the American intellectual scene sixty years prior. Self-reliance, translated from the page to the prairie, becomes architecture.*

The Ornament That Remains: Restraint, Excess, and the Unresolved Logic of Decoration in Art Nouveau and Minimalism
Poster #37 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Nadia Ruvalcaba-De Leon
Research Mentor(s): Ehsan Sheikholharam Mashhadi

What does a building say when it says nothing? When John Pawson strips a room to bare stone and light, or Mies van der Rohe replaces ornament with void, they are making a claim — not just aesthetic, but ethical. A century earlier, Victor Horta was making an equally urgent claim in the opposite direction: that the curling iron tendril climbing a staircase was not decoration but necessity. These two positions have long been treated as opposites. This paper asks whether that opposition is real. Art Nouveau emerged in the 1880s as a rejection of historicism, treating ornament as inseparable from structure — form and decoration unified through natural motifs. Minimalism, crystallizing in the late twentieth century through figures like Pawson and Tadao Ando, pursued the opposite: reduction, material honesty, and deliberate silence. Yet both movements ground their aesthetic in a moral argument about what architecture should be. This paper examines the relationship between Art Nouveau and Minimalism through three thematic lenses — aesthetics and ornamentation (C1), technology and materiality (C2), and ethics and symbolism (C3) — drawing on Riegl's Problems of Style, Loos's Ornament and Crime, and Pawson's Minimum alongside scholarship by Kenneth Frampton and Debora Silverman. This research argues that Minimalism inherits and inverts the ornamental logic of Art Nouveau rather than escaping it. Restraint, in Minimalism, functions as decoration — no less deliberate, no less symbolic. This paper shows that the history of architectural ornament is not a narrative of progressive elimination, but a recurring, unresolved negotiation between presence and absence.

Perception of Mental Illness: Exploring Spatial Impacts on Well-Being
Poster #41 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Dilan Stafin
Research Mentor(s): Robin Puttock

Bipolar disorder is often misunderstood, and its complex sensory and emotional needs are rarely considered in architectural design. Although research demonstrates that the built environment *significantly affects stress, regulation, and healing, these insights are seldom applied to spaces dedicated to mental health awareness. This thesis investigates how architectural thresholds within a mental health awareness museum in Harris County, Texas, can bridge the gap between spaces of experience and spaces of care for everyone, using bipolar disorder as a guiding lens. Reframing thresholds as therapeutic elements, the study draws on trauma theory to examine how transitions between openness and enclosure, stimulation and pause, and exposure and protection can spatially express psychological shifts associated with bipolar disorder (Herman, 1992). Through the careful orchestration of light, materiality, acoustics, and spatial rhythm, the project translates emotional variability into an immersive architectural experience that fosters empathy, reflection, and mental health awareness. Using qualitative and phenomenological methods, including precedent analysis, spatial mapping, and diagrammatic studies, the research develops design strategies that emphasize regulation rather than spectacle. The proposed design positions architecture as an active participant in mental health advocacy, demonstrating how thresholds can function as a language for care, understanding, and collective awareness.*

Port of Being
Poster #5 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Ninnti Crooks
Research Mentor(s): Ameen Farooq

Located in Dakar, Senegal, the West Point fishing port functions through a series of logistical system that are defined by infrastructural decay and no access to the public . This research driven design explores how crucial maritime infrastructure can be repurposed as a civic space that meets survival needs. The project supports the idea that built environments both mirror and influence social awareness, drawing from Maslow's framework of human motivation (Maslow, 1943) and current scholarship on spatial justice, informal urbanism, and humanitarian urbanism (Lefebvre, 1991; Simone, 2004; Roy, 2005; UN-Habitat, 2020). The central hypothesis suggests that adaptive infrastructural frameworks can strengthen social cohesion by spatially mixing production, education, and gathering within a central architectural system. A second hypothesis states that reconfiguring circulation, storage, and market logics through participatory spatial mapping will increase equitable access and civic belonging. The research is produced from two questions: How can infrastructural architecture evolve from a purely logistical tool to a symbolic civic landmark? What spatial relationships between fishermen, vendors and transport logistics can be remapped to reduce separation? Methodologically, the thesis project uses mixed-method approaches, including spatial morphology, stakeholder analysis, and socioeconomic data synthesis. Observational mapping of circulation patterns, vendor clusters, and storage networks is combined with analysis of fishing economies in Dakar to identify inefficiencies and disparities. Design iterations act as research tools, testing scenarios like communal spaces, or market halls. My beginning findings suggest that integrating civic programs into infrastructural frameworks *can reframe ports as inclusive urban anchors rather than exclusive labor zones. Using architecture to combing survival functions with spaces that can transform them into additional opportunities of self development. Ultimately, the research argues that when designed through a holistic hierarchy of human needs, maritime infrastructure can evolve from an instrument of survival into the civic heart of community life.*

Rebel Commons: Reimagining Commoning, Connectivity, and Civic Space Through the Gen-Z Uprisings of 2025
Poster #3 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Corbin Austin
Research Mentor(s): Ameen Farooq

In September 2025, Nepal's Generation Z ignited one of the largest horizontally organized youth uprisings in South Asia, utilizing digital platforms to coordinate mass protests against corruption, unemployment, and inequality. These grievances are intensified by Nepal's mountainous terrain, infrastructural fragmentation, and post-conflict political instability, causing an increase in youth outmigration, which has further weakened civic continuity and institutional trust. Contextually, this research argues that architecture can serve as civic infrastructure and a mediator by creating spaces for participation, transparency, and community. The study draws on theories of spatial production and insurgent citizenship (Holston, 2008; Lefebvre, 1991), collective governance of shared resources (Ostrom, 1990), and the redefinition of public space under digital conditions (Low & Smith, 2006; Stavrides, 2016). Research demonstrates how built environments influence trust, resilience, and collective memory in post-conflict societies (Boano & Astolfo, 2020; Yiftachel, 2020). Building on this scholarship, the thesis positions adaptive reuse of government architecture as a strategy for civic renewal. Located in Kathmandu at Singha Durbar, the symbolic center of federal governance, the project proposes transforming the parliamentary complex into a hybrid civic space. It advances three hypotheses: that adaptive reuse of monumental state buildings into participatory civic infrastructure can lower spatial and psychological barriers between youth and governance; that combining physical public assembly with digital infrastructure can reduce physical and informational gaps in mountainous regions; and that community-designed civic spaces centered on ritual, education, and transparency can build intergenerational trust. Methodologically, the research employs a mixed-methods framework that combines spatial mapping of infrastructural disconnections, policy analysis, precedent studies, and iterative prototyping. Studio-based architectural work operates as inquiry, producing spatial hypotheses tested through modeling and programmatic simulations. Preliminary findings suggest hybrid civic infrastructures rooted in communing practices can redefine state monumentalism as an approachable, co-created public domain, shifting architecture from symbolic authority to participatory engagement.

Reclaiming Civic Space: designing a public space for political engagement
Virtual Presentation (Microsoft Teams)
Session 2 at 3:00pm – 4:00pm
Undergraduate Student(s): Joiya Nguyen
Research Mentor(s): Ehsan Sheikholharam Mashhadi

According to a 2018 survey of the United States, youth represent the loneliest generation in modern history, especially if they are on social media. Despite this knowledge, youth are still using it in place of in-person social relationships from dating to political engagement. The root of this turn to the digital is the lack of adequate public spaces. This project investigates how the built environment can reclaim civic spaces for young people by offering meaningful, in-person alternatives to digital interaction. Drawing on Henri Lefebvre's Right to the City and Anthony Vidler's writing on occupied spaces, alongside an analysis of historical civic precedents, this research maps the recurring failures of past public initiatives and categorizes successful public spaces. This inquiry reveals that successful civic spaces must accommodate a spectrum of social sensibilities from open forums for public debate to intimate settings for private conversation and spaces dedicated to self-directed learning in the public sphere. The methodology was to find four distinct spatial typologies, each facilitating discourse in its own way with a diverse range of participants. These typologies were then tested through central, linear, and radial organizational arrangements, examining how each configuration shapes the voids and social opportunities that emerge between them. Yet space alone is insufficient. Many well-intentioned public spaces fail due to hostile architecture, transactional experiences, and hyper-surveillance, conditions that discourage lingering and suppress open engagement. This project navigates these pitfalls, ensuring that the resulting spaces foster discussion and occupation without invoking fear or exclusion. By juxtaposing these historical typologies and filtering them through the specific needs of today's youth, this results in a new civic space, one oriented around conversation, reclamation, and belonging. Rather than replicating the detachment of online platforms, this project responds directly to a generation's hunger for genuine connection and renewed participation in public life.

Resilient Environments: Investigating the Environmental Design Strategies of Community Centers
Virtual Presentation (Microsoft Teams)
Session 1 at 12:00pm – 1:00pm
Undergraduate Student(s): Styles Jones
Research Mentor(s): Pegah Zamani

As civic anchors, community centers have conventionally functioned prioritizing social engagement, collective identity, and public dialogue. Over the past few decades, designers have redefined this typology to integrate environmental responsibility alongside social function, given *the advancement of sustainable design technologies. This research examines the environmental strategies architects embed within community centers and how these strategies align with community-centered programming. Using a qualitative comparative case study approach, the study analyzes a sample of sustainably designed community centers across the United States, examining their architectural documentation, environmental systems, and spatial organization. Cross-case analysis identifies recurring strategies and characteristics. Findings indicate that resilient community centers consistently employ passive design strategies such as daylighting and natural ventilation, and integrate flexible multipurpose spaces within the architectural framework. By identifying commonalities across case studies, this research underlines the understanding of the community center as an evolving resilient typology, positioned as both advancing environmental stewardship while reinforcing social cohesion and civic values.*

Same Effect, Different Times: Fluidity Expressed Differently in the Work of Zaha Hadid and Frank Lloyd Wright

Virtual Presentation (Microsoft Teams)
Session 1 at 12:00pm – 1:00pm
Undergraduate Student(s): Dina Elemam
Research Mentor(s): Ehsan Sheikholharam Mashhadi

What does it mean for architecture to feel fluid? Is fluidity a matter of movement, of harmony, or of breaking rules? Across different centuries, architects have challenged the rigid traditions of their time in order to create spaces that feel dynamic and alive. This question becomes particularly compelling when comparing a figure rooted in the late nineteenth-century debates on modernity with a contemporary architect working at the turn of the twenty-first century. This paper examines the theme of fluidity through a comparative analysis of Frank Lloyd Wright's "Fallingwater" (1935) and Zaha Hadid's Vitra Fire Station (1993). Situating Wright within the intellectual legacy of nineteenth-century discussions on aesthetics, individuality, and the tension between tradition and modernity, the paper explores how his organic philosophy sought harmony between architecture and nature. In contrast, Hadid's work emerges from late twentieth-century theoretical discourse, emphasizing movement, fragmentation, and spatial tension. Although separated by time, geography, and technological context, both architects rejected conventional architectural language and proposed new spatial experiences. Drawing on excerpts from course readings that address nineteenth-century debates on style, character, and modernity, this paper examines questions of aesthetics, individuality, and the tension between tradition and modernity through a comparative analysis of Frank Lloyd Wright's Fallingwater and Zaha Hadid's Vitra Fire Station. Through close analysis of built form, material strategies, and theoretical positions, the study investigates how each architect redefined architectural fluidity within their cultural and historical frameworks. This research argues that while Wright expressed fluidity through balance, horizontality, and integration with landscape, Hadid articulated it through sharp geometries, dynamic lines, and spatial instability. Ultimately, the *paper shows that fluidity is not a fixed formal quality, but a theoretical position shaped by its historical moment, achieving the same effect through radically different means.*

Silence, Light
Virtual Presentation (Microsoft Teams)
Session 1 at 12:00pm – 1:00pm
Undergraduate Student(s): Chandler Marshall
Research Mentor(s): Robin Puttock

This research investigates how sacred architecture can employ light and silence to create restorative spaces that support human well-being. Contemporary sacred environments often prioritize visual form and symbolism while neglecting the sensory and psychological dimensions that foster reflection, calm, and renewal. This study proposes light and silence as active design agents capable of shaping emotional, physiological, and spiritual balance. Using both qualitative and quantitative methods, the research analyzes precedents such as Tadao Ando's Church of Light, Peter Zumthor's Therme Vals, and Louis Kahn's Salk Institute for their orchestration of light, material, and atmosphere. These qualitative insights are evaluated through measurable frameworks including the WELL Building Standard, the 14 Patterns of Biophilic Design, and neuroscience-based research that connects environmental qualities with cognitive and emotional restoration. By integrating sensory experience with empirical data, the study establishes a dual framework that unites phenomenology and neuroscience. The results aim to demonstrate that when light and silence are designed intentionally, they can transform sacred architecture into environments that promote psychological clarity, circadian balance, and spiritual well-being. Ultimately, this thesis reframes sacred architecture as a multisensory and evidence-based practice, revealing that the orchestration of light and silence can serve as a pathway toward healing, contemplation, and restoration.

Spaces of our Own: Reclaiming Community in Jaipur's Informal Settlements
Poster #7 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Daisy Bhambhani
Research Mentor(s): Robin Puttock

India's rapid urbanization has resulted in fragmented urban fabrics, where women and children remain in vulnerable positions. They face systemic barriers in education, safety, and social participation due to under-resourced environments. Despite the nation's commitments to gender equality and the right to education, slum environments continue to lack adequate infrastructure that supports learning and collective well-being. Architecture has the potential to combat these challenges by creating spaces that promote social inclusivity. While architects and planners have recognized the increasing need for inclusive spaces, most projects do not explore how a built form *itself can create empowerment within marginalized populations. This thesis investigates how multifunctional community centers can be designed to advance empowerment for women and children in Jaipur's Kacchi Basti slum. Through a qualitative research approach, this study integrates precedent analysis, site investigation, and design exploration to examine how architecture can strengthen social connections and community life. Precedents such as women-led schools and community hubs across India and other similar global contexts provide design strategies rooted in community participation and sensitivity to the local environment. The Kacchi Basti serves as a case study to test how adaptable, programmatically flexible spaces can strengthen community inclusion and opportunity. The expected outcome is a design framework for multifunctional community centers that demonstrates how architecture can support empowerment through accessibility, safety, and shared learning. By linking spatial design to social transformation, this research aims to position community architecture to promote gender equality and advance educational opportunity within India's informal settlements.*

Spatial Computing for Sustainable Urban Development: An Analytical Comparison of AR and VR Technologies for Accessible Immersion
Virtual Presentation (Microsoft Teams)
[Session 4 at 3:00pm – 4:00pm]
Undergraduate Student(s): Jayden Gilliard
Research Mentor(s): Pegah Zamani

Spatial computing enables new methods for visualizing and communicating complex environmental and planning data to support sustainable urban development and engage diverse stakeholders. Emerging technologies, particularly within Augmented Reality (AR) and Virtual Reality (VR), offer new opportunities to visualize urban systems, simulate environmental impacts, and support participatory decision-making processes. Conducted as part of a VIP course focused on the application of artificial intelligence in sustainable communities, this research presents an analytical comparison of AR and VR technologies within the Extended Reality (XR) ecosystem. The study evaluates a spectrum of hardware devices, ranging from high-end spatial computing systems such as Microsoft HoloLens 2 to more accessible standalone headsets like Meta Quest and mobile-based AR applications. In parallel, the research examines both specialized planning platforms (including Arkio) and general-purpose development environments such as Unity and Unreal Engine. The findings indicate that while advanced hardware–software ecosystems enable highly immersive and precise spatial simulations suitable for digital twin applications, they often present significant financial and technical barriers that limit accessibility for community organizations and grassroots initiatives. In contrast, mobile-based AR solutions, particularly those supported by WebAR frameworks, offer a scalable and cost-effective approach for broader public engagement. The study concludes that a software-first, hardware-agnostic approach can help expand the accessibility of spatial computing technologies in sustainable urban development. By aligning sustainability goals with appropriate tiers of *immersive technology, this research proposes a practical framework for planners, researchers, and nonprofit organizations seeking to integrate XR tools into community-centered urban planning.*

Sustainable Building Materials: Architectural Forms and Structural Design
Oral Presentation (Prillaman Hall, Indoor Plaza)
2:00pm – 2:50pm
Undergraduate Student(s): Brody Daniels, Laura Puerta, & Alejandro Vega Cardona
Research Mentor(s): Giovanni Loreto

Concrete is the most widely used construction material in the world today and accounts for 8-9% of anthropogenic greenhouse gas emissions globally. Structural members made from concrete are commonly precast into rigid frames that form prismatic shapes. While effective, there is material waste that leads to increased costs and CO2 emissions. Recent literature on fabric formwork indicates that optimized, organic members created can potentially reduce material usage and gas emissions, while maintaining structural integrity. However, research on optimizing these shapes for structural performance, as well as production methods and implementation of these methods in the industry, remain limited. Our study endeavors to bridge this gap by designing and testing fabric-formed concrete members with the goal of optimizing material usage and maintaining or surpassing industry standards of structural performance of modern prismatic members, while guaranteeing ease of production. Our research is focused on sustainability by finding optimized shapes for production that are easily re-creatable with limited resources to make it attractive and easily adoptable by the construction industry. Current tests also focus on the material properties of a variety of fabrics to determine which is most suitable for the fabric formwork, as well as potentially acting as external reinforcement for precast members. Results from testing indicate that fabric-formed beams exhibit comparable strengths relative to conventional prismatic beams cast in rigid formwork. 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.

Tensile Characterization of Fabrics for Flexible Formwork in Reinforced Concrete Casting
Poster #42 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Jocelon Smith, Grant Gibbs, & Rianne Delos Santos
Research Mentor(s): Giovanni Loreto

This research ultimately encourages innovation across architecture, engineering and construction disciplines. The purpose of this study is to explore the attributes of alternative formwork materials, testing architectural forms for strength, durability, and sustainability in concrete beam casting. Fabric formwork has emerged as a viable alternative to rigid molds for the production of reinforced concrete members, enabling geometries that respond more directly to structural demand and material efficiency objectives. The performance of these systems, however, is governed by the mechanical behavior of the fabric during casting, where tensile capacity and deformation under load directly influence the resulting member geometry. This study investigates the tensile response of three candidate fabrics intended for use in flexible formwork applications. Controlled uniaxial tests are conducted to establish stress–strain relationships, stiffness characteristics, and ultimate tensile capacity, with the goal to generate reliable input parameters for predictive models of cross-sectional shape evolution in fabric-formed beams. In parallel, the experimental program examines the influence of gripping mechanisms and coupon tab configurations on measurement accuracy and repeatability. Variations in tab material and system are investigated to minimize boundary effects and ensure consistent strain readings across specimens. Guided by ASTM D882-18 and ASTM D3822/D3822M-14 standards, three material variations, classified as soft, intermediate, and stiff, are evaluated. Two specimens per material are tested, one with cardboard grips, glued to the materials by epoxy gorilla glue, and one without, resulting in six total specimens. Going off the ASTM material testing guide, each coupon will be 16" by 4", with 4" x 4" each cardboard grips, and 8" free fabric. Experimental considerations include accurately determining specimen thickness for modulus of elasticity calculations, and designing grips to prevent slippage in hydraulic tensile machines, increasing frictional resistance to obtain reliable force-displacement data. The results show how the tensile tests and the test protocols can be included in the design of flexible formwork.

Truth in Materials: From Ruskin's Critique of Industrialization to Kuma's Phenomenological Practice

Visual Display #51 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Laura Puerta
Research Mentor(s): Ehsan Sheikholharam Mashhadi

Can a building possess a soul, or is it merely a sum of its industrial parts? In the 19th century, John Ruskin argued that "honesty" in material reflected society's moral health. Today, amid digital fabrication, the quest for "truth" has shifted from morality to the senses. The 19th-century transition from handicraft to mass production triggered an architectural crisis of authenticity. Ruskin's The Seven Lamps of Architecture championed the "Lamp of Truth" against industrial deception. Conversely, Kengo Kuma revives craft to reconnect the human body with its environment through Japanese tradition and phenomenology. This paper investigates the evolution of "truth in materials" by interrogating the work of Ruskin and

Kuma. It examines how both position craft as resistance against architectural homogenization. Through comparative analysis, this research argues that while both converge on the importance of materiality, their motivations diverge: Ruskin seeks an ethical doctrine to save the worker's soul, whereas Kuma utilizes material to curate sensory experience. Drawing on "The Lamp of Truth" and Kuma's "small architecture," this study juxtaposes Victorian ethics with contemporary practice. It utilizes course themes of Technology/Craft and Ethics/Symbolism to bridge this historical gap. Ultimately, the research shows that "Truth in Materials" is a recurring defense against technological alienation. While Ruskin's resistance was a socio-religious critique, Kuma translates those anxieties into a phenomenological tool, proving that the honesty of craft remains essential to humanizing the built world.

Turning Waste into Architecture: Sustainable Design with 3D Printing
Oral Presentation (Prillaman Hall, Indoor Plaza)
2:00pm – 2:50pm
Undergraduate Student(s): Darius Ebihara, Tristan Alvin, Kara Gladden, & Violet Schultz
Research Mentor(s): Jeffrey Collins

This project explores how waste materials can be reused as architectural resources through additive manufacturing and hands-on experimentation. The research focuses on creating and testing extrusion-based material mixes made primarily from sawdust – a common byproduct of woodworking – combined with different binders and additives. The goal is to understand how reclaimed materials can be transformed into printable building components, and how small-scale testing can guide larger-scale fabrication. Over the semester, the research team tested over 100 different material recipes. Each recipe was evaluated using a consistent set of tests designed to reveal key material behaviors. Small, flat "pucks" were used to observe drying, shrinkage, and cracking. Six-inch extrusion beads, made using piping bags, were used to study flow, smoothness, and slumping. To test vertical performance, small coil pots were constructed, allowing students to analyze how each mix responded to gravity, layer adhesion, and structural stability. The research was organized in phases. First, different binders – joint compound, flour paste, methylcellulose, and liquid rubber – were tested. Next, additives such as vegetable glycerin, linseed oil, and sand were introduced to adjust flexibility, strength, or texture. All materials were measured by volume to keep the process accessible and repeatable. Based on documented results, the mixes were ranked and narrowed down to the most promising recipes. In the final phase, these top mixes will be prepared in larger batches and tested on a clay 3D printer. This step is expected to reveal new challenges related to continuous extrusion, drying time, and structural failure that are not visible at smaller scales. This project demonstrates how discarded materials can be reimagined as valuable design resources. By combining material reuse, experimentation, and digital fabrication, the work shows how students can meaningfully contribute to research focused on sustainable construction and additive manufacturing.

UNVEILING WALLS: Developing Trauma-Informed Spatial Strategies to Support Survivors of Sexual Assault in Their Everyday Campus Experience
Poster #1 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Olivia Aratea
Research Mentor(s): Robin Puttock

I chose this topic because sexual assault is far more common than many people realize. In the United States, 4 in 5 women and 2 in 5 men have experience sexual assault at some point in their lives, and college-aged women are three times more likely to be affected than the general population. That means that on any campus—including ours—many students are quietly carrying trauma while still trying to learn, socialize, and succeed. The main question of thesis is: How can Trauma-Informed Design principles be integrated into KSU's Marietta Campus to promote psychological safety, emotional resilience, and reduce trauma triggers for survivors of sexual assault? This question matters because students who have experienced trauma experience the world very differently. For a typical student, a crowded hallway or a dim room might feel stressful but manageable. But for survivors dealing with anxiety, depression, or PTSD, those same spaces can feel threatening. Trauma keeps the body in a constant fight-or-flight state, meaning that survivors react to their environments with a much higher intensity. Loud sounds, harsh lighting, blind corners, or windowless rooms can trigger panic, hypervigilance, or emotional shutdown. So, while most students feel "normal" stress, survivors of sexual assault experience that stress on a much more intense level. In my research so far, I have examined how the built environment contributes to those reactions by combining three design systems: The first being Trauma-Informed Design (TiD). TiD is a framework that looks at how spaces can reduce trauma triggers and support emotional well-being.it is layered system that consist of 4 assumptions explain why trauma matters, 6 principles that explain what values should guide our choices, then 3 spheres show where those choices should be applied, and then 11 domains outline how they become real spatial strategies. My research uses this structure to explore how the campus environment can better support students and reduce environmental triggers. The second design system is the WELL Building Standard, which is a physical health-focused building framework that looks at how the environment influences physical, mental, and emotional well-being. Categories such as Light, Movement, Mind, and Community each address different aspects of how people experience space, from access to daylight and lighting quality to circulation, activity, stress reduction, and social connection. These categories work together to show how environmental conditions shape our nervous system and overall comfort. In my research, I have begun to use the WELL Building Standard as a way to evaluate the campus through a measurable environmental lens. This has helped me understand where the campus supports well-being and where it may unintentionally contribute to stress. The third design system is Biophilic Design Patterns. Biophilic Design focuses on how connecting people with *nature supports emotional regulation, reduces stress, and improves overall well-being. The patterns I have focused on are visual connections to nature, dynamic and diffuse light, the concept of prospect, and refuge. These describe specific environmental qualities that help people feel calmer, more grounded, and more in control. In my research, I have used Biophilic Design to start to identify where the campus could offer more opportunities for grounding and restoration. This has helped start to reveal how nature-based design strategies can support students' emotional well-being, especially for those who experience heightened responses due to trauma. Combined, these three design systems have created a lens in which to study KSU's Marietta Campus to identify where students feel exposed, where sightlines are blocked, where lighting is harsh, and where circulation increases stress or hypervigilance. In addition to the beginning of identifying opportunities where thoughtful design could provide refuge, clarity, or grounding. Ultimately, my thesis argues that architecture can unintentionally deepen trauma, but it can also intentionally support healing. Survivors deserve more than awareness—they deserve environments that help restore trust, dignity, and peace of mind. And while this research is centered on survivors of sexual assault, these design strategies benefit everyone. A campus that is calmer, clearer, safer, and more supportive improves the day-to-day experience for all students during the pressures of college life. Trauma-informed, biophilic, and wellness-based design creates a more sustainable and human-centered future for higher education, a future that recognizes that students are individuals with different life journeys, and that the environment should help them succeed, not stand in their way.*

Where Light Becomes Truth
Poster #11 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Xitlaly Garcia
Research Mentor(s): Ehsan Sheikholharam Mashhadi

In The Seven Lamps of Architecture (1849), John Ruskin's Lamp of Truth condemns three architectural deceits: misrepresenting structural systems, disguising materials through surface treatment, and substituting machine-made ornament for honest craft. For Ruskin, these failures are not aesthetic but moral; a building that lies about how it stands or what it is made of corrupts the relationship between architecture and civilization. Truth demands that structure be visible, that materials declare themselves, and that every surface reflect the integrity of its making. Deception, however refined, was for Ruskin an ethical collapse that no formal beauty could justify. Tadao Ando's architecture meets this standard with striking directness. His board-formed concrete bears the imprint of its formwork, exposes every joint and tie-hole, and refuses all applied finish. Structure and surface are inseparable. At the Church of the Light (1989, Osaka), walls do not merely enclose space; they openly declare their weight, density, and casting logic. Light, admitted through geometric cuts in the concrete mass, does not decorate the surface but reveals it, making the material's honesty the building's primary spatial and spiritual *experience. In an era defined by architectural spectacle and surface illusion, Ando's work is a sustained act of material transparency. This paper argues that Ando constitutes an unexpected fulfillment of Ruskin's Lamp of Truth; not through Gothic craft, but through an industrial material handled with a discipline and transparency Ruskin's framework demands. The comparison reframes Ruskin's argument: if Truth is the ethical core, then the material is secondary to the honesty with which it is employed. Ando proves that Ruskin's moral standard is not a Victorian artifact but an enduring architectural imperative, one that survives the loss of style, religion, and ornament, and speaks most clearly in a concrete wall with nothing left to hide.*

Wired Differently, Designed Accordingly: Bridging the Beltline to Neurodivergent Creative Experiences
Virtual Presentation (Microsoft Teams)
Session 3 at 4:00pm – 5:00pm
Undergraduate Student(s): Lillie Palmer
Research Mentor(s): Ehsan Sheikholharam Mashhadi

Neurodiversity reflects the natural variation in how brains process information, experience stimuli, and engage with the world. Yet contemporary cities remain largely structured around visual order and efficiency, neglecting the full sensory spectrum through which space is truly felt. For the 15–20% of the global population who are neurodivergent, noise, circulation patterns, materiality, and unpredictability significantly shape their ability to regulate and participate in public life. Despite growing advocacy for neuroinclusive design, sensory-informed strategies remain optional rather than embedded in architectural practice — particularly in the United States, where no formal guidelines currently exist. This thesis proposes a community-centered creative hub situated along Atlanta's Beltline, bridging the open parking lot across from the Ford Factory building back into the city's connective landscape. The building repositions architecture as both a sensory regulator and an instrument of creative expression, embedding neurodivergent design principles from the earliest stages of the design process. Programmatically, the hub integrates studios for art, dance, music, and design alongside a gallery, auditorium, café, and sensory garden. Circulation is intentionally legible, transitional zones soften thresholds between high and low stimulation, and reset spaces offer moments of pause and restoration. The project's conceptual approach draws from neurodivergent design research alongside Art is Art: A Collaboration with Neurodiverse Artists, from which three selected works were studied as spatial cues — translating emotion and artistic language directly into architectural strategy. Rather than treating neurodivergence as a condition requiring accommodation, this research reframes sensory responsiveness as a generative force — one that fosters belonging, regulation, and creative autonomy for all. A city not only seen, but deeply felt.

Working With the Divine: The Connection of Nature with Humanism and Spirituality, as told by Emerson, Gaudi, and Senosiain

Poster #40 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Dianne Salica
Research Mentor(s): Ehsan Sheikholharam Mashhadi

This paper argues that nature functions as a spiritual and humanistic mediator in the writings of Ralph Waldo Emerson and the architecture of Antoni Gaudí and Javier Senosiain. In "Self-Reliance" and "Nature", Emerson defines nature as a "universal being," dissolving the boundary between the individual and the cosmos. For Emerson, immersion in the natural world is not escapism but spiritual alignment: the self becomes most authentic when it recognizes its continuity with divine creation. This transcendental framework positions nature as both moral guide and metaphysical structure. Gaudí and Senosiain translate this philosophy into built form. In Casa Batlló and Sagrada Família, Gaudí employs biomimicry—branching columns, catenary arches, skeletal facades—to materialize sacred geometry and emulate organic growth. Structure becomes theology; ornament becomes ecology. Likewise, Senosiain's Casa Orgánica embeds domestic life within the terrain, using earth-sheltered forms and curvilinear spaces that echo shells and womb-like enclosures. His architecture re-centers the human body within a living landscape. Across these figures, nature is neither backdrop nor resource but collaborator. Their shared philosophy proposes that design must work with, rather than against, natural systems—embracing biomorphic form, material honesty, and spatial continuity with the environment. Ultimately, this study positions their work as a unified argument: that reconnecting architecture to nature is both a spiritual imperative and a humanistic necessity.

College of Computing and Software Engineering

Data Science & Analytics

Beyond the Baseline: A Comparative Analysis of Vision-Language Models and ResNet50 for Few-Shot and Full-Data Cancer Classification
Poster #34 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Alex Rojas, Sagar Patil, & Alayna Zafar
Research Mentor(s): Muhammad Imran

Accurate classification of medical images is a critical task in oncology, but it often relies on large, manually annotated datasets. While deep learning models like ResNet50 are the standard, they traditionally require this "big data." This research investigates the performance of Vision-Language Models (VLMs) as a powerful alternative, particularly in data-scarce scenarios. We conducted a rigorous comparative study of a fine-tuned ResNet50 baseline against a VLM (CLIP) on two distinct medical imaging modalities: a binary breast cancer histopathology dataset and the 7-class HAM10000 dermatoscopy (skin cancer) dataset. We evaluated both architectures across three paradigms: (1) zero-shot classification (VLM only), (2) 10-shot learning, and (3) full-dataset training, measuring accuracy, weighted F1-Score, and AUC-ROC. Our results reveal a nuanced performance landscape. In the zero-shot setting, the VLM's performance was modality-dependent: it failed on abstract histopathology images (0.41 AUC) but demonstrated baseline capability on photo-like skin lesions (0.62 AUC). The few-shot (10-shot) comparison yielded a critical finding: ResNet50 outperformed the VLM on the abstract histopathology data (0.706 vs. 0.648 F1-Score), while the VLM outperformed ResNet50 on the "real-world" photo dataset (0.558 vs. 0.518 F1-Score). Most significantly, in the full-data setting, a VLM linear probe (training only a final classifier head) consistently outperformed the fully fine-tuned ResNet50 on both datasets, achieving a higher AUC-ROC on both breast (0.940 vs. 0.931) and skin (0.944 vs. 0.917) cancer. This study demonstrates that the pre-trained feature space of VLMs is exceptionally robust, capable of outperforming traditional CNNs even with significantly less training. Furthermore, our findings suggest the optimal few-shot learner is data-dependent: ResNet50's ImageNet features may be superior for abstract patterns, while a VLM's web-scale features are more effective for photo-realistic medical images.

Generalization of AI Fake News Detection Across Prompting Styles
Poster #47 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Aya Vera-Jimenez, Sam Jaeger, Calvin Ibenye
Research Mentor(s): Dhrubajyoti Ghosh

AI-generated fake news can be produced under a wide range of prompting strategies, yet most detection models are trained under a single generation setting, raising concerns about their ability to generalize across unseen prompting styles. This study investigates whether machine learning models trained on AI-generated fake news produced using one prompting strategy maintain reliable detection performance when tested on AI-generated fake news produced under different, previously unseen prompts. Using real news, human-written fake news, and AI-generated fake news, detection models are trained under a fixed training prompt and evaluated under cross-prompt testing conditions. A structured feature representation capturing document length measures, sentence structure, lexical diversity, punctuation and capitalization usage, standard readability indices, and fine-grained sentiment and emotion scores is used for model training and evaluation. Multiple classifiers, including logistic regression, random forest, support vector machines, extreme gradient boosting, and a deep neural network, are evaluated under this cross-prompt generalization setting. Model performance is assessed using accuracy, area under the receiver operating characteristic curve, and precision–recall analysis, and performance degradation between within-prompt and cross-prompt testing is used to quantify generalization failure. This study evaluates whether detection performance changes when models are applied to AI-generated fake news produced under unseen prompting strategies and examines the extent of prompt sensitivity and potential distributional shift. This analysis informs the robustness of detection systems trained under limited generation conditions and supports the development of prompt-robust misinformation detection models that can better adapt to evolving AI generation behaviors.

Human–AI Interaction in Mental Health Contexts: Exploring Expert and Non-Expert Applications and Challenges

Poster #26 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Jaden Nelson & Sarah Wimpy
Research Mentor(s): Amir Karami

Mental health is an integral part of a person's well-being that affects how a person thinks, feels, and behaves. Despite its importance, modern society has dealt with a rapid rise in anxiety, depression, and other stress-related disorders, especially among adolescents and teenagers. The need for accurate information and resources has been paramount as experts have sought to expand mental health education and support systems. But a lack of accessibility and affordability in traditional treatment methods has pushed those in need to explore new alternatives, such as Generative AI (GenAI). Its speed in processing and generating information in human-like manners has made it an approachable medium for people to vent their immediate issues. With this technology emerging as a mental health support system, some researchers have already studied how GenAI operates in mental health, such as when acting as a therapist or as a patient.

However, a deep understanding of how people use GenAI in mental health has yet to be firmly established. Our study aimed to identify the use of GenAI in matters related to mental health. Through textual analysis of chatbot data and research reports, we introduce expert use in clinical contexts and non-expert use in personal contexts, its effectiveness and limitations across both spectra, the perceptions around it, and its ethical implications to better understand how and why people choose to use it as a method of support. Additionally, we collected and coded prompts that consisted of many diverse contexts. There were academic-related prompts related to mental health, like identifying the most relevant therapy treatment for patients, and personal prompts related to well-being, such as identifying a mood stabilizer. The results could be used by researchers, policymakers, and practitioners.

Pushing Artificial Intelligence (AI) to Its Limits: Developing Red Teaming and Adversarial Prompting Methods
Oral Presentation (Prillaman Hall, Indoor Plaza)
12:00pm – 12:50pm
Undergraduate Student(s): Iyanu Dabiri
Research Mentor(s): Kevin Gittner & Lauren Matheny

Red teaming is a structured attempt to test generative artificial intelligence (genAI) models to uncover certain weaknesses, pushing models beyond their expected behaviors. Adversarial prompting, a specific red teaming technique, is defined as inputting prompts to expose vulnerabilities in genAI, leading to unexpected or misinformative outputs. Together, these techniques help identify and differentiate AI-generated content from human-generated content. The goal was to develop and evaluate successful red teaming adversarial prompting methods with multimodal genAI using single-request prompt engineering techniques to assess their consistency and effectiveness. Seven genAI models (ChatGPT, Grok, Gemini, DeepSeek, Copilot, Llama, Claude) were evaluated using diverse linguistic, Unicode and special characters, programmatic simulations, visual recognition tasks, and multimodal prompts, to discover unexpected outputs when exposed to adversarial conditions. Successful methods were compared across all models using identical prompting techniques to assess cross-model consistency, with reassessment utilizing most up-to-date GenAI models nine months later. Red teaming adversarial prompts produced consistent patterns across models, including incorrect translations, non-sustained repetitions, unreliable interpretation of visuals, error-terminated outputs, issues counting, and unreliable performance with compound single-step prompts, though not all models failed in every approach. However, all seven models (100%) consistently failed Ishihara color vision tests (Pass/Fail) and incorrectly interpreted images when modified, reformatted, or hand-drawn. All models (100%) correctly interpreted factual requests within compound single-step prompts and saw improved repetition-based output consistency up to each model's repetition tolerance limits. Red teaming adversarial prompt performance was mixed, with some methods maintaining consistency, while others' effectiveness declined as new model *versions were released during the study. As genAI continues to evolve, our methods must be regularly reassessed and refined. Successful prompting approaches can be applied to distinguish AI-generated content from human-generated content. Our findings support researchers, educators, and everyday users to effectively assess genAI content authenticity and reliability.*

Computer Science

Al-Assisted Inverse Design of Magnetic Nanoparticles for Cancer Thermal Therapy

Poster #40 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Chanell Scott
Research Mentor(s): Asahi Tomitaka

Magnetic nanoparticles (MNPs) are pivotal in advancing cancer thermal therapy because they generate localized heat (magnetic hyperthermia) when exposed to alternating magnetic fields. While MNPs show great promise for non-invasive tumor removal, systematic optimization challenges hinder clinical application. Bridging the gap between theoretical nanoparticle design and complex biological performance remains difficult. This research employs Conditional Generative Adversarial Networks (cGANs) to accelerate clinical application through an inverse approach. By inputting a target heating efficiency, measured as the Specific Absorption Rate (SAR), the AI model is trained to determine the precise physical dimensions and experimental parameters required to achieve that target. This particular model was trained on a magnetic hyperthermia dataset that focused on four key physical properties: diameter, concentration, field frequency, and field amplitude. Data preprocessing included one-hot encoding for categorical variables, quantile binning for SAR values, and MinMax scaling for numerical stability. Mode-seeking loss and Gaussian noise were implemented to ensure robust data generation and prevent mode collapse. These refinements, combined with an expanded latent dimension of 64 and a training time of 3,000 epochs, enable the generator to produce a diverse, physically accurate distribution of nanoparticle designs optimized for high-efficiency thermal therapy. The refined cGAN successfully generated a diverse range of nanoparticle configurations, thereby solving previous identical outputs. To validate these designs, a random forest model was used to predict heating efficiency from the generated descriptors. This validation model achieved an R2 value of approximately 0.87. Using this estimation model to verify the cGAN's designs confirmed that the AI accurately suggests new combinations of size and frequency that meet specified clinical SAR targets. By demonstrating a high correlation between generated designs and validated performance, this study establishes AI-assisted inverse design as a viable way to bridge the gap between theoretical nanoparticle optimization and personalized cancer treatments.

Blackbox Adversarial Attacks on Remote Sensing Applications

Poster #38 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Sanjay Ravikumar
Research Mentor(s): Kazi Aminul Islam

Deep learning models deployed in remote sensing applications remain highly vulnerable to adversarial perturbations, particularly in black-box settings where gradient access is restricted. In our prior work, we demonstrated that transfer-based attacks using iterative FGSM (I-FGSM) on surrogate ensemble models significantly degrade the performance of unseen target models. In this work, we extend that study by systematically evaluating black-box attack strategies under a stronger optimization based framework. We first establish a transfer-based ensemble I-FGSM attack as the baseline black-box threat model, leveraging surrogate architectures (ResNet-18, VGG-16, MobileNet, EfficientNet) to craft perturbations transferable to a target ResNet-50 model trained on the UC Merced Land Use dataset. While transfer attacks exploit cross model generalization, their effectiveness remains constrained by surrogate similarity and gradient alignment. To overcome these limitations, we introduce ZO-AdaMM (Zeroth-Order Adaptive Momentum Method) as a gradient-free black-box optimization attack. Unlike transfer only methods, ZO-AdaMM estimates gradients directly from model output queries using adaptive momentum and coordinate wise normalization, enabling stronger convergence in strictly black-box scenarios. Building on the theoretical guarantees of ZO-AdaMM, we adapt the method to remote sensing classification and compare it against transfer-based baselines under identical ℓ_∞ perturbation constraints. This work provides the first comparative analysis of transfer based and adaptive zeroth-order black-box attacks in remote sensing pipelines, offering deeper insights into realistic adversarial threat models and robustness evaluation.

Building a Safe and Robust Multimodal LLM Using Dual-Differential Privacy
Poster #1 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Dawit Abosse & Juan Castro
Research Mentor(s): Xu Honghui

The rapid deployment of multimodal large language models (MLLMs) in privacy-sensitive sectors has introduced significant risks, as traditional fine-tuning often exposes sensitive user data to membership inference attacks. While standard differential privacy (DP) techniques typically protect isolated model components—such as input embeddings or gradient updates—they often fail to provide end-to-end security across the multimodal pipeline. This project implements a novel Dual-Differential Privacy (Dual-DP) framework designed to provide comprehensive protection by injecting calibrated Gaussian noise into both the modality-specific embedding spaces and the low-rank adaptation (LoRA) layers. This dual-level approach not only secures the model against data leakage but also acts as a regularizer, promoting input-space *smoothness and guiding the model toward flatter regions of the loss surface for improved robustness. For this study, the MiniGPT-4 architecture was successfully reproduced and deployed on a high-performance DGX server environment, utilizing a 13-billion-parameter Vicuna backbone aligned with a vision-language projection layer. Experimental results demonstrate that the Dual-DP framework effectively balances the trade-off between privacy and utility, achieving stable performance across various benchmarks while significantly reducing sensitivity to data perturbations compared to single-level DP baselines. This work establishes a scalable and provable methodology for the secure adaptation of large-scale multimodal systems in environments where data confidentiality is paramount.*

Epistemic Security in Financial Cyber-Physical Systems: From Regime Detection to Adversarial Resilience via Causal Verification

Oral Presentation (Prillaman Hall, Indoor Plaza)
12:00pm – 12:50pm
Graduate Student(s): Christopher Regan
Research Mentor(s): Ying Xie

Modern electronic financial markets function as cyber-physical systems where algorithmic infrastructure tightly couples with physical consequences including liquidity shocks, volatility cascades, and systemic instability. This research develops an epistemic security framework for financial cyber-physical systems, progressing from latent state detection through adversarial defense to causal verification across five interrelated studies. Preliminary research establishes that large language models can detect persistent dealer gamma regimes — aggregate positioning states that shape market stability — through structural reasoning about constrained hedging behavior. A temporal obfuscation methodology removes all dates, symbols, and temporal context before analysis, preventing memorization and requiring genuine structural reasoning. Validation across 2,221 evaluations spanning 2020–2025 demonstrates detection rates track zero-days-to-expiration options adoption: 12.1% in 2020 rising to 100% in 2024, with 0% false positives on negative controls. This research further develops heterophilic graph neural networks to detect adversarial actors who fragment manipulation campaigns across venues and accounts to evade surveillance, structurally analogous to distributed denial-of-service attacks. Preliminary results demonstrate GNN architectures achieve AUC 0.9999 where sequence models reach 0.9437, with the gap widening to 15.9 percentage points at production scale. Calibrated models achieve 2.4% false positive rates on out-of-distribution data and 5.2% on real cross-venue market data, validating deployment feasibility. De-obfuscation metrics reveal 12.7 times greater fragmentation resilience than volume baselines, exposing coordinated strategies invisible to sequential models. Ongoing work investigates how transient daily options create persistent multi-month regime states through intraday adaptive sampling across 62 symbols, culminating in a neuro-symbolic agent-based testbed where LLM-driven agents operate under hard-coded physical constraints, enabling counterfactual experiments that verify causal structure by *toggling system parameters. This doctoral-level research establishes a complete arc — state estimation, adversarial detection, dynamics characterization, and causal verification — contributing epistemic security methodology for structurally constrained systems where compliant individual actions aggregate into exploitable vulnerabilities.*

Evaluating Privacy Leakage in Medical Image Classifiers via Model Inversion
Poster #44 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Kevin Tran
Graduate Student(s): Md Jahirul Islam
Research Mentor(s): Kazi Aminul Islam & Md Abdullah Al Hafiz Khan

Privacy-leakage in machine learning is critically concerning for medical imaging applications. It occurs when a trained model reveals information about its training data through its parameters or outputs. In this project, we evaluate privacy risk in medical image classification by training a ResNet-18 model on the PathMNIST dataset, a MedMNIST subset comprising 28x28 histopathology patches across nine tissue classes. We first train a classification model that achieves 88\% test accuracy. In our baseline experiment, this performance varies substantially by class, as shown by per-class accuracy and a confusion matrix. To induce privacy exposure, we implement a gradient-based model inversion mechanism under a white-box threat model, in which the adversary has access to the model and its gradients. Starting from the random noise, we iteratively optimize synthetic inputs to maximize the model's score for a target class. Consequently, it produces class-representative reconstructions that visualize the features that the network associates with each category. The qualitative results demonstrate that strong overall utility can coincide with uneven class-level behavior, and that inversion attacking can extract informative class prototypes from the trained model. It motivates routine privacy evaluation of medical classifiers prior to deployment, and follow-up measurement of reconstruction similarity to real training examples across different training and output settings.

Outlook AI Agent Extension
Oral Presentation (Prillaman Hall, Indoor Plaza)
12:00pm – 12:50pm
Undergraduate Student(s): Robert Mosley
Research Mentor(s): Xinyue Zhang

Modern email assistants such as Microsoft Copilot in Outlook primarily function as reactive language models deriving context from chronologically organized email threads. While they conveniently provide drafting and summarization features, they completely lack deep cross-thread contextual reasoning and structured workflow intelligence. This Outlook extension is a context-aware, automated assistant designed to augment traditional email systems with deeper *reasoning and support. The central question of this research project asks whether embedding emails into a semantic vector space can improve advanced contextual reasoning and decision making than traditional thread-based AI assistants. To address this, my email agent vectorizes emails using transformer-based embeddings, enabling similarity search, topic clustering, and contextual retrieval across threads. This outlook extension can identify commitments, deadlines, and participants, while an auto scheduling detection interprets and suggests meetings to be scheduled autonomously. The assistant also generates context-aware summaries and replies grounded in retrieved past information. An additional contribution to this work is privacy preservation; this is because the AI agent can be deployed locally and doesn't rely on any third-party APIs. This allows users to safely use my outlook extension without worrying about external companies being able to access their data. The results of the project implement improved cross-thread topic grouping and more accurate replies and generated text from Outlook AI assistant. These results indicate that a semantic, memory driven AI agent can move beyond reactive drafting tools to an autonomous workflow.*

Reinforcement Learning-Based Adaptive Data Rate Optimization for Improved LoRaWAN End Device Performance

Poster #24 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Graduate Student(s): Jui Mhatre
Undergraduate Student(s): Eyasu Smieja, Bryan Hoeltzer, & Giovanni Hines
Research Mentor(s): Ahyoung Lee & Hoseon Lee

Low-power wide-area networks (LPWANs) such as LoRaWAN play a critical role in enabling large-scale Internet of Things (IoT) applications, including environmental monitoring, smart cities, and infrastructure sensing. A key challenge in these systems is maximizing battery lifetime for end devices that are often deployed in remote or inaccessible locations. Adaptive Data Rate (ADR) mechanisms help address this challenge by dynamically adjusting communication parameters such as bandwidth (BW), transmission power (TP), and spreading factor (SF) to minimize time-on-air (ToA) while maintaining reliable connectivity. Traditional ADR algorithms rely primarily on signal-to-noise ratio (SNR) and received signal strength indicator (RSSI) measurements to select communication parameters. While effective under stable conditions, these rule-based methods struggle in dynamic indoor environments where environmental variables and structural features influence signal propagation. As a result, ADR decisions become suboptimal, increasing transmission time and reducing device battery life. This research develops an AI-enhanced ADR framework using Model-Based Reinforcement Learning (MBRL) to improve parameter selection for LoRaWAN end devices. Our system integrates environmental and contextual features, including temperature, humidity, barometric pressure, particulate matter, wall density of obstacles in paths, and gateway-to-device distance, to model the indoor propagation environment. These features are used to estimate communication metrics *such as SNR and ToA for different SF configurations. A Dual-Path Hybrid Neural Network (DPHNN) reinforcement learning agent then learns an adaptive policy that selects the optimal spreading factor based on both historical signal quality metrics and real-time environmental context. Experimental evaluation was conducted using the Siegen Indoor LoRaWAN dataset, which contains real-world indoor transmission measurements collected under varying environmental conditions. Preliminary analysis indicates that incorporating environmental context into the ADR decision process improves SF selection accuracy and reduces predicted transmission time compared with conventional rule-based ADR strategies. These results demonstrate the potential of reinforcement learning based ADR optimization to improve communication efficiency and extend battery lifetime for LoRaWAN end devices operating in complex indoor environments. This approach provides a foundation for more intelligent and adaptive communication protocols in next-generation IoT networks.*

Robust Alzheimer's Disease Diagnosis from Partial Multi-Modal Data via Cross-Modal Learning
Poster #10 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Dina Xu Callaway
Research Mentor(s): Chen Zhao

Alzheimer's disease (AD) is a progressive neurodegenerative disorder that affects millions of Americans and imposes a substantial clinical and economic burden. Current diagnostic procedures rely on extensive cognitive assessments, neuroimaging, family history evaluation, and laboratory examinations, which are often costly and time-consuming. As a result, real-world clinical datasets are frequently incomplete because many patients do not undergo every examination. Addressing this challenge is critical for developing more accessible and efficient AD diagnostic tools. This study proposes a cross-modality learning framework for accurate AD diagnosis using partial multi-view data. The framework enables reliable diagnostic predictions from incomplete clinical information while identifying the most informative features across modalities and biomarkers. It integrates multiple data modalities and applies machine learning techniques to learn shared representations that remain robust even when certain views are absent. Experiments are conducted using three widely used Alzheimer's research datasets: the Alzheimer's Disease Neuroimaging Initiative (ADNI), the Australian Imaging, Biomarkers and Lifestyle study (AIBL), and the Open Access Series of Imaging Studies (OASIS). The model is evaluated under varying missing-modality rates to simulate real-world clinical conditions. Preliminary results show that the proposed framework maintains strong diagnostic performance even when some modalities are missing and outperforms several existing diagnostic models. By maintaining high diagnostic accuracy with incomplete modalities, this approach reduces reliance on expensive medical tests. It lowers both the financial and practical burden on patients, providing a more practical and scalable tool for early AD detection.

SymbioticRAG: Human–LLM Collaboration Framework for Trustworthy Retrieval
Poster #24 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Siebe Meertens & Raymond Gantt
Research Mentor(s): Md Abdullah Al Hafiz Khan & Kazi Islam

Large Language Models (LLMs) are increasingly used to assist in navigating complex information environments, but their reliability is often limited by hallucinations and the retrieval of inaccurate or unverified information. Retrieval-Augmented Generation (RAG) systems aim to address this issue by enabling LLMs to access external knowledge sources; however, they still struggle to ensure the factual quality and trustworthiness of retrieved data. This study explores a human-AI collaboration approach that integrates human input directly into the retrieval process. By incorporating a human-in-the-loop, users can guide, validate, and refine retrieved information before the language model generates responses. This interaction helps provide better contextual grounding for the model and improves the quality of the information it relies on. The proposed approach aims to reduce hallucinations, improve retrieval accuracy, and increase trust in AI-generated outputs. By demonstrating how human oversight can enhance the reliability of retrieval-based language models, this work highlights a practical pathway for deploying AI systems in real-world applications that require accurate and dependable information.

Towards Bounding the Behaviour of Neural Networks
Poster #32 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Emmanuel Nwankwo
Research Mentor(s): Arthur Choi

Modern neural networks are typically considered black-box systems: while they are able to achieve state-of-the-art performance in many domains, it is difficult to elicit the reasons behind their decisions. From this, a sub-field of artificial intelligence called eXplainable Artificial Intelligence (XAI) arose to fill this gap. One approach to XAI is based on the symbolic compilation of a neural network's behavior to a logical formula. However, such approaches are limited in scalability, due to the fundamental difficulty of the problem. This research instead proposes an incremental and anytime approach to explaining the behavior of a neural network, for image recognition. Our approach is based on a recently published result by a KSU undergraduate, that proposed an incremental and anytime approach to explaining the behavior of an individual (threshold) neuron. To visualize the behavior of an individual neuron, we propose to enumerate prototypical examples of images that activate the neuron. We propose to visualize the behavior of a neural network by appropriately aggregating the prototypical examples of its *neurons. Preliminary results suggest that such aggregate visualizations reveal interpretable patterns that can reveal the reasoning behind a neural network's decisions. Further, our approach can provide such insights in a more efficient, incremental fashion, compared to prior compilation-based methods which are by nature exhaustive.*

Understanding the Effects of Pruning and Quantization on Adversarial Transferability in Lightweight Convolutional Neural Networks
Poster #28 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Landon Mata-Fraire & Yashwant Pallapolu
Research Mentor(s): Michail Alexiou

Deep learning (DL) models are central to many vision-based applications, from facial recognition and autonomous driving to environmental monitoring, and are often deployed on edge or IoT devices with limited computational and energy resources. This necessitates the use of lightweight DL architectures for efficient processing, which in turn introduces new trade-offs between model efficiency and security. Among these challenges, adversarial attacks pose a unique risk, as they can be applied to physical objects in the form of patches and remain effective across viewpoints and lighting conditions. These attacks are generated by using the gradients of a neural network's loss function with respect to the input image to identify small pixel changes that cause misclassification. Studies have shown that such gradient-based attacks can transfer between DL models, meaning that an attack designed to fool one vision system can also deceive others. Prior work suggests that attacks crafted for standard Convolutional Neural Networks (CNN) transfer poorly to algorithmic lightweight variants such as Dilated CNNs. However, the effect of these attacks on structure-based lightweight models obtained through pruning or quantization requires further investigation. In this study, we focus on generating adversarial attacks using both standard CNN models and lightweight variants obtained through pruning and quantization, and we evaluate their transferability between these models. We train and test our approaches on two datasets: (1) a high-resolution animal image dataset and (2) the low-resolution Fashion-MNIST dataset, to capture differences across varying levels of visual detail. Based on preliminary experiments, we expect that attacks crafted for standard CNNs will be notably less effective against pruned and quantized models. The results of this research will advance the understanding of CNN defense capabilities and how these are affected by architectural and algorithmic modifications, to assist in developing more effective defense strategies.

Information Technology

AI and Machine Learning-Based Solutions for Identifying Early Cardiovascular Disease Risks

Poster #39 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Joaquin Rosental, Soriyah Charles, & Jemiah Hibbler
Research Mentor(s): Nazmus Sakib

Cardiovascular disease (CVD) is one of the leading causes of death worldwide. Traditional risk assessment models often depend on occasional clinic visits and one-time measurements, so they can miss the everyday ups and downs in a person's health. Wearable technology offers a strong opportunity to address this gap by providing continuous, non-invasive time-series data such as heart rate dynamics, activity intensity trajectories, and sleep duration and regularity. By using a time-series deep learning model, we can track changing health signals to spot early signs of cardiovascular risks that episodic checkups might miss. This project compares existing traditional modeling approaches and shows how combining wearable data with interpretable AI can support more practical prevention methods. The proposed approach links consumer wearables to clinical decision-making for risk screening.

Cybersecurity In Healthcare
Virtual Presentation (Microsoft Teams)
Session 1 at 1:00pm – 2:00pm
Undergraduate Student(s): Elhadj Diallo, Morgan Day, Naji Genas, & Shanmukh Chavvakula
Research Mentor(s): Liang Zhao

Hospitals and doctors offices are more connected than ever. From electronic health records to Wi-Fi enabled heart monitors, technology helps save lives, but it also opens the door to new threats, such as data breaches and cyberattacks. These attacks can put private patient information at risk, and in some cases, disrupt critical care. The goal of this research is to determine how healthcare organizations can more effectively protect themselves from cyber threats than before. A lot of the existing research on cybersecurity focuses heavily on the technical side, like better firewalls or complex encryption. While that work is important, it often overlooks the human element. In a busy hospital, a security measure is more effective if the people on the front lines, such as doctors, nurses, and staff, can actually take part in security practices. This project tries to fill that gap by looking at the bigger picture of having employees take a bigger role in protecting healthcare data. The method of gathering data includes finding reputable articles on healthcare data breaches on Google Scholar and looking at public reports of major data breaches in hospitals to understand what went wrong. Additionally, reviewing government guidelines and recommendations for healthcare cybersecurity, and analyzing articles and case studies from industry experts and security blogs. Early on, it becomes clear from these sources that there's no single technical solution. Strong technology is a must, but the real world examples show that successful security *also depends on ongoing training and a workplace culture where security is seen as everyone's job.*

Early Cardiovascular Risk Screening by Fusing Fitbit Wearables with Health History Survey Data
Poster #28 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Troy Omotayo & Carly Warren
Graduate Student(s): Nursat Jahan
Research Mentor(s): Nazmus Sakib

Heart disease is one of the leading causes of death, and many people do not realize they are at risk until it becomes serious. This project focuses on creating an early detection model that combines wearable device data with family history and self-reported health factors to better predict cardiovascular risk. Wearable devices like smartwatches can track heart rate, activity levels, and sleep patterns. However, they do not fully reflect family-inherited and long-term risk. We aim to develop a more accurate and personalized way to identify early warning signs by combining both daily health data and self-reported survey information. We outline a practical pipeline to clean and align survey and wearable features. Then we train and compare standard machine learning models Random Forest, XGBoost, Support Vector Machine, K-Nearest Neighbor, and Multi-Layer Perceptron to compare which model would be better for testing early detection of CVD. The XGB and MLP models performed the best out of the five models with promising accuracy. These findings support our aim to develop a more accurate and personalized way to identify early warning signs.

Multimodal Deep Learning for Alzheimer's Disease Classification: A Practical Fusion Framework for Clinical Deployment
Oral Presentation (Prillaman Hall, Indoor Plaza)
12:00pm – 12:50pm
Undergraduate Student(s): Zakaria Elghazzali
Research Mentor(s): Yixin Xie

Deploying multimodal deep learning for Alzheimer's disease (AD) classification in real-world clinical practice remains challenging due to class imbalance, limited data, and computational constraints. We present a robust and efficient CNN-Transformer hybrid framework that integrates cross-modal attention, self-supervised contrastive pretraining, and progressive imbalance mitigation, tailored for clinical neuroimaging. Using the ADNI dataset (744 subjects; CN: 48%, MCI: 34%, AD: 17%), our approach employs adaptive class weighting, label smoothing, and targeted augmentation to address severe imbalance, while an optimized preprocessing pipeline reduces training time by over 97 %. The model achieves 84.3 % accuracy, *88.2 % ROC-AUC, and 85.0 % macro F1, outperforming realistic baselines such as InterFusion (82.7%), with sub-2-hour training and 0.05 s inference per case on standard hardware. Extensive ablation confirms the necessity of each component for robust generalization. Limitations include reliance on paired MRI-PET data and single-cohort validation. This study demonstrates that thoughtfully adapted, resource-conscious AI can bridge the gap between research and clinical deployment in neuroimaging.*

A Review of AI Being Incorporated into Hydroponic Systems for Crop Management
Virtual Presentation (Microsoft Teams)
Session 1 at 1:00pm – 2:00pm
Undergraduate Student(s): Xander Jones
Research Mentor(s): Xu Tao

Overview: Hydroponics has revolutionized farming by lessening water usage and getting rid of all soil-borne diseases. However, it has been years since an experiment was conducted using new technology to innovate the industry. The purpose of this research is to establish the methods took to incorporate AI based programs and conduct experiments to create results and compare them to original methods. Methodology: Researchers applied multiple AI IoT-based systems like Planteye and ANN models to fully automate monitoring plant models and activities. With the models, a controlled experiment was conducted to determine what recipe of the NPK macro nutrients plants can help yield gain from plants in a system. 10 treatments were created 1 being a control and were dispersed through plants over 5 weeks with just an Ion Selective Sensor being used to not create any energy management issues. The proposed ANN model then took the treatments and created 5 different recipes to test and create graphs on different plant attributes like height and base area to create a healthiness score to compare the macro nutrient efficiency between the different attributes. Results: When the findings were compared, it was found that the use of nitrogen could be more efficient in the control recipe as 12% of nitrogen in the treatment concentrations were being wasted. This indicates that the original recipe that used all these years could have some improvements with how it handles nutrient control.

SmartContig: A Contiguous Tensor Cache for Faster Deep Learning
Poster #29 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Dhruvpal Mehru
Graduate Student(s): Kaveen Jayamanna
Research Mentor(s): Xuechen Zhang

We can improve performance in modern deep learning by employing an LRU cache to eliminate redundant memory access patterns that arise when using transposes or permutations in network architectures. SmartContig, a self-tuning LRU cache, identifies duplicate contiguous memory *access patterns for tensor data and stores a copy in memory so that future accesses to the same pattern do not incur a memory access penalty. This cache provides a number of benefits, including reducing memory access latency, increasing overall system throughput, and enabling previously infeasible batch sizes. We measure the effectiveness of SmartContig in various optimization configurations, including eager execution, SDPA, torch.compile, and combinations of SDPA and torch.compile with caching, on two popular neural network architectures: Vision Transformer (ViT) and Graph Attention Network (GAT). In the case of ViT models (BEiT-Large 384^2, BEiT3-Giant 336^2, ViT-Giant, EVA-Giant) run on an NVIDIA RTX PRO 6000 Blackwell GPU, we observe that SDPA+cache provides 11–13% speedup over SDPA alone in all cases, with hit rates ranging from 72% at batch size 24 to 95% at batch size 80 and memory savings of 3.9–7.9 GB per forward pass. In contrast, torch.compile alone provides less than 5% speedup. Moreover, since compile has no effect in memory-bandwidth-saturated regimes (i.e., FP32), SmartContig provides an additional 18–20% speedup in these cases. SmartContig also enables otherwise impossible batch sizes: BEiT-Large at batch size 96 and BEiT3-Giant at batch size 32 both run out of memory without caching. Under compile+cache via custom op registration, SmartContig provides an additional 0.8–1.0% over torch.compile alone on BEiT in BF16/FP16 at large batch sizes, demonstrating that caching and compilation operate at complementary levels. Finally, SmartContig yields a 5–7% speedup on GAT by eliminating redundant contiguous copies generated during multi-head attention over node features in each round of message passing.*

Tiny AI for Healthy Crops
Poster #26 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Julian Marks
Research Mentor(s): Xu Tao

This project is focused on developing a remote crop monitoring system that integrates sensing, low-power and long-range communication, and AI. Precision agriculture technologies offer promising solutions for sustainable farming by collecting field data and analyzing it in the cloud for crop monitoring, disease detection, and resource optimization. However, practical deployment remains challenging in rural environments. Reduced access to power, limited coverage, and geographical interference can get in the way of our communication needs. However, some solutions to this problem, such as 5G, aren't cost effective, use too much energy, and include many restrictions. This research explores a low power and long range communication network, LoRaWAN, to address these challenges. Having our devices communicate through LoRaWAN takes advantage of its low power, long range, and less restricted access. The system is made up of three components that each needed to be configured and connected to complete the LoRaWAN topology. These include a server, gateway, and end devices. Our server remains local for more controlled accessibility, using programs from

ChirpStack. The gateway is implemented using DLOS8N Dragino. The final component being the end LoRaWAN end devices integrating agricultural sensors that receive downlinks and send uplinks, forming a pattern of communication with the gateway. The successful configuration and established connection is confirmed within the server and the gateway. Allowing for data from end devices to be communicated to the gateway, then be displayed within the server and being processed with AI models. The system is also scalable by adding more end devices forming a star topology.

Tiny AI for Healthy Crops: Detecting Plant Diseases with Smart Sensors
Visual Display #49 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Brendan Miller
Research Mentor(s): Xu Tao

Each year, up to 40 percent of crop yield is lost due to plant disease, costing billions and harming farmers and communities worldwide. To mitigate this, nations worldwide have invested into possible solutions. This project researches artificial intelligence (AI) for use in plant disease detection. More specifically, edge AI that utilizes the Internet of Things (IoT) to collect data and then process it on the device. Additionally, the overall goal is to develop edge devices for crop disease monitoring tailored to agricultural environments, integrating sensing and on-device AI while operating efficiently under low-power constraints. This research entails creating a prototype edge device which can collect data using cameras which is then pushed through a lightweight AI model (e.g., YOLOV8_n) that will provide information on what type of plant disease was detected. The anticipated outcome of this project includes providing farmers in regions where resource constraints such as access to stable power and the ability to transmit data prevents the usage of resource-intensive tools. Providing farmers in these resource-limited regions with this device could allow for remote monitoring of crops, reduced labor needs, and the ability to prevent the mass spread of plant diseases to crops which could save a significant amount of money and the crops themselves.

Understand Alzheimer's Disease Using Molecular Dynamics Simulations Through Tau Protein Mechanisms
Poster #13 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Miley Herrera, Alex Paauwe, Hetvi Patel, Ryan Bohannon, & Morgan Forrest
Research Mentor(s): Yixin Xie

In 2025, it was recorded, 7.2 million Americans aged 65 and older are living with Alzheimer's disease (AD). It is one of the seventh-leading causes of deaths in the US, data recorded by 2060 *to nearly double by 13 million. AD is a progressive neurodegenerative disorder characterized by synaptic dysfunction, extracellular amyloid-β (Aβ) deposition, and intracellular tau aggregation. In this study we used the Molecular Dynamics (MD) simulations, protein visualization, and data analysis on tau protein (PBDID: 9FOR) from the protein data bank. Using the protein data bank, we identified and visualized ten different AD-associated proteins, such as Neurofilament, amyloid precursor protein (APP), and Amyloid Beta Protein. Out of the ten we selected one best candidate for MD simulations. For the MD we used software NAMD2, OpenMM and Chimera. Trajectory will be analyzed and visualized using the python-package developed by the previous First Year Scholar team. Integrating structural biology with protein interaction analysis enhances understanding of molecular mechanisms, also underlying AD progression. This research will contribute to the neurodegenerative diseases area and provide references for future research in AD by identifying therapeutic targets aimed at modulating pathological protein interfaces.*

Software Engineering and Game Development

An Exploration of How Narrative Development and Voice Acting are Important to Game Developers

Visual Display #50 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Anaiya Tucker
Research Mentor(s): Joy Li

This project focuses on how narrative development and voice acting are important to a game developer's skillset. Throughout my game design coursework, I noticed more emphasis was placed on the technical aspects of game design to the detriment of narrative focus. While it is possible to engage in more artistic self-expression within this degree, they are reserved for electives or senior design rather than core classes, which puts game developers at a disadvantage if they want to pursue game development after graduating. My approach seeks to make the game design degree focus more broadly on different components of game design by demonstrating how the narrative skillset impacts student success and learning. To do this, I have created an original narrative for my game design project that I plan to fully voice act once completed. My final product is a demonstration of my voice acting within the game and a research paper detailing my process, how engaging in narrative design and voice acting impacted me as a game developer, and how it has impacted my current projects. In doing this, I hope to bring attention to how narrative focus and other artistic elements could be implemented in earlier and more core stages of the degree to broaden game developers' skillsets.

Comparing the Impact of Note-Taking Modalities on Student Learning Outcomes in a VR Classroom

Poster #43 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Sawyer Strickland
Research Mentor(s): Sungchul Jung

Learning in immersive environments has been proposed as a way to provide rich immersion and interaction, effectively addressing the distractions and low engagement commonly found in traditional online learning settings. To further enhance immersive learning experiences, we explore various input modality techniques to support learning in a customized virtual reality (VR) classroom environment. In this poster, we introduce the prototyped input modalities, propose a research design to evaluate them, and discuss the impact of motor skill–supported learning (e.g. handwriting or typing) versus non–motor skill–based note-taking (e.g., voice notes) on learning experiences and outcomes. We designed a 3 × 1 between-subjects study. Participants will be assigned to one of three conditions: writing with a VR stylus (Stylus), typing on a virtual keyboard (Keyboard), or voice-to-text dictation (Voice). All participants will watch a short lecture video in the VR classroom using a head-mounted display (HMD). During the lecture, participants will be able to take notes using their assigned modality. At the end of the study, all participants will complete a quiz to assess learning outcomes, followed by subjective questionnaires. During the note-taking process, variables such as word count and verbatim overlap will be measured to examine whether each modality promotes synthesis of lecture content. This research is grounded in findings from neuroscience and psychology suggesting that motor skills, such as note-taking, can enhance learning by improving cognitive processing and decision-making, ultimately leading to better academic performance. Based on this prior work, we hypothesize that participants in the Stylus and Keyboard conditions will achieve higher quiz scores and report more positive learning experiences than the Voice condition. Additionally, we expect that using a VR stylus for note-taking will have a more positive effect on information retention than keyboard typing, but it may induce more fatigue.

Exploring Augmented Object Intelligence: A Prototype for Context-Aware Digital Asset Generation
Virtual Presentation (Microsoft Teams)
Session 2 at 1:00pm – 2:00pm
Undergraduate Student(s): Braylan Mann
Research Mentor(s): Chenyu Wang

The integration of physical environments with digital systems is a key component of the emerging metaverse, yet most current platforms treat everyday objects as passive elements rather than active participants in digital ecosystems. This project explores the concept of Augmented Object Intelligence (AOI) by developing a prototype that transforms physical objects into triggers for generating contextual digital assets. Using the Phaser 2D game engine, we designed *a system that models an "Object-to-Asset" pipeline in which a smartphone camera captures an image of a physical item that is then classified and used to generate a digital hero with unique attributes and rarity levels such as Common, Rare, Epic, and Legend. Each generated asset is assigned a unique identifier (UUID) along with provenance information describing when and from which physical object the hero was created, allowing the system to simulate the transparency and ownership history expected in digital asset ecosystems. To evaluate the functionality of these generated assets, the prototype includes a turn-based combat module where hero attributes such as health and attack directly influence gameplay outcomes. Preliminary results demonstrate that the system can successfully generate contextual digital entities and integrate them into an interactive gameplay environment that tests their utility. By turning routine physical interactions into opportunities for digital asset creation, this work demonstrates a potential pathway for bridging real-world objects with interactive digital environments and future metaverse technologies.*

Exploring Dynamic Gameplay as a Method for Enhancing Horror Aesthetics
Visual Display #48 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Aidan Kleine, Jaime McBride, Lisbeth Martinez, Lauren Rousell, & Karizma Quiroz
Research Mentor(s): Joy Li & Tanmay Bhowmik

In game development, there is an idea called "mechanics, dynamics, and aesthetics" (MDA). This concept illustrates the connection between a game's rules, the relationships between the player and the game that those rules create, and how the game feels to play as a result. This concept is integral to the horror genre of games. Many mechanics in horror games center around the limitation of a resource, creating a relationship where the player is always looking for resources and using them strategically in order to survive. This then creates a sense of helplessness. Some games also use a "sanity system," where the game changes slightly depending on the player's actions in order to intensify the game's existing dynamics. The dynamic gameplay system created for this project attempts to synthesize these ideas by adjusting the game's mechanics in order to change how the player utilizes resources. The House Watches, the game this system is created for, is a game about a boy and a dog trying to reunite after mysterious supernatural creatures invade their home. In the first level, centered around the boy, the player's main resource is space. In the second level, following the dog, the main resource is time. There is a point counter in each level that increases as certain actions are taken. This point value then dictates a group of random events that are triggered for the rest of the level, each designed to limit that level's main resource. The goal of this system is to use these new mechanics to intensify the hostile dynamic between the player and the enemies, and in turn, increase the player's sense of fear. To assess the system's effectiveness, playtesters will be given a *form with questions evaluating how the progression of the gameplay system increased their sense of fear.*

Fallguard: Predicting and Preventing Risk of Fall in Immersive Environments
Virtual Presentation (Microsoft Teams)
Session 2 at 1:00pm – 2:00pm
Undergraduate Student(s): Caleb Tran & Joshua Hentz
Research Mentor(s): M. Rasel Mahmud

In this project on developing a real-time fall prevention system called Fallguard, we focused on creating a system for fall detection and prevention during the use of augmented reality. The project aims to determine effective integrated sensor modalities and develop a real-time fall prediction system. Our research showed that the IMU sensors, which are most valuable, are accelerometers and gyroscopes. Gyroscopes ensure that we know the tilt of the device, and accelerometers allow us to see its movement. We use our simulation setup to collect motion data using sensors like IMU, then process the data through a csv file. The activities recorded were more of gait and near-fall experiences. We can use the CoM(Center of Mass) of the participants to make an estimation of the participants' position and displacement. The data will aid the models to recognize where the imbalances are and trigger an active response, like an alert or feedback, before the fall occurs in real time. This research combines sensor integration real time analysis to get adaptive feedback. Some previous research showcases false positives, false negatives, and big conflicts. Researchers wanted to make detection both accurate and fast enough for real-time safety. Some other articles theorized how they would prevent the fall, but never had a real system or prevention to do so. Other papers with therapy training to improve balance for the elderly, instead of not physically stopping a fall in real-time scenarios. In summary, Fallguard brings IMU integration, CoM analysis, and real-time ML models to assess falls. Using these together, we can make a system that not only detects falls, but can also predict them and give advice to its users.

How Virtual Reality Impacts Blood Donation
Poster #6 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Brooke Berman
Research Mentor(s): Joy Li & Robert Keyser

Purpose: The purpose of this study is to address the ongoing shortage of blood donations by exploring the potential of immersive virtual reality (VR) to reduce anxiety and increase engagement among potential donors, particularly young adults. Blood donation is essential for supporting surgeries, trauma care, cancer treatment, and chronic illness management, yet participation rates remain low. Common barriers include fear of needles, discomfort with medical *environments, and uncertainty about the donation process. This study investigates whether a short VR experience can create a more comfortable and engaging environment that helps reduce anxiety and encourages greater willingness to donate blood. Methods/Approach: To examine the impact of VR on blood donation perceptions, a custom immersive VR prototype was developed using Unity and implemented on Oculus Quest headsets. The experience included five environments designed to educate and relax participants: an Educational Theater explaining the donation process, an interactive Library with trivia questions, a Meditation environment with guided breathing, simple Arcade games for distraction, and a calming Art Gallery. A pilot study was conducted with 22 participants aged 18–26. Participants completed surveys before and after interacting with the VR experience to measure satisfaction, anxiety levels, and willingness to donate blood. Results / Findings: Over 80% of participants reported being very or extremely satisfied with the VR experience. Approximately two-thirds reported reduced worries about blood donation, and 63.63% indicated they felt more inclined to donate after completing the experience. Although 41% reported mild cybersickness symptoms, overall feedback remained positive. Conclusion / Practical Implications: These findings suggest that immersive VR may help reduce anxiety and improve engagement among potential blood donors. VR shows promise as a tool to enhance the donation experience and may help encourage participation in future blood drives.*

Integration of Large Language Model (LLM)-Driven Conversational Agents into Multi-User Educational Virtual Reality (VR) Environments to Enhance Narrative-Driven Immersive Learning of STEM Topics

Poster #21 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Devon Haynes
Research Mentor(s): Lei Zhang

While Extended Reality (XR) provides experiential and interactive foundations for STEM education, current storytelling and narrative-driven applications often lack responsive non-player characters (NPCs), limiting interactive potential through pre-scripted stories. Additionally, despite the growth of Large Language Model (LLM) integration in XR, limited research explores the combined use of multi-user XR systems and conversational Artificial Intelligence (AI) to facilitate real-time, adaptive instruction. This project seeks to address these gaps by 1) Developing a narrative-driven STEM learning XR prototype that incorporates synchronous multi-user interaction and an embedded LLM-driven conversational agent and 2) Exploring the effectiveness of combining these technologies to improve learning engagement and educational outcomes. The proof-of-concept prototype will be evaluated in a pilot study with 5–10 university students possessing varying prior knowledge of microbiology, specifically DNA damage and repair. Participants will complete surveys and subject-related quizzes before and after the XR experience to collect key evaluation metrics. These metrics will assess objective *performance on content-based examinations as well as participants' subjective perceptions of their learning. Findings from this study will inform the design of future adaptive, collaborative, and narrative-driven XR learning systems for STEM education.*

Neural Network Based Intrusion Detection Using the NSL KDD Dataset
Virtual Presentation (Microsoft Teams)
Session 1 at 1:00pm – 2:00pm
Undergraduate Student(s): Bhavya Patel, Amaya Decaille, & Jayden Gillard
Research Mentor(s): Yong Shi

As cyberattacks become more frequent and complex, accurate intrusion detection systems are essential for protecting digital infrastructure. This project examines whether a feedforward neural network can effectively distinguish normal network traffic from malicious activity using the NSL KDD dataset. The study aims to determine whether a relatively lightweight deep learning model can identify patterns associated with cyberattacks and support more reliable threat detection. To investigate this question, the model was trained on the KDDTrain+ dataset and evaluated on the KDDTest 21 dataset, both of which contain labeled records of normal and attack traffic. The data were preprocessed, encoded, and normalized before being used to train a neural network with multiple hidden layers and nonlinear activation functions. Model performance was evaluated using classification accuracy and attack detection effectiveness on unseen test data. The results indicate that the neural network successfully learned meaningful traffic patterns and performed strongly in distinguishing malicious behavior from normal activity. These findings suggest that neural network-based intrusion detection is a promising approach for cybersecurity applications and provides a strong foundation for future work involving multiclass classification, model optimization, and comparisons with classical and quantum machine learning methods.

ParentSHIELD-MR-AI: Preventing Child Injuries through Intelligent and Adaptive Immersive Virtual Reality Training for Parents
Virtual Presentation (Microsoft Teams)
Session 3 at 1:00pm – 2:00pm
Undergraduate Student(s): Anupom Chakraborty
Research Mentor(s): Lei Zhang

Injuries are a leading cause of death among infants and toddlers in the United States, with more than 2,300 deaths and 1.3 million emergency department visits reported in 2023. Many of these injuries can be prevented through improved caregiver education. Traditional safety education methods such as pamphlets and videos provide information but often fail to support active understanding or practical skill transfer. XR training environments offer an interactive alternative where caregivers practice hazard identification and prevention through simulation.

This study examines whether integrating a large language model driven instructional assistant into an XR home safety training system improves training guidance and learning outcomes. This project focuses on the integration of an AI tutoring component within the ParentSHIELD VR training system deployed on the Meta Quest 3. The contribution centers on the instructional LLM integration. A curated home safety knowledge base was constructed from public safety guidance, cleaned, segmented into structured text chunks, and indexed using a FAISS vector database. A retrieval augmented generation pipeline was implemented to ensure responses remain grounded in verified safety information. The system was evaluated through internal testing using structured safety questions, scenario prompts, and XR training interactions. Metrics included response latency, grounding accuracy, response completeness, and instructional usefulness. Preliminary results show the system consistently retrieves relevant safety information and produces grounded responses with fewer unsupported claims compared to baseline prompting. Early testing shows response times remain within acceptable limits for XR interaction. Internal testing also showed higher task completion confidence and improved hazard identification when users received contextual AI guidance. These findings suggest retrieval augmented LLM tutors can improve XR safety training by providing grounded explanations and actionable guidance. Ongoing work focuses on improving model efficiency, expanding evaluation datasets, and conducting pilot usability testing to further validate learning effectiveness.

Quantum vs. Classical Model for Detecting Phishing Emails
Virtual Presentation (Microsoft Teams)
[Session 1 at 1:00pm – 2:00pm]
Undergraduate Student(s): Bhavya Patel
Research Mentor(s): Yong Shi

Phishing is still one of the biggest issues in cybersecurity because fake URLs and websites can look real enough to trick people into giving away private information. For this project, I wanted to see whether a small quantum machine learning approach could actually hold up against a normal classical model for phishing URL classification. I used the PhiUSIIL phishing URL dataset and compared three fair models using the same four features. The three models were a classical Random Forest classifier, a quantum support vector classifier, and a hybrid model that combined the classical and quantum outputs. I also tested a practical classical baseline using the broader feature set. Across five different train test splits, the classical four feature model had a mean accuracy of 1.00, the hybrid four feature model had a mean accuracy of 0.99834, and the quantum four feature model had a mean accuracy of 0.98. The practical full feature classical baseline had a mean accuracy of 0.996. Overall, the results showed that the selected four features carried a lot of predictive power and that the classical model was the strongest overall on this dataset. The quantum model still worked well, but it was better as an experimental supporting method than as the main phishing detector. I have used AI throughout the project. I have used

GPT-5 model of OpenAI to fix bugs and also used it to provide me with resources on YouTube, FreeCodeCamp, etc. I have used it also to summarize the topic and enhace the flow of the abstract. However, the idea of creating this project and core workload has been contributed by me.

Smell-GPT
Poster #29 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Ian Nortey
Research Mentor(s): Taeyong Choi

While electronic noses (e-noses) are essential for food safety, interpreting their complex outputs remains a technical challenge. Conversely, Large Language Models (LLMs) demonstrate a unique ability to reason over unfamiliar data through in-context learning. This project benchmarks the limits of LLMs reasoning in non-textual domains, exploring whether general-purpose AI can serve as an accessible alternative for processing olfactory information. This research investigates if LLMs can effectively classify olfactory data without traditional fine-tuning. Through Smell-GPT, we test the capacity of models like Llama 3 and Qwen to interpret raw chemical signatures through structured prompting, determining if general-purpose AI can reason through raw sensory data. The research followed a two-phase trajectory from manual testing to automated collection. Initially, various Ollama-hosted models, including Llama 3, 3.1, 3.3, and Qwen, were evaluated for computational efficiency. These models were then applied to a manual dataset of nine food categories, spanning groups such as dairy, beverages, and proteins (e.g., milk, coffee, sausage, lettuce), to test their ability to identify samples within specific classes. To address the consistency challenges found in manual sampling, the second phase introduced an automated pipeline. This featured a robotic arm for precise sensor placement and a top-down camera system to track randomized scenes of three to five food types across multiple sampling sessions. Initial experiments revealed that while LLMs could process formatted data, classification accuracy remained low, between 10% and 20%. Comparative analysis showed that classical algorithms significantly outperformed LLMs, with logistic regression achieving a 53% accuracy rate. This suggests that while LLMs provide an accessible research interface, current prompt-based approaches struggle with high-dimensional sensor nuances compared to traditional models. Future work will analyze the latest robotic datasets to determine if increased spatial and temporal context improves LLM-based perception.

Taking Augmented Reality Beyond the Lab
Poster #18 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Robert Hoeh, Gabriel Coffee, Jemimah Ogbomoh, & Peeranat Wattananuruk

Research Mentor(s): Brooke Zhao

Navigation is fundamental to accessibility in public spaces. Recent advances integrate artificial intelligence (AI) as a navigation agent and Augmented Reality (AR) smartglasses to enable hands-free guidance, presenting digital information directly within the user's line of sight. Such systems have the potential to support first responders and individuals with motor or cognitive limitations by reducing interaction demands while maintaining environmental awareness. This study evaluates the feasibility and usability of an AI-enabled AR indoor navigation system. The system comprises AR interface deployed on Meta Quest and a backend implementing RAG (Retrieval Augmentation Generation) technology to reason over structured spatial representations in response to natural-language navigation queries. A prototype of this system in the Atrium building of KSU's Marietta campus was developed and is currently undergoing empirical evaluation to assess navigation accuracy and usability in complex indoor environments, with the goal of informing the design of accessible and cognitively supportive navigation systems.

Radow College of Humanities and Social Sciences

English

Afterlives of Black & Unknown Bards: The Role of Print in Amplifying Black Oral Traditions
Oral Presentation (Prillaman Hall, Indoor Plaza)
11:00am – 11:50am
Undergraduate Student(s): Octavia Mann
Research Mentor(s): JoyEllen Williams

Oral tradition refers to the transmission of cultural narratives, morality, or history through spoken and audible means across generations. In pre-colonial West Africa, oral traditions served as the primary mode of cultural transmission. Enslavement and European colonization both influenced and suppressed African oral traditions, often devaluing them in favor of Western printed works. Primary sources, however, show that printed works did not eradicate Black oral traditions. Instead, they offered them a new life. Analyses of rare books and special collections in the Williams Rare Book Museum demonstrate the ways that printed works of the twentieth century give voice to Black American oral traditions – specifically folklore and religious music – and continue to shape public perception of these works today. Works used for this analysis include Black folktales reinterpreted and published by white writer and printer Joel Chandler Harris, anthologies of African American spirituals by James Weldon Johnson, and volumes of poetry by writers like Paul Luarence Dunbar and Langston Hughes. Analyzing these books as historical artifacts complicates the relationship between oral and print traditions, encouraging modern-day audiences to reflect on the many ways that printed works have influenced understandings of early African American folklore and music. Dr. Henry Louis Gates Jr.'s Signifying Monkey literary theory emphasizes the rhetorical strategies used in the ritual of the repeated oral narrative. I will be using this methodology alongside historical bibliography to focus on reader and writer relationships with figurative language, as it has been the vehicle for Black American oral literature.

Constructing Heritage: Indigenous and Spanish Influences in Mexican Architecture
Poster #39 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Andrea Rodriguez
Research Mentor(s): Erin Bahl & Shuchita Mishra

This Visual narrative project examines Mexican architecture as a living record of Indigenous knowledge, Spanish colonization, and environmental adaptation, asking how material, color, and *spatial design communicate layered cultural identity. Grounded in architectural history and visual arts practice, the work responds to vernacular adobe construction, courtyard-centered domestic planning, hacienda estates, and the ornate Baroque and Churrigueresque traditions exemplified by the Metropolitan Cathedral of Mexico City, while also drawing attention to the vibrant urban landscape of states like Guanajuato as a contemporary expression of historically symbolic color. Using a research-based sequential panel format, I combined architectural analysis with illustrated diagrams and comparative studies to examine adobe's organic composition, clay barrel roofing, exposed wooden beams, wrought iron detailing, and passive climate strategies such as thermal mass and courtyard ventilation. The project emphasizes the experimental process of translating architectural research into visual storytelling, structuring each page to mirror the historical layering of Indigenous and European influence. Through this synthesis, I argue that Mexican architecture is defined not by replacement but by transformation: imported European forms were reshaped through local materials, climate conditions, and regional craftsmanship. Ultimately, the work positions architecture as both functional engineering and cultural narrative, highlighting the urgency of preserving vernacular traditions among modernization while demonstrating how built environments communicate resilience, identity, and continuity across generations.*

Divide by 2: Growing Up Between Two Homes
Visual Display #48 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Iris Apodaca
Research Mentor(s): Erin Bahl & Shuchita Mishra

Divide by 2 is a mentored creative inquiry that investigates how moving between very different households shapes an adolescent's sense of identity and emotional stability. At its core, this project asks: "What does it feel like to grow up divided between two homes, and how do those repeated transitions affect a young person over time?" Guided by faculty mentorships, this work combines scholarly research in child development and family studies with a deeply personal visual narrative. Rather than presenting research in a traditional academic format, I translate studies on shared custody, environmental instability, and emotional regulation into a comic that reflects lived experience. The sequential art format uses 2-4 panels per page, repetition, shifting spaces, and symbolic imagery—such as road signs, bedrooms, and divided landscapes—to mirror the cyclical nature of custody transitions. Brief research reflections are woven throughout the story to connect personal moments with broader psychological patterns identified in existing studies. Artificial intelligence tools were used selectively during the drafting process to refine language, organize structure, and strengthen clarity, while the narrative content, artistic direction, and personal experiences remain entirely my own. Influenced by graphic memoir and autobiographical comics, this project treats visual storytelling not only as expression but as a research method. By playing research alongside quiet, everyday moments, the work invites *viewers to consider how data and lived experience intersect. The final image—of a third path beginning to form between two diverging roads—represents resilience and the process of building an identity beyond division. Ultimately, Divide by 2 demonstrates how creative practice can make research more accessible, emotionally resonant, and reflective of real human experience.*

Do you Use AI?: A Talk-Aloud Study to Determine How Students are Using AI in their Writing

Virtual Presentation (Microsoft Teams)

Session 1 at 3:00pm – 4:00pm

Undergraduate Student(s): Ruth Sikhamani, Vara Nath, Kylee Johnson, & Kaylee Ward
Research Mentor(s): Jeanne Law

This study examines how students use generative AI in their academic writing. Because of the increase in the use of generative AI tools, such as ChatGPT, into academic environments, students and instructors are faced with ethical challenges related to academic integrity and authorship. The purpose of this study is to investigate how students incorporate generative AI into their academic writing processes and to assess whether their usage aligns with concerns regarding diminished learning or authorship. AI has now become a normalized part of the writing process for many students worldwide. But there is a persistent lack of consensus surrounding the ethical use of AI within academia. Consequently, students' increasing use of AI in academic writing calls attention to redefining integrity and originality. While much of the public discourse surrounding AI within education focuses on fear of misuse, few studies show how students use AI in practice. This study employed a talk-aloud protocol to examine how twenty freshman students interact with generative AI tools during the composition writing process. Using think-aloud methodology provides insight into the cognitive processes as they engage with AI. This study examines two data sets to provide patterns between students using AI in their writing process. This will be used to provide meaningful addition to conversations regarding the ethics and induction of AI in academia. The think-aloud protocols were also accompanied by a short survey that asked students to self-report their thoughts on AI. The evaluation of this study will produce answers to questions such as: (1) How do students incorporate AI writing tools such as ChatGPT into their academic writing processes? (2) How much AI use is considered ethical by students? (3) How does AI impact students' writing processes and learning outcomes?

Illustrating the Indeterminable: The Interpretation Shift of Cells as Mechanical to Self-Organizing Through an Artistic Narrative.

Poster #18 (Convocation Center, VyStar Arena)

9:00am – 9:45am

Undergraduate Student(s): Somaya Malik
Research Mentor(s): Erin Bahl

In recent years, cellular biologists faced a shift in the cell's interpretation – instead of a mechanical nature, the cell expresses contingent, self-assembling, randomly expressed properties. This presentation examines the nondeterministic view of cellular biology with a narrative lens, arguing that while a mechanical metaphor formed the common paradigm, shifting the narrative towards contingencies and enhancing explanations via visual art will shape future intuition. Through an autoethnographic comic, the project discusses the evolution from hand drawn biology illustration to 3-d molecular animations, and how this reflects my reframing of not only cellular biology, but the underlying scientific assumptions concerning absolute truth. The resulting 20-page nonfiction comic aims to spark curiosity and awe, reintroducing protein creation and function through a nonmechanical framework, emphasizing the dialogue between probabilistic genetic activation and self-organizing cellular components. By integrating visual arts with cellular biology, the comic and accompanying presentation demonstrates the benefits of modernizing science communication through visual narratives, as they convey complex biochemical pathways with levity, but without oversimplification, which protects the public from misinformation. The presentation concludes by acknowledging the contribution of visual artists inciting scientific literacy and cultivating public appreciation for the investigative, ever evolving nature of biological research.

The Reluctance to Speak
Virtual Presentation (Microsoft Teams)
Session 1 at 2:00pm – 3:00pm
Undergraduate Student(s): Nicky Melendez, Ana Nilsen, & Harmoni Griffin-Denson
Research Mentor(s): Kurt Milberger

In the current age of shifting politics, people have become more hesitant to speak out about LGBTQ+ history. While studying the history of the Cobb County, Georgia, commissions' 1993 decision to defund the arts, which came after a "family values" resolution condemning the so-called gay lifestyle, we've conducted archival research and interviews with community members involved in the events. Since starting our research, we have hit many roadblocks surrounding interviews and the willingness of participants to recount their experiences.
We aim to better understand the political, cultural, and social factors that shaped public opinion and influenced the county's decision to withdraw funding for the arts. While archival materials offer valuable insights, our research depends on oral histories from community members, artists, and policymakers who witnessed or participated in the debate.
Throughout our efforts, we have struggled to contact individuals and secure interviews, as many potential participants have been reluctant to speak with us, often citing political concerns, discomfort revisiting the past, or fear of misrepresentation. This reluctance presents a challenge to preserving an accurate and human account of these events.
Our presentation will explore not only the Cobb County controversy, but also the broader

consequences of silence in regions where political pressures shape what histories are remembered, and which ones are left untold. In this presentation, we consider these challenges as well as potential means of overcoming the reluctance to speak in the practice of collecting oral histories.

World Languages and Cultures

The Application of Translation Theory on German Letters to English at Kennesaw State University History Museum and Holocaust Education (MHHE)

Poster #43 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Liz Tillman
Research Mentor(s): Noah McLaughlin

This presentation examines the application of translation theory to the translation of 1940s German-language letters held in the collection of Kennesaw State University's Museum of History and Holocaust Education (MHHE). Drawing on ten sources, ranging from case studies to the philosophical writings of Walter Benjamin, this research establishes a theoretical framework that prioritizes both fidelity to the original text and accessibility for modern English-speaking audiences. Central to this framework is the principle that a translation should convey not only the factual content of the source material, but also its tone, humor, and emotional depth. Applied to the MHHE letters, this means that English-speaking readers can engage with the same meaning, humanity, and feeling that a native German reader would experience in the original. The methodology reflects a commitment to making these historical documents inclusive and accessible without sacrificing authenticity. To illustrate these principles, the presentation will showcase select translation examples drawn directly from the letters, chosen with respect for their authors. This research demonstrates the vital role that theoretically grounded translation plays in museum contexts, ensuring that primary sources remain meaningful and accessible to all visitors.

Geography and Anthropology

3D Visualization of a Local Freshwater Reservoir Using Terrestrial LiDAR (Laser Scanner)

Poster #46 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Edward Whitehurst, Sean Clark, James Greer, & Caillou Guzman
Research Mentor(s): Ranbir Kang

Terrestrial LiDAR (laser scanner) technology is increasingly used in environmental analysis for detailed visualizations of landscapes. Our study aimed to utilize terrestrial LiDAR to create a 3D visualization of the earthen dam of a local freshwater reservoir, Frey Lake. We conducted scans of the study area and registered the scans to create a single comprehensive point cloud of the dam and the surrounding area. It included 37 scans of the study area from different locations, 83 links between these scans to register them as one continuous point cloud, and over 800 million points. Data collection took approximately 9 hours, which was followed by 35 hours in the lab to register and process the data. The resulting point cloud was used to create a complete visualization of the landscape in 3-dimensional space. While providing a new lens to look at freshwater landscapes our results also provide high resolution spatial data for managing freshwater landscapes by different agencies.

3-D Visualization of Building Interior Using Terrestrial LiDAR
Poster #18 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): James Greer
Research Mentor(s): Ranbir Kang

LiDAR or Light Detection and Ranging, is a highly versatile, highly accurate method of 3-D scanning objects and environments at millimeter measurements with many applications and too many to name. The purpose of this study was to gather a set of scans to create a point-cloud (a 3-D model made up of millions of millimeter data points) of the interior of a high traffic educational building. Point-clouds and data were collected using a Leica RCT360 laser scanner in approximately four and a half hours of work with 32 scans; overall I had collected over 800-million data points to make up a point-cloud of the first floor of the social sciences building. My point-cloud can be used for future reference of the school for any number of measurements needed, for material analysis, or to measure deterioration for building maintenance. The most important outcome of the work was for my research team, and myself to learn about LiDAR, its applications, and how to use the technology and the software that goes along with it for our growth within our respective fields of study and prepare us better for our workforce.

Applications of LiDAR-Derived 3D Geo-Visualization for Indoor Built Environments
Poster #15 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Sean Clark
Research Mentor(s): Ranbir Kang

The application of Terrestrial Laser Scanning (TLS) is commonly used to create 3D visualizations (point clouds) of different environments and objects. The goal of this study was to create a 3D visualization of the interior of an educational structural environment composed of *office space, study areas, and classrooms. A TLS was utilized for this study (Leica RTC-360) to scan the interiors of a building. The scanner took photos and alsogenerated a 3D point cloud of the environment. Overall, there were 57 individual scans and 71 links between the individual scans that helped align individual scans. Furthermore, the bundle error was 0.003 m, the overlap was 48%, the strength was 68%, and the target error was also 0.003 m. In conclusion, the scans of the interior of the building created a digitized 3D representation of the building. The level of detail can be used for precise measurements. They can also be used by future scholars, architects, engineers, and planners to better manage infrastructure. The future work will focus on merging multiple scanned areas of a building as one continuous visualization.*

Assessing AI Generators of 3D Models
Visual Display #49 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Miles Peterson
Research Mentor(s): Uli Ingram

Have you ever 3D modeled something? If so, you probably know the feeling of spending countless hours working to design something in a modeling software. The time-consuming 3D modeling process led to a search for better ways. This study investigates whether AI generators can successfully generate 3D models for geocache containers. To address this, we first tested multiple 3D model generators, including Meshy AI, Fast 3D, Hyper3D, Printpal, Tripo AI, and Makerworld. Experimental results demonstrate that Meshy AI is the overall best 3D model, with the ability to use Image-to-3D, Text-to-3D, and the AI Texturing. Results also show that Bambu Labs Makerworld Image-to-3D generator is the best budget-friendly AI generator. After testing, we imported the models into Blender and Fusion 360 to hollow them out and create containers for geocaching.

The Digital Stillness Index: A Reproducible Geospatial Intelligence Framework for Quantifying Anthropogenic Disturbance Absence
Virtual Presentation (Microsoft Teams)
Session 2 at 2:00pm – 3:00pm
Undergraduate Student(s): Stephen Kyle Mills
Research Mentor(s): Kyusik Kim

The absence of disturbance is a spatial condition with significant implications for ecological stability, cognitive restoration, and environmental planning, yet it remains poorly quantified in geospatial analysis. This study introduces the Digital Stillness Index (DSI), a formally defined composite spatial metric that measures stillness as the inverse expression of anthropogenic intensity across landscapes. The index integrates multi-source spatial datasets representing acoustic exposure, mobility activity, population density, artificial illumination, and land-use *change to capture independent dimensions of human disturbance. Variables are percentile-normalized to reduce sensitivity to outliers and weighted using entropy-based coefficients to minimize subjectivity while preserving informational contribution. The method is implemented as a geospatial plugin that enables reproducible execution, parameter transparency, and cross-study comparability within standard GIS environments. Its architecture incorporates an embedded artificial intelligence module based on a hybrid spatial ensemble framework: convolutional neural networks extract localized spatial features from stacked raster inputs, gradient-boosted decision trees model nonlinear relationships among disturbance variables, and a probabilistic regression layer produces pixel-level uncertainty estimates for each prediction. This design allows the system to learn empirically grounded representations of stillness directly from spatial data rather than relying solely on predefined assumptions. Model stability is further assessed through Monte Carlo parameter perturbation, generating a spatially explicit uncertainty surface accompanying the primary index output. Validation against independent environmental and perceptual reference datasets demonstrates consistent spatial agreement between high-index values and empirically observed low-disturbance environments. By transforming stillness into a measurable and computationally reproducible spatial construct, the DSI establishes a new analytical dimension for geospatial science and applied planning, providing a rigorous and scalable tool for identifying low-disturbance regions, prioritizing conservation efforts, and evaluating the spatial footprint of human activity across time and space.*

Ecology at the Margins: Quantifying Environmental Motifs in Public Art along the Atlanta Beltline Eastside Trail
Oral Presentation (Prillaman Hall, Indoor Plaza)
11:00am – 11:50am
Undergraduate Student(s): Sophia Donovan
Research Mentor(s): Ranbir Kang

Urban greenways often use public art to shape place identity, yet how ecological themes are represented—and how media choices shape that representation—remains underexamined. We conducted a mapped, walking audit of roughly 800 artworks along the 2.25-mile Atlanta Beltline Eastside Trail, coding each piece for style, dominant color, human depiction, and environmental motifs. Descriptive results show that 13% of works include environmental content; within this subset, plants are most frequent, while water motifs are rare. Graffiti and street art constitute the clear majority of the corpus, which is a media mix that leans toward typography and portraiture rather than imagery incorporating nature. Human figures are primarily adults and are disproportionately white; overt political messaging is uncommon. We discuss implications for linear park design and governance, including commissioning briefs that invite nature-oriented media (e.g., mosaics, reliefs, sculpture), interpretive tools (labels/QR links) that connect artworks to local ecologies, and curatorial strategies that balance sanctioned installations with informal *expression. The study contributes to an operational method for auditing public art on trails and offers evidence to guide placemaking and public realm management where ecological storytelling is a goal.*

Kiln it! Middle Woodland Experimental Ceramic Reconstruction
Poster #31 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Leigh Murray
Research Mentor(s): Terry Powis

Technological research on the manufacture of pre-contact 1,500-year-old pottery throughout North Georgia, and on the symbolic significance of clay vessels, has been conducted for decades. Many findings have revealed key elements of production, such as clay coiling and stacking, or pinching, to form a vessel from a solid mass of clay. These concepts have been formed through prior experimental tests and archaeological analysis of vessel structures. However, the use of geometric tear-drop designs and zoning patterns seen in the Middle Woodland, specifically among the Swift Creek people, has not been observed in any other group before or after them. The importance of this research is to identify how the Swift Creek people produced distinctive vessel patterns found only in this area and time period. Testing hand-carved stamps and paddles on locally sourced clay through trial and error has narrowed down the possible methods for producing these intricate patterns. These findings are preliminary.

Mapping Buried Memories: Geospatial Documentation of Old Ebenezer Cemetery, Marietta, Georgia
Poster #4 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Claire Baker
Research Mentor(s): Teresa Raczek

Old Ebenezer Cemetery, a historically Black burial ground in Marietta, Georgia, has been shaped by histories of neglect, community revitalization, landscape transformation, and archival erasure. Building on the history of collaboration at this site, relationship-building with the affiliated church and local stakeholders will develop a framework for documentation and stewardship. This project produces a tentative boundary delineation of the cemetery and identifies at least eighty-eight individuals through archival and genealogical analysis. Using community based archaeological methods, descendant centered research will help create long-term momentum for perpetual care. Through methods of landscape survey, preliminary mapping, and archival research, the histories of the people buried there will be investigated. Church records, historic maps and census data are used to reconstruct burial histories and trace potential descendant communities. By approaching Old Ebenezer as a living cultural landscape *rather than a static archaeological site, this research demonstrates how geospatial documentation and community-centered storytelling can function as meaningful tools of restorative justice.*

Old Enough to Be Your Grandmother: An Exploration of the Grandmother Hypothesis and Degrees of Kinship
Poster #14 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Emma Holland
Research Mentor(s): Susan Kirkpatrick-Smith

The Grandmother Hypothesis is an anthropological hypothesis first proposed in the 1960's that explores the proposition that the lengthening of human lifespans over time and space can be accredited to the presence of older, experienced women combined with the biological process of menopause. The hypothesis suggests that long lives in a post-reproductive state and menopause itself, can be attributed to the need to assure offspring survival into adulthood and preservation of knowledge essential in maintaining the kin group. Today, many regions of the world follow patriarchal and patrilocal systems of community that foster power and value for men and masculine identity, yet, observably it appears that women (i.e., mothers and grandmothers) hold more authority when it pertains to making decisions for the family. This project takes a bio-cultural approach into the power and value of older women in society and pairs it with an analysis of biological effects from unseen and invisible labor in relation to different kinship types and population demographics. The data collected is founded on textual analysis of published life histories, ethnographies, and genome wide association studies (GWAS). Conclusions will be drawn from compounded data to include patterns and frequencies from specific categories including subsistence methods, kinship types, role and importance of children, allostatic load, and cultural knowledge proliferation.

Point-Cloud-Based 3D Modeling of a Building Using Terrestrial LiDAR
Poster #13 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Caillou Guzman
Research Mentor(s): Ranbir Kang

Light Detection and Ranging (LiDAR) technology enables the creation of highly detailed three-dimensional visualizations of human-made and physical environments. By measuring laser reflections, it can provide accurate measurements and positional data for environmental visualization. This project produced a 3D model of the exterior of the Social Sciences building and its surroundings at Kennesaw State University using terrestrial Lidar. A Leica RTC360 scanner captured high-density point cloud data around the building's perimeter, resulting in a dataset of approximately 1.5 billion points with millimeter-level detail suitable for engineering-

related spatial analysis and quality-control workflows. The collected data was registered and aligned in Leica Cyclone REGISTER 360, a point-cloud processing software, ensuring spatial accuracy across 62 scan positions connected by 115 alignment links. While the model achieved high precision, environmental factors introduced minor discrepancies, including duplicate point clouds caused by reflections off nearby windows, and the inherent difficulty of achieving perfect 1:1 alignment in complex outdoor environments. The processed data was then imported into Cyclone 3DR to generate an interactive 3D model that supports immersive visualization and spatial analysis. These results demonstrate the feasibility of creating large-scale, high-resolution terrestrial models in an academic setting and highlight the potential to expand this workflow to develop a full 3D digital representation of the university for long-term documentation, planning, and historical preservation. This project advances knowledge by showing how terrestrial LiDAR can support engineering applications that require precise spatial data while contributing to broader geospatial visualization and campus-scale archival efforts.

Spill the Beans: Understanding Tipping Norms from the Perspective of Coffee Shop Patrons
Poster #32 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Alexandria Nottage
Research Mentor(s): Brandon Lundy

Coffee shop culture is built around relationships and consumer values that make up everyday interactions. These social interactions are built around transactions between a customer and employee that serve as silent communication, often ending with the question of whether to leave a tip. Tipping culture has shifted from a moral gesture of gratitude to one that feels socially obligatory, leaving coffee shop customers questioning the true connotation of leaving a tip. This research focuses on understanding how coffee shop patrons perceive tipping norms and how that reflects their cultural and social values. Through methods of direct observations and semi-structured interviews, my goal was to examine customers' perspectives and how their behaviors demonstrate the divide between feelings of obligation and fairness. Through coding techniques in NVivo, I analyzed eight interviews with patrons and field notes from two direct observations, creating word cloud visualizations that supported my hypothesis. Coffee shop patrons do associate feelings of obligation with tipping norms; however, tipping norms are also influenced by existing relationships between the customer and employee, as well as the quality of service and product.

Psychological Science

Assessing a Course-Based Undergraduate Research Experience
Poster #19 (Convocation Center, VyStar Arena)

9:00am – 9:45am
Undergraduate Student(s): Uchenna Megwa & Dexter Clements
Research Mentor(s): Ebony Glover

A sense of belonging, defined as feeling valued, accepted, and integral to an academic community, is critical for student persistence and engagement, particularly for students navigating unfamiliar or marginalizing higher education contexts. Undergraduate research experiences (UREs) increase motivation, skill development, and graduate school aspirations, yet many students lack awareness of research opportunities and perceive research as inaccessible or reserved for high-achieving students. This study examines whether embedding a Course-based Undergraduate Research Experience (CURE) within one section of a cognitive psychology course at Kennesaw State University (N = 35) increases students' sense of belonging, research awareness, motivation, course interest, and perceptions of research benefits. Students are recruited from the enrolled course roster, provide informed consent, and complete training in responsible conduct of research before participation. Over eight weeks, students will develop original research questions and work in teams to conduct empirical studies or design and evaluate active learning demonstrations. Projects are scaffolded through structured assignments and staged deadlines guiding proposal development, data collection, analysis, and dissemination. Students complete baseline and post-semester surveys assessing motivation, research self-efficacy, belonging, learning satisfaction, and research awareness. Data collection is ongoing. Results will examine pre–post changes and associations among belonging, awareness, and motivation to inform inclusive models that broaden access to authentic research experiences.

Campus Resource Awareness and Psychological Education's Effect on Student's Perceived Stress Levels
Poster #25 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Audrianna Kisley
Research Mentor(s): Ebony Glover

Stress is a pervasive challenge in college students' daily lives and can interfere with academic performance, psychological well-being, and physical health. Without effective coping strategies, chronic stress may contribute to negative outcomes across these domains. Although many students report experiencing significant stress, few utilize available campus support services. Therefore, understanding factors that may reduce perceived stress and increase engagement with resources is critical. This study is designed to identify changes in perceived stress levels of students based on the acquisition of knowledge, by quantifying psychological courses passed with a C or above and awareness of campus wellbeing resources. Precursors for behavior change are considered to understand what motivates student engagement in these services. Data will be collected through a Qualtrics survey, using the Student Stress Inventory (SSI; 2020), paired *with an additional set of questions tailored to measure psychological education, attitude changes, engagement levels, and prior knowledge. Relationships between variables will be confirmed through the usage of computational statistical analysis tools, such as Qualtrics and SPSS. Projected hypotheses recognize a weak negative correlation between quantity of psychological courses passed and perceived stress levels. We expect a significant difference in perceived stress levels of students only if campus resources are utilized. Contribution to literature analyzing psychological stress for students in collegiate institutions is notable, and we hope to urge psychological education requirements in the future.*

Caregiving Across Generations: Resource Use, Self-Identification, and Well-Being
Poster #38 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Cathy Powell
Research Mentor(s): Anisah Bagasra

This study explored differences in resource use by generation, the relationship between resource use and quality of life, barriers to resource use, and whether caregiver identity predicts resource use. Caregiving is an expanding area of responsibility in the United States. Many individuals who provide care do not immediately identify as caregivers. Previous research has focused on caregiver burden. The relationship between generation, caregiver identity and resource use, however, has not been explored. This study used a cross-sectional survey design, collecting data from 254 caregivers from four generations: Baby Boomer, Generation X, Millennial, and Generation Z. Caregivers completed a questionnaire assessing their use of informal, formal and digital resources, whether they identified as a caregiver, barriers to accessing additional resources, and the Family Caregiver Quality of Life Scale (FAMQOL). Descriptive statistics, ANOVA, Pearson's r correlations, chi square and a general linear model were used to analyze the data. The study found that digital resource use varied by generation, with younger generations showing higher levels of digital resource use. Higher levels of resource use were associated with higher levels of caregiver quality of life. Caregiver identity did not differ by generation but did show higher overall resource use among those who identified as a caregiver. An interaction effect was found, suggesting that the relationship between identifying as a caregiver and resource use differed by generation. Digital devices and family support were identified as the most helpful resources. Cost was the most frequently named barrier to using additional resources. Millennials and Generation Z were significantly more likely than previous generations to name financial concerns as a barrier. These results demonstrate the relevance of generation and caregiver identity to understanding how caregivers can access available resources, and the need for generationally relevant interventions.

Childhood Adversity May Shift the Moral Compass: Observing the Links between Adverse Childhood Experiences and Moral Foundations Theory

Poster #1 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Sophia Aguilar
Research Mentor(s): Lisa Thompson

Childhood trauma is strongly linked to deviance in adulthood. Research has found that trauma from a young age can negatively affect development, thus influencing aggressive and violent behaviors. While there are measures of Adverse Childhood Experiences (ACEs) and a relationship between Morals and Decision-Making have been established, there has yet to be a research endeavor combining all three. This study 1) examines the link between ACEs and deviant behavior and 2) explores the mediating role that Moral Foundations Theory plays between the two. Using an online survey method, data is collected from a representative sample of 300 US adults. Results focus on the relationship between ACEs, history of deviant behavior and moral foundations, thus helping criminologists and psychologists gain a greater understanding of how ACEs influence the development of a person's moral systems and how childhood trauma may influence deviance in adulthood. By better understanding this link, insights from this research can be utilized to improve rehabilitation methods that focus on internal motivation and healing from traumatic experiences to alter behavioral outcomes.

Chronic Pain Experiences in College Students
Poster #11 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Hannah Hadley
Research Mentor(s): Anisah Bagasra

Chronic Pain is defined as pain lasting longer than three months, it has been associated with reduced quality of life, psychiatric difficulties, and increased risk of medication misuse. Although medication remains the most common treatment, research has shown the benefits of non-pharmacological coping strategies, including art therapy and virtual reality interventions. Prior research demonstrates that art therapy can improve emotional awareness, emotional regulation, coping and self-efficacy in individuals with chronic pain (Hass-Cohen et al., 2022; Demir et al., 2024). Emerging virtual reality interventions have shown feasibility and engagement in pediatric pain populations. However, limited research has examined how VR art therapy may improve quality of life in chronic pain populations, specifically pediatric populations. The study asks what role virtual reality art therapy could play in improving quality of life for children experiencing chronic pain? To ethically test this question before working with pediatric patients, this study first examines college students experiencing chronic pain. A survey was distributed through the PREX/SONA system and participants were rewarded 0.5 PREX credit. Two hundred participants answered questions assessing chronic pain, life impact and use of alternative interventions. Preliminary findings suggest that over 62% of participants reported *pain lasting three months or longer. Fifty-four percent reported use of over-the-counter medication, and 18% reported prescription medication use. Pain most frequently interfered with sleep, followed by academic and social life. Additionally, 38% reported using alternative therapies, 28% had engaged in art therapy and 52% had never used VR. These findings suggest a significant impact of chronic pain on daily life and show willingness to alternative interventions beyond medications. Results will guide future in-person testing of VR art therapy programs to evaluate feasibility for application for pediatric chronic pain populations.*

Designing Connection: A Qualitative Study on Technology Needs of Older Adults
Poster #23 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Maria Malespin Mendoza & Ethan Burin
Research Mentor(s): Isreal Sanchez-Cardona, Luisa Valentina Nino de Valladares, Paola Spoletini, & Maria Valero de Clemente

Technology has become the primary method of communication today, and many older adults have a hard time adapting. Studies show that we know little about how co-designed technologies affect people's health and well-being. To help close this gap, our project takes a stakeholder-centered approach to collect the voices, experiences, and priorities of older adults and their support networks to help in the technology design. In this project, we are conducting 10 semi-structured interviews with older adults to understand the needs, challenges, and expectations of older adults regarding features, usability, and barriers to adopting an app to support older adults and their families. Interviews last approximately 45 minutes and are limited to people aged 60 and older. Qualitative analysis, thematic analysis will be conducted using the software NVIVO, which helps to consolidate and codify data into meaningful categories and themes. The information from these interviews will inform app design choices, aiming to create an intuitive and easy-to-use platform for both older adults and caregivers. Although this project is ongoing, we anticipate that this app can provide a better quality of life, improving physical and mental health in older adults, and design app features following recommendations from older adults' needs and experiences. This work aims to connect advances in technology design with the development of practical, digital solutions that genuinely reflect and support the needs of older adults in an increasingly connected world. In the future, this evidence could inform research with more participants to further explore the improvement of app quality and application in different contexts and languages, and possibly help those with less access to health care.

Dispositional Mindfulness, Psychological Distress, and Buying Impulsivity
Poster #4 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Harlie Bowen
Research Mentor(s): Shadi Beshai

Buying impulsivity is a persistent pattern of unplanned and excessive purchasing that is associated with financial strain, psychological distress, and diminished well-being. Although cognitive and affective factors have been implicated in impulsive buying, relatively little research has examined whether dispositional mindfulness, defined as the tendency to attend to present-moment experience with openness and non-reactivity, is associated with reduced buying impulsivity. The present study examined the associations between dispositional mindfulness (measured by the Five Facet Mindfulness Questionnaire—Short Form; FFMQ-SF), psychological distress (Depression, Anxiety, and Stress subscales of the DASS-21), and buying impulsivity (Buying Impulsiveness Scale; BIS) in a sample of 376 U.S. adults (53.7% women; Mage = 39.36, SD = 12.47) recruited through Prolific. Pearson correlations revealed that FFMQ total scores were negatively and significantly associated with buying impulsivity ($r = –.32$, $p < .001$). At the facet level, Acting with Awareness showed the strongest inverse association with buying impulsivity ($r = –.35$, $p < .001$), followed by Nonjudging ($r = –.23$, $p < .001$), Nonreactivity ($r = –.17$, $p < .001$), and Describing ($r = –.12$, $p = .018$). All three DASS-21 subscales were positively correlated with buying impulsivity (rs = .14 to .31, ps < .01). A two-step hierarchical multiple regression predicting BIS scores revealed that mindfulness was a significant independent predictor of buying impulsivity, even after accounting for variance contributed by psychological distress symptoms. These findings indicate that dispositional mindfulness is inversely associated with buying impulsivity above and beyond shared variance with psychological distress, and that the Acting with Awareness facet may be particularly relevant to disrupting impulsive purchasing behavior.

EEG Measurement of Implicit Bias and Person Categorization Task
Poster #21 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Jaden Limes & Sam Oliveira
Research Mentor(s): Tim Martin

Tests of implicit bias, such as the implicit association test (IAT) and person categorization test (PCT), assess implicit associations between social categories and evaluative attributes, measuring reaction time differences during categorization. In a convenience sample of 70 undergraduate students, we assessed implicit bias and the underlying neural processing using EEG, PCT, and a survey to evaluate each participant's Social Dominance Orientation (SDO), trait anxiety, and state anxiety. These were used as the predictors for brain activation during the foreperiod between cue and target in the PCT. Standardized low-resolution brain electromagnetic tomography (sLORETA) was used to localize the sources of brain activity. Multiple regression analysis of the foreperiod activity revealed no significant effect for trait anxiety. However, both state anxiety and Social Dominance orientation (SDO) significantly predicted brain activity ($z > 1.96$), primarily in Brodmann Area 10 (anterior prefrontal cortex), *which is associated with a range of functions, such as decision making, reward and conflict, and working memory (Peng et al., 2018). Behavioral analysis showed no significant differences across conditions; there was a statistically significant difference ($t \geq 3$) in brain activation patterns identified in the comparison of brain responses to Black vs. White faces after a negative prime. No other pairings showed significant effects. These findings demonstrate that differences in brain activation can occur without behavioral differences, but the meaning of such differences is unclear.*

The Effect of Religious Coping on Life Stress and Mental Health Outcomes in Undergraduate Students and Minority Groups
Virtual Presentation (Microsoft Teams)
Session 2 at 2:00pm – 3:00pm
Undergraduate Student(s): Vivek Ghate
Research Mentor(s): Anisah Bagasra

Undergraduates encounter a variety of acute and chronic life stressors that increase their risk for psychological distress. Religious coping has been identified as a potentially significant determinant of mental health outcomes. Previous research indicates that religious coping is varied: positive strategies are generally associated with improved adjustment, while negative strategies are linked to poorer outcomes. Stress-process theory argues that life stressors alter mental health by mechanisms such as coping, social support, meaning-making, and self-concept. In spite of these established frameworks, significant gaps remain in understanding how religious coping operates among college students, and whether its benefits are more pronounced for racial and ethnic minority undergraduates who may utilize religion as a culturally grounded resource. This study examines the extent to which religious coping moderates the relationship between general life stressors and mental health among undergraduates, and whether this moderating effect is more pronounced for racial and ethnic minority students. Participants completed various validated measures of life stress, positive and negative religious coping, and mental health indicators, using a quantitative survey design. To ascertain whether the religious coping methods mitigates or exacerbates the effects of stress, and whether or not these patterns differ across demographically diverse subgroups, analyses will use moderation models. Preliminary analyses indicated that higher levels of general life stress were strongly associated with poorer mental health outcomes among undergraduates. Positive religious coping exhibited a modest protective effect, corresponding to slightly lower distress, whereas negative religious coping was clearly associated with increased psychological symptoms. The initial moderation analyses suggested that positive religious coping buffers where negative religious coping intensifies, the relation between stress and mental health issues. These effects appeared somewhat stronger among racial and ethnic minority students, which presents in line with theories that propose that religion may serve as a culturally-grounded resilience factor.

Establishing Regional NMDA Receptor Profiles in Cortex, Cerebellum, and Amygdala: Establishing protocol for future substance use studies
Poster #10 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Armanda Cuyler, Sanai O'Garro, John Greco, & Alissa George
Graduate Student(s): Bilal Saleem
Research Mentor(s): Erica Holliday

While cannabis use has grown exponentially, our understanding of its long-term neurobiological consequences is still catching up. This study explores how delta-9-tetrahydrocannabinol (THC) and stress interact to drive memory deficits. Specifically, we quantified changes in NMDA receptor subunits across brain regions implicated in the transition from intermittent to compulsive behavioral states, including the amygdala, cerebellum, and cortex. By examining region-specific alterations in NMDA receptor subunit expression, this work aimed to clarify how stress may prime neural systems for persistent cognitive vulnerability and long-lasting impairments in learning and memory. The cortex is fundamental to executive function and the cognitive control required to regulate behavior. NMDA receptor-mediated glutamate signaling supports the plasticity necessary for decision-making and the top-down regulation of emotional circuits. The amygdala serves as a central hub for emotional processing and the management of stress-related responses. Plasticity within this region, driven by NMDAR expression, allows the brain to adapt to emotional challenges; however, chronic THC and stress were implicated in the transition from intermittent to compulsive emotional states. The upregulation of GluN2B subunits was associated with a state of hypersensitivity, which may explain why "primed" rodents are reactive to physiological discomfort during withdrawal. The cerebellum, traditionally linked to motor coordination, is increasingly recognized for its role in fine-tuning motivational drive and automatic, habit-related processes. Through feedback loops with the temporal lobe and cortex, NMDAR-dependent plasticity in the cerebellum helps maintain inhibitory control over behavior. In quantifying these changes, we utilized Western blotting to measure GluN2A and GluN2B levels across the amygdala, cortex, and cerebellum in rodent models undergoing stress-challenges. Identifying subunit shifts helps explain the fundamental shift in addiction: why the brain eventually stops pursuing pleasure and begins seeking relief from distress. AI was used to help with the grammar and flow of the abstract.

Exploring Educational Occupational and Housing Differences by Race Among Georgia's WWII Veterans
Poster #16 (Convocation Center, VyStar Arena)
10:00 am – 10:45am
Undergraduate Student(s): Savannah Gill, Adrian Alicea, & Shania Mister
Graduate Student(s): Zachary Carden

Research Mentor(s): Kristin Horan & Chris Hess

World War II is often remembered as a unifying moment within American history; however, post and during war experiences of Black veterans were shaped by racial inequalities (Gullickson, 2010). This study aims to study and share the experiences and impact that stressors had on Black veterans and their family members' resilience during a time of adversity and discrimination. The analysis is based on the Public Use Microdata Series (PUMS) from the decennial census, a dataset composed of a 1% sample of the entire US population for a given decade. The dataset includes survey weights to broaden generalizability to the full US population. For this study, we filtered results to persons in Georgia and applied additional filters to fit reporting goals. Analysis of 1960 census data revealed substantial racial disparities among World War II veterans. Roughly 30% of Black veterans had only a grade school education, compared to 10% of White veterans. White veterans averaged 16 years of education compared to 11 for Black veterans. Occupational differences were also pronounced, with Black veterans concentrated in labor positions (SEI 11) while White veterans more often held managerial roles (SEI 59). Average household income for Black veterans was $5,000 compared to $10,000 for White veterans — a gap most clearly reflected in home ownership rates (63.5% vs. 83.8%). These findings highlight the enduring impact of racial inequality post World War 2. Despite military service, strong disparities in education, occupation and income all reflected structural barriers that heavily restricted opportunities.

Exploring the Predictors of Adolescents' Self-Esteem Across Varied Conditions
Poster #42 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Artemas Souder
Research Mentor(s): Ordene Edwards

Adolescents' self-esteem can impact various aspects of their lives, including well-being, academic experiences, and mental health. Self-esteem is normally relatively stable; however, it can fluctuate due to major life disruptions such as the COVID-19 pandemic. Thus, examining predictors of self-esteem under varied environmental conditions can reveal possible context-dependent effects. Factors including family dynamics, academic performance, student engagement, and demographics are significant predictors of self-esteem. Framed from the self-esteem theory, this study aims to examine how the relationship between these factors and self-esteem differs between students before and after the COVID-19 pandemic. We asked two research questions: 1) How do demographic factors (i.e., race, sex, geographic region, parents' education, and religion), family context (living conditions), and academic performance/engagement (i.e., GPA and attendance) predict self-esteem before the COVID-19 pandemic? 2) How do demographic factors, family context, and academic performance/engagement predict self-esteem after the COVID-19 pandemic? We expect the strength and direction of the relationship between *our predictors and self-esteem to differ between pre- and post-COVID pandemic responses, reflecting pandemic-related disruptions to adolescents' experiences. Data from the annual University of Michigan "Monitoring the Future" survey was used. The survey samples 8th, 10th, and 12th-grade students across the United States. We will assess the 8th-grade and 10th-grade data, particularly responses on the Likert-type self-esteem scale (6 items) and the demographic questionnaire. Using regression analyses, we will analyze the 2019 pre-COVID (N = 28,818) and 2024 post-COVID (N = 28,536) data. The findings provide school administrations with factors that influence student self-perception, allowing targeted interventions for students at risk. Furthermore, it can aid counselors in targeting specific issues facing students and how students have changed since the COVID-19 pandemic.*

Factors Impacting Healthcare Utilization among African American Young Adults
Poster #2 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Deebari Barisi
Research Mentor(s): Anisah Bagasra

The aim of our research is to examine how everyday discrimination, experiences with health care, medical mistrust, and health literacy are related to the postponement and utilization of healthcare service in young African American individuals. The question we're trying to answer is if the occurrence of medical mistrust affects the postponement of medical care in African American young adults. Our hypothesis is that higher levels of medical mistrust and postponement of medical care will have a positive correlation. Previous research has shown that there is an inverse relationship between perceived racism, medical mistrust, low health literacy, previous negative experiences and health-care utilization and healthcare postponement. Our research is focused on African American individuals aged 18-30. Participants were recruited through physical flyers as well as a variety of digital means such as through emails, advertising through various social media outlets, and distribution through group chats. Data collection is currently ongoing with an expected sample size of 50-75 participants. We expect our findings to support that high levels of everyday discrimination, negative experiences with healthcare, medical mistrust, and health literacy will have a positive relationship with postponement of medical care but an inverse relationship with utilization of healthcare services.

Factors Leading to Burnout Among Caregivers to Veterans vs. Non-Veterans: A Comparative Study
Poster #24 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Jennifer Phan & Aishat Oyelade
Research Mentor(s): Brian Moore

Caregivers comprise nearly half of the United States adult population. Many caregivers struggle with balancing high caregiving demands in addition to personal life, ultimately leading to burnout. Caregivers to veterans tend to have higher rates of burnout, which can diminish the quality of life for both the veteran and the caregiver. Currently, little research has been done to understand the factors leading to the difference in burnout between caregivers to veterans versus non-veterans. Assessing this is crucial to improving the overall care that is provided. This study aims to analyze the difference in burnout experienced by caregivers to veterans versus caregivers to non-veterans, while also considering the factors that may cause these differences. A cross-sectional, non-experimental survey was conducted to assess the levels of stress and burnout in the participants. A series of general linear models determined which factors led to the greatest burnout. Results indicate that caregivers to veterans have a higher rate of burnout in comparison to caregivers to non-veterans ($b = 0.54$; $t = 4.10$; $p < .001$). However, results show that the military status of the care recipient is not the leading factor for higher burnout ($b = 0.17$; $t = 1.26$; $p = 0.209$). The factors with the greatest influence on burnout were the recipient's differing levels of limitations to their activities of daily living, health conditions, and time needed for care. Therefore, agencies for veterans are encouraged to use this knowledge to provide resources to increase resilience for caregivers to veterans, improving both the caregiver and the recipient's quality of life.

From "Hardworking" to "Terrorist": Mapping Contemporary Stereotypes of Arab Muslim American Men

Poster #13 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Sydney Hammett, Sage Skillman, MacKenzie Jackson, Lily Thibodeaux, & Ahana Pattewar
Research Mentor(s): Tracie Stewart, Anisah Bagasra, Jennifer Willard, Tim Martin, & Ordene Edwards

Stereotypes play a powerful role in shaping how individuals are perceived and treated, especially when race, ethnicity, and religion intersect. Arab Muslim Americans are frequently portrayed in public discourse and media in ways that associate them with danger, foreignness, or disloyalty, yet surprisingly little empirical research has examined which specific stereotypes are most strongly linked to Arab Muslim American men. The present project sought to answer a central question: What contemporary stereotypes do American adults culturally associate with Arab Muslim American men, and how do these associations compare to perceptions of White American men? Across three studies conducted between 2024 and 2025 (total $N = 207$), college students and community members completed online surveys evaluating the perceived prevalence of more than 100 traits for these groups. Participants were asked, "According to most people, what percentage of [group] in the U.S. have the following characteristics?" This phrasing allowed us to measure shared cultural stereotypes rather than personal opinions. Difference *scores in prevalence estimates of each trait for Arab Muslim American men vs White men comprised our measure of Arab Muslim American stereotyping. Traits included in the assessment were selected based on common media portrayals and the research literature and refined across studies to identify the most consistent patterns. Analyses revealed that relatively few traits reliably emerged as stereotypes for Arab Muslim American men. Negative traits such as "terrorist," "superstitious," and "anti-American" were strongly and consistently associated with Arab Muslim American men across studies. However, "hardworking" proved to be the only positive trait to reach statistical significance. Overall, the findings suggest that stereotypes of Arab Muslim American men are strong, predominantly negative, and narrow in scope. This research contributes to broader conversations about intersectional stereotyping.*

Gender Identity and Neurodiversity: Investigating Patterns of Self-Reported Traits
Poster #20 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Alexander Jovanovic
Research Mentor(s): Ebony Glover

Previous research suggests there may be an overlap between neurodivergence and gender nonconformity, defined as not identifying with one's assigned gender based on sex. However, research on this relationship remains limited, and many studies tend to use the terms neurodivergent and autistic interchangeably, despite autism representing only one condition within the broader neurodivergent spectrum. This project aims to explore the potential relationship between gender identity and neurodivergence using a broader conceptualization of neurodiversity. Drawing on established literature and self-report measures associated with different forms of neurodivergence, this study proposes the development of a general self-report measure intended to capture a wider range of neurodivergent traits. Participants will complete this measure alongside questions about gender identity, including whether they identify with their assigned gender at birth. Based on these responses, participants will be categorized into two groups: gender-conforming and gender-nonconforming individuals. Survey data will then be analyzed to examine whether gender identity is associated with higher levels of self-reported neurodivergent traits. By expanding the definition of neurodivergence beyond autism alone, this study aims to contribute to a more comprehensive understanding of how gender identity may relate to broader patterns of cognitive and behavioral diversity. The findings may help clarify whether previously observed associations reflect a wider relationship between gender diversity and neurodivergence rather than a connection limited specifically to autism. While data has not yet been collected, it will be both collected and analyzed before the Symposium takes place.

The Influence of Social Essentialist Beliefs on Reader Identity Development and Comprehension
Virtual Presentation (Microsoft Teams)

Session 2 at 2:00pm – 3:00pm
Undergraduate Student(s): Maci DeMott
Research Mentor(s): Yian Xu & Ordene Edwards

Reading comprehension is critical for college students' success, which can be influenced by their reader identity and reading motivation. Social contexts can shape reader identity, and social essentialism may predict it. Social essentialism relates to a belief system that maintains social groups have inherent, fixed properties. Although evidence exists that essentialist beliefs influence sociocultural identity, little is known about its effect on reader identity. Moreover, despite overwhelming evidence of the influence of social factors on motivation, the literature is scant about the role of social essentialism in college students' reading motivation. Given the impact of comprehension on postsecondary achievement, it is crucial for educators to identify the social predictors of reader identity and reading motivation and understand how reader identity and reading motivation influence comprehension. As such, the present study asked: (1) How do students' social essentialist beliefs influence students' reader identity and motivation? We also replicated prior studies to explore two additional questions: (2) How are students' reading motivation and reader identity predicted by other social factors (3) How are students' reader identity and reading motivation related to their reading comprehension? Undergraduate students (N = 132) attending a public university in the Southeastern USA completed a survey online and were assessed on their social essentialist beliefs, reader identity, and reading comprehension. We found that stronger essentialist beliefs on cohesiveness and naturalness were positively associated with reader self-efficacy and utility value. However, the naturalness dimension was positively correlated with reader identity, metacognitive self-regulation, and motivation. Cohesiveness beliefs were positively related to students only reading for academic purposes. Interestingly, a multiple linear regression revealed that family was the only significant predictor for reader identity and motivation. Finally, the students' reader identity and motivation were associated with greater reading comprehension. Implications include insight for educators and families to develop adaptive reader identity.

Juror Decision-Making and Domestic Minor Sex Trafficking: Defendant Age and Disability Status of Alleged Victim
Poster #27 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Alex Llamas, Audrey Beilharz, & Kadie Fiveash
Research Mentor(s): Dorothy Marsil & Jennifer Willard

Individuals who are commercially sexually exploited (CSE) through force, fraud, and/or coercion, or who are minors, are considered victims of trafficking. In recent years, scholars in psychology, public health, and law have increasingly examined this global issue. Although awareness has led to stronger efforts to prosecute sex trafficking perpetrators—particularly in *cases involving children—less is known about how jurors evaluate evidence and make decisions in these cases. Understanding juror decision-making is critical, as perceptions of defendants, victims, and expert testimony may influence trial outcomes. The proposed study aims to examine factors that may influence mock juror decision-making in a case of domestic minor sex trafficking (DMST) using a 2 (Age of Defendant) × 2 (Disability Status of Alleged Victim) between-participants design. Jury-eligible adults will be randomly assigned to read one of four brief trial summaries and complete an online questionnaire assessing guilt ratings, verdict decisions, confidence in verdict, perceptions of witness believability and credibility, and demographic information. Findings from this research are expected to contribute to the literature on juror decision-making in trafficking cases by identifying potential sources of bias related to defendant age and alleged victim disability status. By examining how these factors interact to influence guilt perceptions and verdict outcomes, this study may inform forensic interviewing practices, expert testimony, and broader legal strategies. Specifically, results may guide forensic interviewers and expert witnesses in structuring testimony to address potential juror misconceptions and implicit biases, while also assisting attorneys and other legal professionals in anticipating how demographic factors may shape juror evaluations of credibility and evidence. Ultimately, this research aims to support more equitable judicial outcomes in cases involving domestic minor sex trafficking. Results will be presented at Kennesaw State University's Symposium of Student Scholars.*

Juror Decision-Making and Domestic Minor Sex Trafficking: Defendant Age and SES Alleged Victim

Poster #4 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Audrey Beilharz, Kadie Fiveash, & Alex Llamas
Research Mentor(s): Dorothy Marsil & Jennifer Willard

Individuals who are commercially sexually exploited (CSE) through force, fraud, and/or coercion, or who are minors, are considered victims of trafficking. In recent years, scholars in psychology, public health, and law have increasingly examined this global issue. Although awareness has led to stronger efforts to prosecute sex trafficking perpetrators—particularly in cases involving children—less is known about how jurors evaluate evidence and make decisions in these cases. Understanding juror decision-making is critical, as perceptions of defendants, victims, and expert testimony may influence trial outcomes. The proposed study aims to examine factors that may influence mock juror decision-making in a case of domestic minor sex trafficking (DMST) using a 2 (Age of Defendant) × 2 (Socioeconomic Status of Alleged Victim) between-participants design. Jury-eligible adults will be randomly assigned to read one of four brief trial summaries and complete an online questionnaire assessing guilt ratings, verdict decisions, confidence in verdict, perceptions of witness believability and credibility, and demographic information. Findings from this research are expected to contribute to the literature on juror *decision-making in trafficking cases by identifying potential sources of bias related to defendant age and alleged victim socioeconomic status. By examining how these factors interact to influence guilt perceptions and verdict outcomes, this study may inform forensic interviewing practices, expert testimony, and broader legal strategies. Specifically, results may guide forensic interviewers and expert witnesses in structuring testimony to address potential juror misconceptions and implicit biases, while also assisting attorneys and other legal professionals in anticipating how demographic factors may shape juror evaluations of credibility and evidence. We will have results to present at the symposium, highlighting how these factors interact to influence guilt perceptions and verdict outcomes. Ultimately, this research aims to support more equitable judicial outcomes in cases involving domestic minor sex trafficking.*

Moderate Oral Cannabis Exposure During Pregnancy Did Not Alter Important Memory-Related Brain Proteins in Adolescent Offspring

Poster #39 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Graduate Student(s): Bilal Saleem
Undergraduate Student(s): Ujala Zaman
Research Mentor(s): Erica Holliday, Vishnu Suppiramaniam, Kawsar Chowdhury, & Miranda Reed

Exposure to cannabis during pregnancy has been linked to long-term changes in brain development and learning ability in offspring. However, it is still unclear whether exposure to the main psychoactive component of cannabis, Δ^9-tetrahydrocannabinol (THC), during pregnancy changes important proteins involved in brain communication. In this study, we examined whether prenatal THC exposure alters key proteins that help brain cells communicate with each other in the hippocampus, a brain region important for learning and memory. Pregnant rats were given a moderate dose of THC (5 mg/kg) or a control solution during pregnancy and early postnatal development. When the offspring reached adolescence, we analyzed proteins from their hippocampus using a laboratory technique called Western blotting, which allows researchers to measure the amount of specific proteins. We focused on α-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid (AMPA) receptors, which play a major role in transmitting signals between brain cells. Specifically, we measured two receptor components of AMPA receptors (GluA1 and GluA2), a structural post synaptic density protein (PSD-95) that helps organize synapses, and two regulatory phosphorylation sites on the GluA1 at Ser 831 and Ser 845 location, that control how the receptor functions. Our results showed no significant differences between the control group and the THC-exposed group in the levels of these proteins or in the phosphorylation of GluA1. This suggests that moderate prenatal THC exposure did not change the overall amount of these important synaptic proteins in the hippocampus during adolescence. It is important to note that Western blotting mainly detects large changes in protein levels. Therefore, it may not detect more subtle changes, such as small shifts in receptor *organization at synapses or fine-scale molecular modifications. Even so, the results indicate that moderate prenatal oral THC exposure does not cause major changes in the overall levels of these key synaptic proteins.*

Neighborhood Place Attachment and Social Connectedness in Young Adulthood
Poster #17 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Alanna James
Research Mentor(s): Chanler Hilley

Place attachment is described as the emotional bond between individuals and specific geographic locations (Clarke et al., 2017). These bonds often develop through personal memories, shared experiences, and a sense of belonging within a community (Williams & Vaske, 2002). Given that young adulthood is marked by increased autonomy, mobility, and identity exploration, place attachment may be especially important during this transitional period (Chevrier & Lannegrand, 2023). Little is known about the factors that promote neighborhood place attachment during young adulthood or how it relates to social connectedness, which is defined by Lee and Robbins (1995) as a subjective sense of belonging and interpersonal closeness. Prior cross-national research suggests that social relationships within a place may strengthen feelings of belonging and meaning (Dallago et al., 2009); however, few studies have directly examined the association between social connectedness and neighborhood place attachment among college students. The current study examines how neighborhood place attachment relates to social connectedness. Participants were 452 young adults recruited through introductory psychology participant pools. Analyses will be conducted using multiple regression. This study will improve our understanding of social connectedness as part of a broader social context.

Pattern Recognition Ability and Its Impact on Test Accuracy
Poster #30 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Kate Scott
Research Mentor(s): Ebony Glover

Pattern recognition is identified as one of the numerous processes utilized in working-memory. Previous research in cognitive psychology suggests that individuals use implicit pattern detection to guide decision-making, especially in moments of confusion or uncertainty. This begs the question: Does pattern recognition through working-memory affect the accuracy of multiple-choice question tests? To test this, participants will complete an online study consisting of two parts: a shortened Raven's Progressive Matrices (RPM) task serving as a pattern-recognition test, and a 20-item general knowledge test composed of multiple-choice questions. Participants will be randomly assigned to one of two test conditions through the general knowledge test: a *control group with randomized correct answer choices, and an experimental group with correct answer choices arranged in a discernible pattern. Accuracy on the test will serve as the primary dependent variable. It is predicted that participants who have higher pattern-recognition scores will have higher rates of speed and accuracy on the multiple-choice test, performing better than the control group. Findings can be utilized to help shape future directions in academics, balancing how to transfer information into long-term memory rather than test taking strategies. The results can also bring potential to exploring another perspective within this study, such as the social perspective of how individuals change their behavior when exposed to unexpected patterns.*

Perceptions and Predictors of Digital Self-Help Mindfulness Interventions
Poster #32 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Kirah Shepard, Carolina Espinoza, & Brooklynn Wolfe
Research Mentor(s): Shadi Beshai

Increasing mental health literacy is driving help-seeking, and digital psychological interventions have proliferated to meet this demand. Among these, mindfulness- and self-compassion-based programs have gained traction as scalable approaches to psychological wellness. Engagement with and retention in psychological interventions is consistently associated with attitudes about treatment acceptability (i.e., the perceived suitability of a treatment) and credibility (i.e., the perceived logic and likely effectiveness of a treatment). However, it remains unclear whether dispositional mindfulness and self-compassion are associated with such critical engagement-related attitudes toward mindfulness-based digital interventions. This study examined whether dispositional mindfulness, self-compassion, and self-help adherence propensity predicted perceived acceptability and credibility of Mind-OP, a mindfulness- and self-compassion-based digital self-help program. A community sample of adults ($N = 379$; $Mage = 45.61$, $SD = 28.91$; 54.1% female) recruited through Prolific completed measures of dispositional mindfulness, self-compassion, self-help adherence propensity, depression, and anxiety, followed by an evidence-based description of Mind-OP and measures of treatment acceptability (TAAS) and credibility/expectancy (CEQ). Self-help adherence propensity was significantly correlated with both treatment acceptability ($r = .76$, $p < .001$) and credibility ($r = .60$, $p < .001$). Dispositional mindfulness ($r = .39$, $p < .001$) and self-compassion ($r = .34$, $p < .001$) were also significantly associated with treatment acceptability. These findings suggest that individuals higher in dispositional mindfulness, self-compassion, and self-help propensity may be more receptive to mindfulness-based digital interventions, informing strategies to enhance uptake of scalable mental health programs.

Priming Lighting Expectations and Psychological Functioning
Poster #29 (Convocation Center, VyStar Arena)

10:00am – 10:45am
Undergraduate Student(s): Kate Scott
Research Mentor(s): Kayla Sargent

Previous research has determined that differences in environmental interior lighting, including hues and luminance, has a physiological impact that can influence an individual's cognition, mood, and behavior (Durak et al., 2006; Bouberki et al., 2014). The present study builds on this work, examining whether individuals' associations with lighting conditions affect psychological functioning, even without direct exposure. Participants completed an online study in which they were randomly assigned to view an image of a conference room that varied only in lighting type. After viewing the image, participants responded to a writing prompt describing the tasks they would perform in the room. This task was intended to prime their associations with the depicted lighting environment. Participants then completed a brief digit span test to assess cognitive performance, followed by a self-report emotional scale to assess their emotional state. It is hypothesized that exposure to the image featuring a certain type of lighting, paired with the writing task, will prime participants' expectations about the environment, influencing cognition and mood. Preliminary data from this study will be presented.

Productive Conflict Among High Stress Work Environments
Oral Presentation (Prillaman Hall, Indoor Plaza)
11:00am – 11:50am
Undergraduate Student(s): Adrian Alicea, Rhayne Ash, & Raima Hussain
Research Mentor(s): Kristen Horan

Interpersonal conflict in the workplace refers to the negative exchanges between individuals that may cause disagreements, hostility, or general incompatibility in values or communication styles. In terms of overall occupational stress, such conflict has been linked to augmented psychological strains and stress-driven physical health declines. While in most cases conflict in the workplace is deemed harmful, such interactions can be used to foster productivity because it has the potential to bring about collaboration and improved problem-solving skills. Understanding how to use conflict in a constructive manner in high-pressure environments is very important when prioritizing employee wellbeing and organizational effectiveness. We conducted a cross-sectional study that investigated the relationship between workplace conflict and health outcomes among the general working population. Preliminary data included a sample of 46 employed students who completed validated self-report surveys through SONA, measured included the Interpersonal Conflict at Work Scale (ICAWS), the Thomas Kilman Conflict Management Style inventory, the Copenhagen Burnout Inventory, and three-item scales measuring attitudes toward and intentions to participate in integrated occupational safety and health programming (modified from Lassen et al., 2006). Correlation analyses revealed that more frequent workplace conflict was positively associated with burnout, $r(44)=0.58, P<0.001$. Those *who preferred to compromise in the face of conflict were more likely to report positive attitudes toward, r(45)=0.37,p<0.05, and stronger intentions to participate in integrated safety and health programming, r(45)=0.35, p<0.05. These findings suggest that although frequent workplace conflict was positively associated with work burnout, workers that were willing to find a compromise while facing conflict were more likely to report both positive attitudes and stronger intentions and willingness to participate in safety and health programming. Overall, this suggests that the promotion of collaboration and compromising behaviors can promote a healthier organizational climate and promote participation within safety and health interventions.*

Qualitative Analysis of Memorable Messages and Self-Determination Theory Basic Needs During the Transition to Adulthood
Virtual Presentation (Microsoft Teams)
Session 2 at 2:00pm – 3:00pm
Undergraduate Student(s): Kait North & Aylin Ramirez
Research Mentor(s): Chanler Hilley

Memorable messages are concise, "sticky" messages (Knapp et al., 1981) that may influence behavior and self-regulation and inspire meaning making (i.e., control theory; Carver & Scheier, 2008). Prior research has investigated how young adults' job-related messages fit into basic needs highlighted by self-determination theory (competence, autonomy, relatedness; Scarduzio et al., 2018). In the present study, we coded memorable messages about the broader transition to adulthood reported by 792 young adults who completed online surveys. Each open-ended response was coded based on the three SDT basic needs, identity exploration, and message domains (e.g., family, work, education). Preliminary analyses demonstrate that messages mostly pertained to autonomy and independence. Memorable messages can help guide young adults through major life experiences (Wolfe et al., 2025). For instance, researchers found that college students who reminisced on academic-related memorable messages helped to alter their behavior (Nazione et al., 2011). Beyond content and sources of memorable messages, the influence that they have on individuals shapes their transition to adulthood (Wolfe et al., 2025), including how young adults are socialized and how they explore their self-concepts (Cooke-Jackson et al., 2025).

A Qualitative Study of Neighborhood Place Attachment, Pride, and Future Residential Intentions in Young Adults
Poster #41 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Natilee Talvan
Research Mentor(s): Chanler Hilley

Place attachment refers to the social and emotional bonds individuals form with meaningful places (Altman & Low, 1992). Although place attachment research is more commonly quantitative, existing scales may not sufficiently capture how young adults conceptualize their neighborhoods (Manzo & Pinto de Carvalho, 2018). Residential instability and self-discovery are common characteristics of young adulthood (Arnett, 2000), which may influence how place attachment is experienced and displayed in young adults. While quantitative methods assess the strength of place attachment, they may miss the meanings, emotions, and social processes underlying place attachment bonds (Manzo & Pinto de Carvalho, 2018). This study examines how college students describe and interpret their neighborhoods, with a specific focus on pride and future plans to live in that neighborhood, in an effort to improve the measurement of place attachment in young adults. Participants were 452 students from Kennesaw State University who completed a Qualtrics survey. After coding open-ended responses about young adults' neighborhood experiences, we plan to focus on how measurement scales can be modified to their developmental contexts and how they express place attachment or detachment. By examining young adults' experiences qualitatively, we aim to provide important context that will aid in the development of more internally and ecologically valid measures of place attachment for future research.

The Relationship Among Adverse Childhood Experiences, Mental Health, Inflammation, and Working Memory

Poster #35 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Saloni Patel
Research Mentor(s): Sharon Pearcey, Cody Mashburn, & Erica Holliday

Adversity in early life, measured by adverse childhood experiences (ACEs), increases the risk for depression, anxiety, and cognitive difficulties (Lowry et al., 2022). But how these early experiences relate to later mental health and cognitive problems is not well understood. This research aims to explore whether the body's inflammatory signals can bridge the connection between ACEs and cognitive impairments. We hypothesize that adverse childhood experiences (ACEs) contribute to heightened systemic inflammation, which mediates the relationship between ACEs and affective measures (e.g. depression and anxiety), ultimately resulting in impairments in working memory capacity. Participants completed a demographics survey, the adverse childhood events checklist (ACES), the Depression, Anxiety, and Stress Scale (DASS), the State-Trait Anxiety Scale (STAI), and the STROOP task to assess working memory. Participants provided a saliva sample in order for us to measure C-Reactive Protein using enzyme-linked immunosorbent assays (ELISAs; Salimetrics, State College, PA). These findings will provide a more comprehensive view of how cognitive abilities, adversity in early life, mental health, and inflammation are interrelated for future non-invasive diagnostics.

The Relationship Between the GRIN2B Gene, Adverse Childhood Experiences, and Cognitive Functions
Poster #9 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Emily Clarke
Research Mentor(s): Sharon Pearcey, Erica Holliday, & Cody Mashburn

The current study investigates the relationship among the genotypic expression of the GRIN2B gene, adverse life experiences (ALEs), and drug use. The GRIN2B gene is implicated in the glutaminergic system's N-Methyl-D-Aspartate (NMDA) receptors and synaptic plasticity (Barros et. al., 2025). While there are thousands of GRIN variants, the majority of mutations are concentrated within the GRIN2A and GRIN2B genes (Ugale et. al., 2024). The GRIN2B gene codes for the expression of the GLUN2B subunit of the NMDA receptor, which is involved in the control of synaptic plasticity and glutamate release within the hippocampus and frontal cortex (Doan et. al., 2023). Given that glutamate is the most abundant excitatory neurotransmitter within the brain, this neurotransmitter is inextricably tied to the development and functioning of cognitive abilities. Certain variations of the GRIN2B gene have been found to correlate with cognitive deficits (Karanović et. al., 2025). Previous studies have shown that exposure to ALEs can induce long-lasting changes in epigenetic patterns, such as DNA methylation, thus providing a genetic explanation for adverse effects from ALEs (Engdahl et. al., 2021). Fifty-eight female and 28 male undergraduate students (M age = 18.63 years) took surveys assessing adverse life experiences (Life Events Checklist; LEC), adverse childhood experiences (Adverse Childhood Experiences Questionnaire; ACEs), substance use (Alcohol, Smoking, and Substance Involvement Screening Test; ASSIST), and state/trait anxieties (State-Trait Anxiety Inventory; STAI-S, STAI-T; Spielberger, et al., 1983). Cognitive flexibility and impulsive decision making were measured using the Number Letter Switch Task (millisecond.com) and the Delay Discounting Task (millisecond.com), respectively. Participants provided a saliva sample for DNA extraction and analysis of the GRIN2B gene expression. Data is fully collected; however, salivatory biomarker analysis is ongoing. It is hypothesized that GRIN2B genotypes will mediate differences in resilience toward the cognitive deficits as they relate to ACEs.

Relationships Between the Public Occupational Safety and Health Workforce and Occupational Injuries, Fatalities, and Workforce Productivity
Poster #3 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Adrian Alicea, Savannah Gill, & Mahi Polineni
Research Mentor(s): Kristin Horan & Shiyang Su

Worker wellbeing and occupational health are not only shaped by both individual and organizational factors, but also macro-level determinants such as governmental investment in *occupational safety and health (OSH) research, education, and outreach. Since 1971, the National Institute for Occupational Safety and Health (NIOSH) has played a key role in promoting and funding research on OSH policies as well as providing resources and workplaces (NIOSH, 2023). This study aimed to investigate the direct relationship between NIOSH funding and NIOSH workforce size to the following Variables: Occupational Injury Rates, Occupational Fatality Rate, Workforce Productivity, and Time Spent Working. This study hypothesized that a higher level of NIOSH funding will be directly associated with lower injury and fatality rates, at no detriment to overall workforce productivity and time spent working. To test this hypothesis, data was collected through archival data across several decades since the direct creation of NIOSH in 1971 to the most recent publication of outcome data in 2024. Data was analyzed using an autoregressive distributed lag (ARDL) model to better examine both current and lagged effect of NIOSH funding on occupational health and safety outcomes. The Akaike Information Criterion (AIC) was used for model selection. Results showed that the NIOSH budget rose from $17 million in 1971 to approximately $360 million in 2024 during this time the occupational injury rate decreased, occupational fatality rates decreased and workforce productivity increased as well as time spent working increased. Overall, this study aimed to explore the relationship between federal investment in OSH infrastructure and occupational injury and fatality rates and workforce productivity through utilizing archival data. These findings help to inform policymakers that investment into public occupational safety and health workforce is fundamental as it is strongly associated with decreased injuries and fatalities without harming productivity levels.*

Shift Work and Later-Life Cognitive Decline: Examining Long-Term Occupational Risk Factors for Cognitive Aging

Poster #12 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Maria Fata
Research Mentor(s): Dianhan Zheng

While working nonstandard hours is popular in current economies, worries have been raised about the long-term health impact of shift work. Shift work, especially night and rotating schedules, has been linked with circadian rhythm disruption, sleep disturbances, and increased cardiometabolic risk that collectively are associated with cognitive impairment. However, relatively little research conducted in the U.S. has investigated whether exposure to shift work predicts cognitive decline later in life. Based on circadian disruption theory and cognitive reserve frameworks, our research question is: Do adults who have worked non-daytime shifts in midlife show lower cognitive functioning later compared to daytime workers? I will use data from the Midlife in the United States (MIDUS) project, which followed a nationally representative sample of over 7,000 adults longitudinally. Work schedule information was obtained from MIDUS 1 (1995-1996), in which participants reported whether they worked regular daytime, *evening, night, or rotating shifts. Cognitive functioning was assessed in MIDUS 2 (2004-2009) using standardized measures of episodic memory and executive functioning. Shift work status at MIDUS 1 will serve as the independent variable, coded as daytime (0) versus non-day shift (1). The dependent variable will be a composite cognitive functioning score from MIDUS 2. Multiple regression analysis will be used to examine whether midlife shift work predicts later cognitive performance while controlling age, gender, education, and self-rated health. I expect to find that MIDUS 1 participants who reported working non-daytime shift will demonstrate lower cognitive functioning at MIDUS 2. However, causal conclusions will not be possible given the study design. Additionally, shift work will be measured only at Wave 1, meaning the analysis will not capture changes in work schedule between MIDUS 1 and MIDUS 2. Overall, this study aims to contribute preliminary evidence regarding the potential long-term association between midlife shift work and later-life cognitive functioning.*

Social Norms and Student Perceptions of AI Misuse in Higher Education
Poster #38 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Hannah Rowe
Research Mentor(s): Jennifer Willard

As artificial intelligence (AI) tools become increasingly available, college students may struggle to determine when and under what circumstances it is acceptable to use these tools (Freeman, 2025). Social norms including injunctive norms (beliefs about what we ought to do) and descriptive norms (beliefs about what we do) shape people's behavior in a variety of circumstances. Prior research suggests that these norms are dynamic and can be updated when people receive new information about peer behavior (Deutchman et al., 2025), but little is known about how they shape perceptions of AI usage in particular. This study sought to examine the extent to which these two types of norms are related to students' perceptions of AI appropriate versus inappropriate uses of AI in academic settings. In an online survey, college students are randomly assigned to complete one of three measures that ask about the frequency of several AI-misuse behaviors: perceived injunctive norms, perceived descriptive norms, or self-reported behaviors. All participants rate the extent to which they perceive these same AI-misuse behaviors as cheating. Participants then complete college-related questions (e.g., major) and demographic information.

South Asian Perspectives on Autism Assessment and Therapy
Poster #3 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Duaa Bilal
Research Mentor(s): Anisah Bagasra

Autism spectrum disorder is a neurodevelopmental condition that benefits from early diagnosis and intervention. It is increasingly recognized in the United States; however, South Asian families continue to face disparities in timely diagnosis and access to services due to barriers such as limited autism literacy, stigma, gendered caregiving roles, and cultural or religious interpretations of disability (Hossain et al., 2017; Jegatheesan et al., 2010; Smith et al., 2024; Theara & Abbott, 2015). Research remains limited on how these factors interact to influence help-seeking behavior among South Asian parents in the U.S. Therefore, this study examines how these factors relate to South Asian parents' willingness to pursue autism assessment and therapy services for their children. It is predicted that lower autism literacy will be associated with higher self-stigma and lower willingness to seek services. An anonymous Qualtrics survey consisting of demographic questions and scales measuring autism literacy, help-seeking intentions, stigma, and religious beliefs was distributed through social media, community organizations, and South Asian autism support networks. Participants were required to identify as South Asian, be at least 18 years old, reside in the United States, and the parent of an autistic individual. Preliminary descriptive data indicate that responses measuring stigma-related attitudes towards autism yielded relatively low agreement overall ($M = 1.71$, $SD = 0.90$). In contrast, responses measuring help-seeking intentions and beliefs about pursuing services showed moderately higher agreement ($M = 3.26$, $SD = 1.37$). These results suggest that stigma surrounding autism among South Asian parents in the U.S. may be decreasing, while willingness to pursue services may be increasing. These findings contribute to a growing body of research examining cultural influences on autism service utilization among South Asian communities. By highlighting factors that may shape parental decision-making, this study aims to inform culturally responsive outreach efforts and family-centered interventions that reduce barriers to care.

Student Perceptions of Arabs, Muslims, and Arab Muslims
Poster #33 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Mia Rodriguez-Alvarado, Van Phan, Sydney Hammett, Langston Hankerson, & Ahana Pattewar
Research Mentor(s): Tracie Stewart, Anisah Bagasra, Yian Xu, Jennifer Willard, Tim Martin, & Ordene Edwards

The media and global politics play a critical role in shaping society's views on social groups. Recent events, such as the New York mayoral race featuring a Muslim candidate and geopolitical conflicts in the Middle East, have intensified public discourse around Arab Muslim American communities and sparked discriminatory practices. This public spotlight on Arab Muslim Americans signals the importance of better understanding the stereotypes associated with this group to more effectively reduce the harmful effects of these biases on the Arab Muslim American community. The present research builds on a series of studies investigating public *perceptions of Arab Muslim American men in the United States (Hammett et al., 2026). In this study, 80 KSU undergraduate students completed an open-ended survey aimed at delineating contemporary stereotypes of Arab Muslim American men and determining whether these biases were attributable to race, religion, or an interaction of both. Participants listed stereotypes for White men, Black/African American men, and either Arab Muslim American men, Arab American men, or Muslim American men. The total count of traits and number of positive and negative traits generated per group were analyzed. Overall, fewer traits were generated for the Arab/Muslim groups than for other groups and results indicated little differentiation among the three Arab/Muslim subgroups, supporting outgroup homogeneity — a bias where people perceive members of other groups as lacking variability. Arab American men — the only subgroup without a religious identity — received the most negative and fewest positive traits of the three subgroups. These findings suggest that Arab identity may be the strongest predictor of stereotyping behaviors among non-Arab/Muslim participants, and that outgroup members do not highly differentiate between distinct Arab/Muslim identities. Understanding these stereotype patterns is essential for developing evidence-based interventions, such as situational attribution training, to reduce bias and discrimination against Arab and Muslim Americans.*

Suicidality and Risk Factors in Informal Caregivers to Veterans and Non-Veterans
Poster #31 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Aishat Oyelade
Graduate Student(s): Kimberly Gomes
Research Mentor(s): Brian Moore

Background: Caregiver suicidality is a significant yet under addressed public health crisis. They experience higher rates of suicidal ideation compared to the general population. The psychological burden is often brought on by social isolation, depression, anxiety, and severity of the care recipient's condition. These factors lead to higher suicidal ideation and burnout over the course of their tenure. However, little is known about how the military status of recipients affects caregivers. This study aims to examine which factors contribute to higher suicidality in caregivers who care for veterans compared to caregivers who care for non-veterans. Methods: Participants ($N = 270$) were caregivers recruited from a community sample who completed a battery of assessments to evaluate contextual and individual predictors of suicidal ideation. We ran two separate logistic regression models with the same structure (i.e., demographics, caregiving effort, psychological distress, and positive coping resources) varying only in the outcome variable (i.e., if the individual cared for a veteran or civilian and reported some level of suicidal ideation). Results: The model identified that sleepiness ($\beta = .126$, $p = .026$, $OR = 1.13$) was associated with suicidal ideation among caregivers of civilians, $\chi 2\ (26) = 80.27$, $p <.001$, Nagelkerke R2 = .373. In contrast, when examining the same model structure among caregivers of veterans, anxiety ($\beta =.096$, $p = .029$, $OR =1.10$) was the only variable associated with suicidal *ideation among this subgroup of caregivers, $\chi 2$ (26) = 67.93, p <.001, Nagelkerke R2 = .384. Discussion: Results indicate that 43 percent of participants endorsed struggling with suicidal ideation. Of those struggling, 63 percent cared for veterans, while 37 percent cared for non-veterans. For caregivers who care for veterans, the most prevalent factor contributing to suicidality is anxiety, while the most prevalent factor for caregivers to non-veterans is sleepiness.*

Testing the Efficacy of a Workshop to Increase Knowledge and Behavioral Intention to Engage in Advanced Care Planning Among Undergraduate Students
Poster #45 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Hamna Zahoor, Lea Allen, & Bella Barnes
Research Mentor(s): Anisah Bagasra

Does a workshop with college student participants advance knowledge and behavioral engagement in advanced care planning (ACP)? Advanced care planning (ACP) is a personal plan that maps out an individual's wishes at the end-of-life if they are unable to make that decision themselves. Previous research shows a lack of role responsibility within the medical field for ACP. This, paired with young adult's lack of understanding of young death and illness creates a communication gap between medical professionals and young adults leading to a lack of engagement in ACP and completing of Advance Directives (ADs). Previous research also shows that minorities are less willing to participate in advance care planning compared to white communities. One of the main barriers that stops young adults from completing ACP is lack of knowledge (Tripken & Elrod, 2017). Previous research on games, apps, and simulations indicating that games can make talking about ACP and end of life wishes more accessible, relaxing and reduce stigma (McDarby, Llaneza, George & Kozlov, 2021). Using this research as the basis, a one-hour workshop was conducted in the 2025 spring and fall semesters to four different groups of undergraduate students. Fifty-eight participants completed pre-assessment before the workshop and post-assessment after the workshop. Paired t-tests were conducted. Findings indicate statistically significant differences in confidence in knowledge of ACP from pre (M=1.77, SD=..98) to post workshop (M=3.72, SD-=.80) t(13)=56, p=.0001, and willingness to discuss ACP (M=2.23, SD=1.3) to (M=2.96, SD=1.4) t(4)=55, p=.0001 post workshop. Thirty six percent said it was fairly likely and 15% indicated it was very likely that they would add an AD to their medical record, indicating moderate rates of behavioral intention to complete AD. Future research will include one month follow-ups to determine advance directive completion, and workshops conducted with a larger, more diverse population.

Understanding How Socialization Relates to Future Orientation in Young Adults
Poster #22 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Elon Haynes

Research Mentor(s): Chanler Hilley

Positive attitudes about one's own ethnic-racial identity are positively related to developmental assets such as hope for the future (Stevenson et al., 2002; Takamasa et al., 2024). As individuals reach young adulthood, they mature and broaden perspectives, leading to their understanding of ethnic/racial identity becoming deeper and more refined (Umaña-Taylor et al., 2014). The process by which families socialize ERI is referred to as ethnic-racial socialization (ERS), which is comprised of four dimensions: cultural socialization, preparation for bias, egalitarianism, and promotion of mistrust (Houston-Dial et al., 2025). Studies have shown that future orientation is related to positive youth outcomes such as behavioral flexibility, increased curiosity about the future, increased consciousness of future consequences, and decreased unruly behavior (Johnson et al., 2015; Santilli et al., 2017). In this study, we examine the relationship between ERS and future orientation in African American young adults. Data are currently being collected from 238 African American young adults through the survey platform Prolific. We anticipate that higher ERS will be related to higher future orientation. This study is intended to provide insight for parents, caretakers, and professionals on the ways in which ERS can assist African American young adults in preparing for their futures.

What Factors Impact When People Support Company Diversity Statements?
Poster #26 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Indira Robotham & Victoria Tirino
Research Mentor(s): Danica Kulibert

The BLM movement has brought renewed attention to racial injustice and prejudice. While Industrial-Organizational Psychology has explored how identities such as race and gender influence workplace behavior, little research has focused on how people respond to companies that take public stances on social justice issues. This study investigates how attitudes toward social justice and understanding of social movements influence support for companies that express such positions. We surveyed 396 people about their involvement in social justice activities, perceptions of sexism and racism, understanding of the BLM movement, and support for companies engaging with social justice. Correlation results showed that greater involvement in social justice, stronger recognition of sexism/racism, and more positive views of BLM were all associated with greater support for companies engaging in social justice (r's > .30). The findings suggest that customer attitudes toward social justice shape how corporate activism is received, highlighting the importance for companies to consider values of their consumer base when deciding whether to take a public stance.

When Do Authority Figures Tell The Truth?
Poster #32 (Convocation Center, VyStar Arena)

1:00pm – 1:45pm
Undergraduate Student(s): Jamesyn Moore, Charlotte Clement, Stella Steinman, Ivy Breinig, Ashley Iupi, Parker McCaig, Amelia Packer, & Joe Anthero Rosa
Recently Graduated Student(s): Kaylie Phu
Research Mentor(s): Nicole Martin

During the fundamental years of development, children are heavily influenced by the authority figures in their lives. This study examined three key authority figures that school-age children interact with often; each figure varies on level of influence on children: principal (direct-impersonal), parent (direct-personal), and caregiver (indirect-personal). A friend has no authority, serving as the fourth and neutral category. Children rely on the truthfulness of what adults tell them, forming the basis of their understanding of the world and the control authority figures have over them. Referencing Fu et al., (2007), this study presented children (6- to-11 years) with four short stories (4/8 total stories) by a researcher in an online testing scenario. The stories involved three authority figures and one non-authority figure (friend) who were either lying or telling the truth to a child character in the story. After each story, child participants judged whether the character was lying and explained their reasoning. Preliminary data collection has included about 90 children of varying ages and approximately an equal split of male and female participants, with ongoing collection taking place. Early analysis trends toward a positive relationship between age and successful lie detection. Qualitative analysis of child participants indicates that there is more acceptance toward principals lying in the scenarios and that children provide a wider breadth of rationale for the reasoning behind the lying. In contrast, children viewed the stories which included two friends as having the least room for lying within their relationship. Children identify that other children have equal power, while viewing authority figures as having more power over them, resulting in children feeling less in control and discomfort when lied to by authority. Children value honesty in adults, and their willingness to accept deception may depend on the perceived control an authority figure has over the child.

Sociology & Criminal Justice

The Biological and Social Determinants of IVF: The Impact of Age, Ovarian Reserve, and Pre-existing Medical Issues on Assisted Reproduction Outcomes
Poster #28 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Emma Martin
Research Mentor(s): Evelina Sterling & Linda Treiber

The outcomes of in-vitro fertilization (IVF) are influenced greatly by a variety of biological factors, such as maternal age, pre-existing health problems like Polycystic Ovary Syndrome

(PCOS) and Endometriosis, and ovarian reserve. Maternal age is one of the most significant predictors for the outcome of IVF, with younger women having higher pregnancy and live birth rates due to their increased number of oocytes, while older women (over 35) have declining oocyte quality, as well as live birth and pregnancy rates. Certain underlying medical issues, particularly endometriosis and PCOS, also contribute to success in IVF. Women who have been diagnosed with endometriosis have been shown to produce fewer oocytes and embryos during controlled ovarian simulations; differently, women who have PCOS often demonstrate higher yield of oocytes, however differences in embryo quality and other factors may affect clinical outcomes of IVF. Ovarian reserve and its measurements of anti-Müllerian hormone (AMH) levels are also strongly correlated with the success of IVF in women. A mixed method research approach was used, with qualitative data coming from fertility clinics which assess their individual success rates. Additionally, data from previously published research studies as well as the CDC (Center for Disease Control) will be used to evaluate IVF success quantitatively. The use of both types of data will help explore if marketing and business practices emphasize biological predictors adequately, or if representation of these IVF success rates is skewed based on factors such as economic status and racial inequality. It is anticipated that the aforementioned biological factors will have a large effect on the success of IVF, but social determinants like economic level and racial disparities can affect the way clinics selectively present their data; this leads to the need for more transparent reporting practices and equitable healthcare for women struggling with reproductive health issues.

Embodied Liberation: Theatre of the Oppressed as Rehabilitation in American and German Carceral Systems

Poster #26 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Amari Lewis
Research Mentor(s): Tanja Link & Margaret Pendergrass

In the United States, nearly two million people are currently held in local, state, and federal jails and prisons, giving the US the highest incarceration rate of any independent democracy. As the global carceral trend continues to grow in favor of long-term sentencing (specifically in Europe and America), this deepening institutionalization is not met with comparable rates of effective and intensive rehabilitation programs. Drawing from the critical framework of Augusto Boal's Theatre of the Oppressed, and from ethnographic research collected on site at Atlanta Transitional Center and JVA Wiesbaden's theatre ensemble, Die Werft, this essay examines ways in which prison-theatre initiatives in the United States and Germany seek to fill the gap. Through the lens of phenomenological critical theory, this study seeks to further explore how embodied critical consciousness manifests within both the performers in prison-theatre initiatives and their corresponding audiences. Ultimately, this paper argues that prison-theatre initiatives serve as effective models of rehabilitation in carceral settings by encouraging embodied *reflection, community-building, and radical empathy in incarcerated performers, their audiences, and their communities, and offers strategies on how to improve upon rehabilitation efforts.*

From Penal Codes to Moral Codes: Exploring the Relationship Between Parental Incarceration, Deviance, and Moral Foundations
Poster #7 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Obadiah Blaine
Research Mentor(s): Lisa Thompson

For years, social scientists and researchers have examined the correlation between incarcerated parents and the likelihood of delinquency among their children. However, no research has linked parental incarceration and likelihood of delinquency among their children with Moral Foundations. Using Social Learning Theory and Moral Foundations Theory, we examined the link between parental characteristics, moral systems, and deviance. We hypothesized that those who grew up with at least one incarcerated parent had a higher chance of participating in delinquent behaviors. Using a secondary data source of 1,770 US adults, we examined data on moral foundations, parental incarceration, and family characteristics. Employing a self-report online and offline deviance survey and the Moral Foundations Questionnaire allows us to better analyze the link between parental incarceration, delinquency, and moral foundations. Looking at parental incarceration, measures of both online and offline deviance, and scores from the Moral Foundations Questionnaire, we found that the presence of an incarcerated parent appears to lead to a higher chance of delinquency. Proof of this correlation will allow us to better support incarcerated parents and their children, while understanding the moral foundations of this research suggests that having more social support systems for expecting parents and at-risk youth will be beneficial for many communities.

Institutional Definitions and Structural Barriers Within Access to Reproductive Care
Poster #40 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Kaliyah Stewart
Research Mentor(s): Evelina Sterling & Linda Treiber

Infertility has definitions across different disciplines. Sociologically infertility is not being able to produce children, not medically but social factors such as sexual orientation. Medically infertility is the failure to achieve pregnancy after 12 months of unprotected intercourse. These definitions reference eligibility for diagnosis and treatments, racial disparities in reproductive care raise questions on if these definitions are representing accurately. This project examines how infertility definitions influence access to reproductive-care with factors such as Insurance eligibility and treatment access using data publicly accessible in the SART/CDC data base and *evaluating how infertility treatments are marketed on clinic websites and other publicly available materials. The study will also consider research on pregnancy outcomes after an infertility diagnosis mentioning maternal morbidity, and access to prenatal care among minorities. This project is meant to evaluate how the label of infertile may shape treatment eligibility and reproductive health outcomes. The analysis suggest that infertility relies heavily on prompt diagnosis and consistent access to reproductive care, this may unintentionally delay treatment. When analyzed next to systematic barriers it will affect the likelihood of achieving a healthy pregnancy from minorities. As an expected result definitions may not structure access to treatment but interact with broader problems and reproductive health outcomes. Understanding how definitions shape eligibility is essential to keep infertility and reproductive medicine growing and improving. While simultaneously defining racial disparities within reproductive care we will be able to provide better outcomes for those struggling with fertility medically, or sociologically.*

Moral Traits and Emotional States: Examining the Impact of Emotion and Morality on Deviant Decisions

Oral Presentation (Prillaman Hall, Indoor Plaza)
11:00am – 11:50am
Undergraduate Student(s): Chrystal Alexander & Emily Martinez
Research Mentor(s): Lisa Thompson Lee

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. Using Moral Foundations Theory and social intuitionist perspectives as our framework, this study expands upon our previous research by incorporating scenarios that explore themes of individualizing (harm/care, fairness) and binding domains (loyalty, authority, purity). Specifically, we explore the relationship between morals and deviant decision-making while accounting for emotional states. Data was collected from 346 United States residents recruited through Amazon Mechanical Turk. During the study, participants listened to emotion priming music to control whether they felt happy or sad. They then were asked to respond to eight different scenarios involving instances of embezzlement, theft, harassment, and victimless crimes in real time, allowing observation of emotional influence on one's moral compass. Lastly, they were tasked to complete the Moral Foundations Questionnaire, and measures of self-control, religiosity, history of deviance, and demographics. Therefore, this study aims to examine the connections between emotions, morality, and decision-making simultaneously. Results indicate emotional states influence decision difficulty and responses, but moral values play the stronger role in determining judgments of right and wrong. Ultimately, findings from this research may provide useful information for treatment and rehabilitation, as well as community education.

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

Poster #27 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Emily Martinez & Chrystal Alexander
Research Mentor(s): Lisa Thompson Lee

In 1915, American Physiologist Walter Bradford Cannon introduced "The 4F responses," a theory suggesting that trauma responses (fight, flight, freeze, and fawn) can disrupt moral reasoning by altering how individuals assess right and wrong in both high-stress and ordinary situations. This project takes an interdisciplinary approach and uses Moral Foundations Theory, Moral Disengagement Theory, the Moral Trauma continuum model, and Social Intuitionist Theory to explore how an individual's moral intuitions and automatic judgment processes impact their trauma responses and behavioral outcomes. Social Intuitionist Theory proposes that moral judgments are often produced by rapid, automatic, and emotional intuitions rather than effortful reasoning, which may overlap with instinctive trauma responses when individuals face perceived threat or stress. This current study involves a sample of 358 respondents and uses a survey method presenting hypothetical scenarios to measure both intuitive and effortful decision-making processes (e.g., decision time and difficulty, confidence level, and levels of self-control). Results showed that moral domains and baseline trauma response tendencies significantly shaped decision-making experiences. In relation to this, flight and freeze patterns were associated with greater decision difficulty and longer decision-time, whereas fight and fawn patterns were associated with reduced decision difficulty, reflecting more automatic processing styles. Additionally, trauma responses did not significantly predict final behavioral outcomes, resulting in history of deviance emerging as the strongest predictor of deviant choices. Collectively, these findings support Social Intuitionist Theory by demonstrating that intuitive and experience-based processes shape moral decision-making, while Moral Disengagement Theory and the Moral Trauma Continuum help explain how prior exposure to deviance influences defensive response patterns.

Rehabilitation Behind Bars: An Ethnographic Comparison of Prison Programs in Germany and the United States

Poster #32 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Robyn Potts
Research Mentor(s): Tanja Link

This ethnographic study explores how rehabilitation is defined, implemented, and experienced within correctional institutions in Germany and the United States. Specifically, exploring how cultural, structural, and legal contexts shape the goals and practices of rehabilitation in different *correctional systems. Existing literature suggests that rehabilitative philosophies vary widely across nations, yet few studies provide direct, immersive comparisons of how these philosophies operate in daily institutional practice. This project seeks to contribute to that gap by examining the lived realities of rehabilitation in two contrasting correctional environments. This research employs field observations and semi-structured interviews that are designed and delivered to be understood within each cultural context. A comparative analytical framework is employed to examine the different rehabilitative approaches. Preliminary findings reveal the extent to which cultural values significantly shape and impact rehabilitative programs, influencing their goals, and the implementation of methods. Within Germany's justice and correctional systems, resocialization and reintegration are highly prioritized, while the United States's systems emphasize on retribution and punitive means, hindering long-term sustainable rehabilitative outcomes. This study concludes that cultural values and legal frameworks substantially shape the aims and effectiveness of rehabilitative programs. By comparing these distinct approaches, the project highlights how correctional systems might better balance accountability with opportunities for growth and reintegration, and how societal beliefs ultimately influence what rehabilitation is allowed to become.*

The Role Political Views and Morality have on Public Perception on Crime

Visual Display #50 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Gage Larabee
Research Mentor(s): Lisa Thompson

With the rise of technology and social media, all news regarding violent crimes–like mass shootings and murder–travels quickly. While many people respond with feelings of fear, sadness, or confusion, contemporary research suggests that reactions to violence and punitive attitudes are linked to political leanings (e.g., right-wing versus left-wing). Additionally, there is strong evidence to support the connection between political leanings and moral values. The current study uses Moral Foundations Theory to investigate the overlap between moral systems and political leanings in order to determine if and how morality and political ideology are connected. Using a series of vignettes that represent current events, respondents indicated their level of agreement with moral foundations-aligned statements. We anticipate that people who are more right-wing will identify more closely with the morals of authority/respect, equality/proportionality, and purity/sanctity while also favouring harsher punishments for offenders, while left-wing individuals will identify more closely with the morals of harm/care and fairness/reciprocity while also favouring lighter punishments for offenders. We also hypothesize that both groups will have relatively equal ties to in-group/loyalty. For those who are identified as centrist, we hypothesize that they will fall somewhere in the middle, giving equal merit to all of the MFT's divisions of morality and favouring middle-of-the-road punishments. Ultimately, we feel that this research will provide a better understanding of the links between morality, *political ideology, and punitive attitudes. Likewise, insights on the moral system can help sociologists and criminologists understand what events spark moral outrage and trigger calls for different purposes of punishment.*

Who is Under Pretrial Services: An Exploration of Correlates of Pretrial Service Assignments
Poster #30 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Graduate Student(s): Destiny Morrison
Research Mentor(s): Melanie Holland

Pretrial agencies operate all over the country and oversee people who have been accused of a crime but not yet tried in criminal court. The purpose of pretrial agencies is to collect information about recently arrested individuals, present this information to the court, remind defendants about upcoming court dates, supervise defendants during the pretrial period, ensure they comply with their release conditions, and report their compliance to the court during the pretrial period. However, little is known about how these discretionary decisions are made. This study endeavors to fill this gap by examining correlates of pretrial service assignments to shed light on which demographic groups are more likely to be assigned to these services. Using data collected by the Virginia Sentencing Commission from 2018-2020, the researchers conducted cross-tab analysis to examine relational trends and chi-square analyses to assess statistical significance. The final sample consisted of 96,135 cases throughout the state of Virginia over 3 years. Of these cases, the majority of defendants were male, indigent, White, between the age of 26-35, and were appointed to an attorney. According to the findings of this study, indigency status, offense severity, gender, race, and age of defendant, among other variables, are significantly related to pretrial service release outcomes. These findings identify relevant trends related to pretrial service assignments, the implications of which are explored further in this study.

Technical Communication and Interactive Design

Designing with Empathy: An Iterative User-Centered Approach to Digital Mental Health for College Students
Poster #16 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Lyn Jung
Graduate Student(s): Zularbine Kamal
Research Mentor(s): Kanu Priya Singh

College students face increasing mental health challenges, yet many refrain from getting consistent help because of barriers related to social stigma, cost, privacy, and confidentiality. While digital mental health tools have promising alternatives, student engagement is often temporary due to lack of usability and user-friendliness of these applications (Lattie et al., 2022; Akinsulore et al., 2022). This study delves into the initial phase of designing and developing an e-mental health app (eMH) for college students by employing empathy-based research methods, including empathy interviews, empathy mapping, and persona development to inform its design principles. We conducted six focus groups and co-design workshops in Spring and Fall 2025 using empathy interviews that captured the emotional and cognitive needs of the students. Participants ranged in age from 18 to 25 years (69.2% female). All participants were either self- or school-diagnosed with mental health problems and had mild to moderate current mental health symptoms as measured via PHQ-9 (depression) and GAD-7 (anxiety) scales. A majority of participants stated they downloaded eMH apps but did not feel motivated enough to continue using them because of complex interfaces, lack of personalization, frequent notifications, or payment walls. In this study, we present a selection of empathy maps and personas derived from our empathy interviews, to offer insights into the diverse experiences and perspectives of participants towards eMH apps. Empathy maps and personas are visual tools that help create a better understanding of user needs and foster empathy towards users (Gibbons, 2018). We also provide preliminary wireframe designs distilled from our empathy methods. We conducted a focus group with four students, recruited from the initial phase pool of participants to assess the designs and ensure that it represents our target users' perspectives. Forthcoming steps include rapid prototyping and multiple rounds of usability testing of the eMH app.

E-Learning Module to Support Dietary Management through RealMeal
Poster #11 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Leah Freeman
Research Mentor(s): Laura Palmer & Kayre Lupo

Access to nutritional information is great, but it's simply not enough when assessing the effectiveness of a user's ability to practice dietary management. Factors such as emotional engagement and user confidence are keys to success when evaluating dietary management. My honors capstone project includes the design and development of a condensed, interactive e-Learning module for users of RealMeal, a developing dietary management platform, in personalizing their account to align with their individual dietary goals/restrictions while understanding basic elements of dietary management. Guided by the ADDIE framework and principles of the SAM model, this e-Learning module is created using Articulate Rise 360 and hosted within Canvas for user accessibility. Specific learning objectives are defined as the measurable success rates of the course, and are also used to analyze the areas of expected user growth after completion of the course. Interactive, multimedia elements such as scenario-based *instruction and random knowledge checks are implemented to promote user engagement throughout. The purpose of this project is to illustrate the effectiveness of instructional design principles when effectively deployed through interactive learning modules. The guided onboarding process paired with additional dietary information serves to better equip RealMeal users with not only the tools, but also the information helpful in reaching and sustaining productive dietary management.*

Nudge App Prototype

Virtual Presentation (Microsoft Teams)

Session 1 at 2:00pm – 3:00pm

Undergraduate Student(s): Grey Gibson, Orryn Echols, Bethany Lee, Ashley Yelverton, Novintzki Ariste, & Erick Montoya

Research Mentor(s): Lauren Palmer

Excessive smartphone use has become a growing public health concern, linked to sleep disruption, cortisol dysregulation, and structural changes in the brain's reward system (Nakshine et al., 2022; Lembke, 2021). App design features like notifications, infinite scroll, and social feedback loops are intentionally designed to maximize continuous engagement, often at the cost of user wellbeing. While a rapidly growing market of screen time wellness apps has emerged in response, existing solutions rely primarily on restriction-based mechanics that temporarily reduce screen time without producing lasting behavioral change. This gap in effective, awareness-based intervention design represents an unmet need in both the screen time wellness market and the broader field of behavioral UX research. The purpose of this project is to identify the most effective design strategies for reducing screen time through behavioral nudges rather than app blocking, contributing a research-backed prototype to the field of Interactive Design. User interviews with three participants revealed that screen time limits are too easy to bypass, that social guilt rather than boredom is often the trigger for problematic use, and that emotional tone of feedback matters as much as the data itself. Users responded negatively to imposed friction but responded positively to friction they configured themselves. A competitive analysis of three leading apps confirmed that none successfully connects screen time reduction to replacement behavior completion, and that feature density without clarity drives early abandonment. Using a mixed methods approach including interviews, affinity mapping, and usability testing, our team is developing Nudge, a Figma prototype that prioritizes awareness-based feedback, configurable limits, and a non-judgmental visual identity. Full results from usability testing and prototype refinement will be presented at the Undergraduate Research Symposium.

Government and International Affairs

A Small but Significant Gap: Facebook and Political Knowledge

Poster #42 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Taelin Vaughn
Research Mentor(s): Benjamin Taylor

Social media has become an increasingly pervasive influence, affecting the way people access and disseminate information. While social platforms are designed to enhance political awareness about substantive issues, emerging studies reveal that algorithmic trends distort information among politically engaged users. Emerging evidence suggests that while platforms like Facebook claim to connect users with information, their systems prioritize engagement over accuracy, leaving users aware of politics but misinformed about facts. A study published by the Journalism & Mass Communication Quarterly confirms that lower levels of political knowledge stem from increased Facebook media consumption. This project investigates the informational effects of social media, and the way platforms program content to misinform the public. At the heart of this research is a simple yet revealing question: How much do individuals know about the government's spending? Through a comparative framework, I analyze data from the American National Election Studies (ANES) 2020 and 2024 surveys to reveal that frequent Facebook users are significantly more likely to misidentify the least-funded federal program than non-users. These findings align with echo-chamber theories, demonstrating how digital platforms prioritize homogenized content over factual data. Interestingly, users regularly exposed to political content on Facebook demonstrate a significant tendency to overestimate federal spending on Social Security, confirming the trend in misinformation and cognitive bias. These results challenge assumptions about the informational benefits of social media and underscore the need to reconsider how digital platforms foster political knowledge. My goal in this study is to bring awareness to the dangers of contemporary social platforms and to encourage citizens to consider more traditional and diverse media outlets when consuming political information.

Bridging Perspectives: Civility and Collaboration in Experiential Learning
Poster #47 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Bridget Zwonitzer, Hannah Anderson, & Ana Luisa Onofre
Graduate Student(s): Margaret Carter & Dylan Whitney
Research Mentor(s): Jennifer Purcell, Jen Wells, Karen Boettler, & William Hargrove

Civility in student affairs and higher education plays an important role in fostering a positive campus climate, promoting respectful dialogue, and supporting student engagement. Challenges relating to incivility have intensified on college campuses resulting from stress, unclear expectations, power imbalances, and online interactions. Depending on their background and *experience, students may be unsure of how to demonstrate civil, respectful behavior. Uncivil actions negatively affect students' academic performance, well-being, and sense of belonging. Therefore, it is important to cultivate civility in higher education systems through experimental learning, intentional student affairs initiatives, positive faculty role modeling, and peer support groups. This study explores how undergraduate students understand civility and their ability to practice respectful dialogue. Using Reflective Structured Dialogue (RSD), students participated in guided conversations designed to encourage active listening, reflection, and respectful engagement across differing perspectives. By giving allotted time to each individual, these dialogues created space for participants to share personal experiences without interruption, cultivating respect through an active listening environment. Insights from these RSD sessions may inform how institutions can better promote civil interactions through student-focused and campus-wide initiatives. Preliminary data analysis suggests that practicing active listening and respect through RSD can be highly beneficial to increasing civility among undergraduate students. This poster presentation will feature detailed findings and implications for student affairs practice and higher education decision makers.*

Correlation Between Education and Political Identification
Visual Display #51 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): David Anderson
Research Mentor(s): Benjamin Taylor

This study examines the relationship between educational attainment and political identification, a topic that offers insight into broader political behavior and voter alignment. Understanding how education influences placement on the political spectrum contributes to ongoing discussions about political polarization, campaign strategies, and voter engagement. Specifically, this research investigates how varying levels of education: elementary, middle school, college, and advanced college, correlate with political identification during the years 2000 to 2004. Using quantitative analysis of survey data from this period, the study evaluates whether differences in education levels significantly impact political leanings. The findings indicate that there is no statistically significant relationship between education level and political identification, and therefore the null hypothesis cannot be rejected. These results suggest that, within the timeframe studied, education alone was not a determining factor in shaping individuals' positions on the political spectrum.

A Fair and Impartial Court? Partisan Confidence in the Supreme Court and Reactions to 21st Century's Most Controversial Decisions
Poster #11 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Emily Cruse

Research Mentor(s): Benjamin Taylor

How does partisanship influence confidence in the Supreme Court of the United States, and how do particularly controversial cases, namely, Bush v. Gore (2000) and Dobbs v. Jackson Women's Health Organization (2022), impact these partisans' confidence? Supreme Court decisions in recent years have highlighted the justices' stark ideological leanings. Both Bush v. Gore and Dobbs generated immense media coverage and controversy that called the true intentions of the justices, particularly the conservative justices, into direct question, emphasizing the need to understand the public's response to these decisions and determine if partisanship has a lesser or greater influence on confidence following a decision. I theorize that Republicans will have greater confidence in the Supreme Court following Bush v. Gore and Dobbs because they believe the Court sided with their ideological beliefs. Subsequently, I believe that Democrats will have decreased confidence following these two decisions because they feel that the court has decided against their views. I hypothesize that confidence in the Supreme Court will be higher among Democratic respondents and lower among Republican respondents, and that Confidence in the Supreme Court will increase among Republican respondents and decrease among Democratic respondents following Bush v. Gore and Dobbs, so I will control for the years 1972 to 2000, 2002 to 2022, and 2024. I use the General Social Survey Cumulative Datafile from 1972 to 2024 to test my hypothesis. Using a chi-square test, I find that a statistically significant relationship exists between partisan identification and confidence in the Supreme Court only in the 2024 timeframe, following Dobbs, and that statistical significance increases over time. Overall, the findings of this research enhance our understanding of the relationship between partisanship and confidence in the Supreme Court and highlight ideological divides following two of the most controversial decisions of the past few decades.

From Classroom to the Ballot Box: How Sex Education Shapes Policy Views for Kennesaw State Students
Virtual Presentation (Microsoft Teams)
Session 2 at 4:00pm – 5:00pm
Undergraduate Student(s): Alyssa Royal
Research Mentor(s): Elizabeth Gordon & Sarah Young

Does a Kennesaw State student's experience with sex education better predict their attitude toward reproductive policies (such as abortion regulation) than their political affiliation alone? I have decided to conduct a research project for my honors capstone. This study explores how college students at Kennesaw State University recall and evaluates their experiences with sex education and how these experiences relate to their broader social and political policy views. Building on previous research conducted, it suggests that political identification often shapes moral and educational attitudes. This project investigates whether the content or absence of sex education in students' formative years correlates with their current policy positions, particularly *regarding reproductive rights, public health, and educational reform. Using a quantitative analysis through survey data, I hypothesized that students who received comprehensive sex education are more likely to support progressive policy stances. At the same time, those with limited or abstinence-only instruction may lean more conservatively on policy issues, regardless of current party affiliation. However, upon surveying the POLS 1101 class (taught by Dr. Taylor), Dr. Gordon and I have found that the data collected does not support the hypothesis I initially made. This investigation is meant to understand why my hypothesis may have been incorrect, what other factors may have contributed to these results, and the correlation between sex education, politics, and policy views overall.*

The Impact of Religion on American Politics from the Pews to the Polls
Poster #2 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Gia Behravesh
Research Mentor(s): Benjamin Taylor

How does the strength of an individual's religious affiliation shape their political attitudes and ideologies? Religious affiliation deeply affects how many Americans vote and the ideologies that they believe in. In addition to this, the degree of a person's religious devotion can impact politics in different ways depending on which religion they follow. My theory is that survey respondents who report stronger levels of religious affiliation will be more likely to be conservative because religious institutions tend to promote traditional values that align with a more conservative ideology. I hypothesize that respondents who have stronger religious affiliations are more likely to uphold conservative political ideologies, while respondents with weaker religious affiliations can also impact political ideology, so I control for that factor. I use the American National Election Study data from 2018 and 2024 and a Chi-square test to evaluate my hypothesis. I find that there is a relationship between religious affiliation and political ideology. Different religious affiliations can also impact political ideology, so I will also control for that factor. I will utilize the American National Election Study Cumulative File from 2018 and 2024 to test my hypothesis. The findings of this research project will help develop knowledge surrounding religion's influence on American politics.

A History of Unjustice: Why Black Respondents Lead the Decline in Confidence for Supreme Court
Poster #17 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Zenar Coggins
Research Mentor(s): Benjamin Taylor

Is there a lack of confidence for Black respondents when it comes to the Supreme Court? The Supreme Court relies on its perceived legitimacy from citizens in order to ensure voluntary obedience to the law. But not all American voters share this institutional trust. Black respondents are the ones who share the least confidence in the Supreme Court. I hypothesize that because of a history of systemic exclusion and judicial rulings that are seen as not delivering equal justice (corruption). Black respondents have lower levels of confidence in the Supreme Court. In comparison to White respondents and respondents from other ethnic groups, I predict that Black respondents will indicate much lower levels of confidence in the Supreme Court due to these historical rulings. Using the General Social Survey (GSS) Cumulative Datafile from 1973 to 2024 and a Chi-square test to test my hypothesis, I find that Black respondents have significantly lower confidence in the Supreme Court than respondents from other racial groups. There is an ongoing confidence gap between Black and other respondents, which highlights the difference of trust due to race. This research shows that Black Americans have a growing lack of confidence in the Supreme Court, showing that the court's function as a source of justice is seen through a lens of mistrust.

Navigating the Aftermath: Determinants of Post-COVID Career Trajectories Among Women Faculty with Caregiving Responsibilities
Poster #29 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Ana Luisa Onofre, Hannah Anderson, & Kyndall Moore
Graduate Student(s): Margaret Carter
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-cession," 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 research presentation will explore said impacts through the analysis of interviews with ten faculty women conducted in 2021 and 2025. Thematic analysis resulted in the following areas of impact: 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 institutional policies and practices to support women faculty professional development and advancement in higher education.

Opinion Formation and Socialization
Poster #2 (Convocation Center, VyStar Arena)

3:00pm – 3:45pm
Undergraduate Student(s): Nardos Alemayehu
Research Mentor(s): Benjamin Taylor

How do early life experiences or socialization agents shape political attitudes later in life? Early life experiences and socialization agents help shape political attitudes because this is what builds your values and morals, which affect your political party affiliation. As we are younger, we are shaped by things around us, so these life experiences help build our foundation. I theorize that religious upbringing influences political party affiliation because the values you learn at church school can instill beliefs in you that could align with your political views. We see that people who went to church school and grew up in a church environment are more prone to gaining values that they learn there. I hypothesize that respondents who attended church school for more years are more likely to affiliate with a certain political party than those who did not attend church school. But I believe that religious upbringing and political party affiliation may change over time, so this relationship will change as well. I use the General Social Survey from 1972 – 2024 to test the relationship between political party affiliation and religious upbringing. Using a Chi-square test to test my hypothesis, I find that Respondents who attended Church School for more years are more likely to affiliate with a certain political party than those who did not go to Church School. Overall, this research shows how these political attitudes affect your values and morals. It touches on identity and the community in which you grew up, which fundamentally shapes our political party affiliation.

Partisanship and Confidence in the United States Supreme Court
Virtual Presentation (Microsoft Teams)
Session 3 at 1:00pm – 2:00pm
Undergraduate Student(s): Brenda Saenz
Research Mentor(s): Benjamin Taylor

How do Democrats, Republicans, and Independents differ in their confidence in the United States Supreme Court? In recent decades, the Supreme Court has become increasingly polarized, causing varying levels of confidence among Democrats, Republicans, and Independents. Partisanship is crucial in understanding how individuals' political attitudes influence their views on institutions like the Supreme Court. I theorize that partisanship will affect confidence in the U.S. Supreme Court because of the nature of the decisions the court has made over time. I hypothesize that Democrats, Republicans, and Independents will significantly display varying levels of confidence in the Supreme Court. I will utilize the General Social Survey to test my hypothesis. Additionally, I will examine the years 1973, 2004, and 2022 to test whether major Supreme Court rulings cause fluctuations in confidence in the Supreme Court across Democrats, Republicans, and Independents. Overall, the findings of this research strengthen our understanding of the relationship between partisanship and confidence in institutions like the

U.S. Supreme Court and examine how major rulings affect fluctuations in that confidence over time.

Partisanship and Perceptions of Women's Suitability for Political Leadership
Poster #19 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Madison Guynup
Research Mentor(s): Benjamin Taylor

How does political identity affect attitudes towards women in politics? Women have historically been underrepresented in political positions and often face significant barriers to come into a political occupation. I believe one of these barriers is people's attitudes about the overall suitability that women have for these roles. I theorize that political identity affects people's attitudes towards women in politics because people who identify as Republican tend to hold more traditional and patriarchal ideals about women in society; whereas, people who identify as Democrats tend to adopt more progressive ideals and continually seek revolution of traditional norms, thus supporting the incorporation of women in political positions. I hypothesize that respondents who are Democrats are likelier to disagree that most men are better suited emotionally for politics than are most women; respondents who are Republicans are likelier to agree that most men are better suited emotionally for politics than are most women. Additionally, given the evolution of ideologies over time, I expect this relationship will be strongest during the Women's Liberation Movement context. Thus, I test these relationships by controlling the years 1974-1985 compared to 1986-2024. I utilize the GSS Cumulative datafile from 1974-2024 and use a Chi-square test to test my hypothesis. I find that the relationship is significant. Overall, the findings of this research will enhance our understanding about the role that political identity plays in individuals' attitudes towards women's suitability for political positions and may help to achieve more understanding on how to boost the likelihood of women being elected to political positions.

Patriotism in the United States
Poster #40 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Anna Scoggins
Research Mentor(s): Benjamin Taylor

How does partisanship affect patriotism? This topic deserves further research because there is a strong surge of nationalism gripping the United States in recent years. My theory is that strong senses of patriotism will be more prevalent among Republican respondents because Republicans tend to support a more "America first" agenda. Thus, my hypothesis is that partisanship affects patriotism with Republicans being more patriotic and Democrats being *less patriotic. I use survey data from the General Social Surveys (GSS) in the years 1972-2024 to perform my analysis. Using a Chi-Squared test, I find that there is a statistically significant relationship between partisanship and patriotism. However, the gamma coefficient of –0.09 indicates that there is a weak negative relationship between partisanship and patriotism. This means that as one variable increases, the other decreases, but only slightly. As a result, it can be seen that partisanship may not be the most influential factor in determining what leads to heightened senses of patriotism amongst Americans. These findings push back against the widely held belief that patriotism is a primarily partisan issue. These insights into what leads to heightened senses of patriotism amongst Americans are invaluable in being able to navigate today's United States.*

Political Attitudes and Behaviors Among Individuals with Disabilities
Poster #32 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Ramiyah Murrell
Research Mentor(s): April Johnson

Research shows that having a disability significantly decreases an individual's probability of voting. The present project investigates why there is a voting gap between those with disabilities and those without disabilities, with particular focus on the psychological mechanisms and environmental factors that play into political involvement. To do so, we gather data from individuals who report having a disability using an online survey platform called Prolific. In addition to survey questions on disability type, onset, and severity, we gather data on individual levels of political engagement, partisanship, political interest, perceptions of the political process, and policy preferences. Results from this study help to shed light on the political behavior of individuals with disabilities and provides suggestions for how they might be better incorporated into political life today.

Public Attitudes Toward Government Assistance: The Role of Age, Gender, and Political Affiliation
Visual Display #49 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Lucy Peal
Research Mentor(s): Benjamin Taylor

This project looks at how people's attitudes toward government assistance programs for low-income families differ based on age, gender, and political affiliation. It focuses on three main areas: whether people support government assistance, whether they believe these programs are effective, and whether they support increasing funding. By examining these factors together, the study aims to better understand how demographic and political differences shape opinions about *social welfare. I expect that younger individuals, women, and people with more liberal political views will show stronger support for assistance programs and see them as effective, while older individuals, men, and those with more conservative views may be less supportive and more likely to oppose expanding funding. Early data shows that while many respondents support government help, others believe individuals should take care of themselves, with a large portion falling somewhere in between.*

The Role of University-Level Student Disability Services on Attitudes Towards Government and Political Engagement
Poster #1 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Sidney Agee
Research Mentor(s): April Johnson

This research examines how university-level student disability services shape attitudes toward government and engagement with the political process. While existing scholarship shows that individuals with disabilities participate in politics at lower rates than those without disabilities, the institutional mechanisms driving this gap remain underexplored. This study investigates whether difficulties navigating formal disability accommodation processes are associated with lower levels of political trust, political efficacy, and local political engagement among university students. Using survey data collected from POLS 1101 students during the Spring 2026 semester, the project will analyze students' experiences with disability services alongside measures of political attitudes and participation. Particular attention is given to how these relationships vary across intersecting identities such as race, gender, and socioeconomic status. By identifying disability services as a site of political socialization, this research contributes to a broader understanding of how everyday institutional encounters influence democratic attitudes. The findings will offer insight into how more accessible and inclusive institutional practices may foster political trust and engagement among marginalized student populations.

Shifting Grounds: The Influence of Political Environments on Refugee Resettlement Policies in Germany and the United States (1975–2025)
Poster #11 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Briana Castro-Balbi, Gabrielle Da Silva, Lucas Mohr, & Kyle Hicks
Graduate Student(s): Dacey Ngo
Research Mentor(s): Ramazan Kilinc

This research project investigates the evolving impact of political environments on refugee resettlement policies in Germany and the United States since WWII. By tracing policy *developments in this time frame, the study examines how domestic political dynamics—such as party ideologies, electoral shifts, public opinion, and institutional structures—have shaped national responses to global refugee movements. The comparative framework highlights both convergences and divergences in the two countries' approaches, offering insights into how liberal democracies balance humanitarian obligations with political constraints. In Germany, the study explores the legacy of post-World War II refugee reception, influences of European Union directives, and the political ramifications of the 2015 refugee crisis. It analyzes how shifting coalitions, rising populism, and debates over national identity have influenced policy decisions, including changes to asylum procedures, integration programs, and border enforcement. In the United States, the research focuses on the interplay between federal and state-level policies, the role of presidential administrations, and the impact of security concerns—particularly post-9/11—on refugee admissions and resettlement infrastructure. It considers the influence of advocacy networks, religious organizations, and local governments in shaping outcomes. The project draws on archival research, legislative records, policy documents, and interviews with policymakers and practitioners. It incorporates quantitative data on refugee admissions and qualitative analysis of political discourse to assess how narratives around refugees have evolved in each country. The study identifies key inflection points—such as the end of the Cold War, the Balkan conflicts, and the Syrian civil war—that prompted significant policy shifts and public debate. While both Germany and the United States have institutional commitments to refugee protection, their policy trajectories are deeply shaped by domestic political pressures and strategic interests. The findings have implications for current debates on refugee governance, democratic accountability, and the resilience of humanitarian norms in an era of rising nationalism and geopolitical uncertainty.*

Watching Congress: The Relationship Between Television News Consumption and Institutional Trust

Poster #1 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Connor Adams
Research Mentor(s): Benjamin Taylor

My research question is: how does television news viewing time affect confidence in the U.S. Congress? This topic deserves further research because public confidence in political institutions plays a key role in the effectiveness of democratic governance. In the United States, confidence in Congress has fallen quickly over the past several decades, leading to questions about its involvement with citizens in government and the success of policies. I theorize that television news watch time affects peoples confidence and trust in Congress, because of the way the news talks about Congress, it will affect the way people perceive them. I hypothesize that people who watch television news more are likelier to have less confidence in Congress. I will use the American National Election Study Cumulative File to test my hypothesis. Overall, the findings *of this research will help us understand the influence the news has on confidence in Congress, and make it important for people to understand this influence, do their own research, and make their own decisions.*

When Safety Is Sponsored
Poster #14 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Stefan Hanson
Research Mentor(s): Kenneth White

This paper examines whether the Uniting for Ukraine (U4U) program represent a structural shift in refuge policy. Using U4U as a case study, the analysis evaluates its historical foundation, procedural design, and creates a comparison between itself. This is done within the context of the Refugee Act of 1980 and Project Safe Haven. While U4U has shown merit in adopting such policies by being one of the fastest methods for distributing humanitarian protection, this speed of success heavily relies on private sponsorship. This sponsorship shifted the responsibility from the government using their own funding and support onto private citizens serving as a functional replacement of said duties. Having a need for private actors has shown a shift in the overall shaping of protections for refugees towards a more conditional framework where safety is dependent on private capacity and executive authority. Ultimately, this paper is searched for answers to whether U4U marked a shift from statutory refugee protection towards private sponsorship and what means for the future of humanitarian protection. What would have previously been labeled as a refugee status with robust legal protections is now reframed as a discretionary parole, something contingent on the structure of social connections and public appeal. Similarly, situated individuals were treated differently because of these components. What this program lacks are durable legal protections and a clear pathway to permanent legal status. Humanitarian protection in this case becomes conditional to the privilege of sponsorship rather than genuine human need. If sustained, it signals a future in which we see humanitarian access dependent on less uniform legal standards and more on political will and discretionary decisions of current administrators.

History and Philosophy

Hidden Forms of Resistance among Indian Soldiers in 1915
Virtual Presentation (Microsoft Teams)
Session 4 at 12:00pm – 1:00pm
Undergraduate Student(s): Nicholas Jones
Research Mentor(s): Yoshina Hurgobin

This abstract seeks to explore the ways in which some of the Indian soldiers dealt with World War I through discontent and forms of resistance. A collection of letters by some of the Indian soldiers in Europe in 1915 indicates that the soldiers were growing in discontent because of the brutal nature of the war in the trenches. Some of the soldiers were also skeptical of the war, as well as the treatment of the British officers in Europe. The second source indicates the forms of self-inflicted hand injuries by some of the soldiers as a strategy of escaping the war. Instead of outright defiance of the war, the soldiers' actions can be seen as a form of resistance to the war in a different sense. The sources indicate that despite the common perception of the Indian soldiers as loyal British subjects, the war led to a number of frustrations, fears, and forms of discontent among the soldiers.

Loyalty and Morale Among Indian Soldiers in the Great War
Virtual Presentation (Microsoft Teams)
Session 2 at 4:00pm – 5:00pm
Undergraduate Student(s): Gabby Morrow
Research Mentor(s): Yoshina Hurgobin

More than a million soldiers from colonial India served the British Empire during the First World War, fighting around the world in Europe, Africa, and the Middle East. This work will examine how Indian soldiers responded to the war through a complex blend of loyalty, cultural duty, and emerging discontent. Focusing especially on soldiers' letters and official welfare reports, the study argues that their responses cannot be reduced to simple obedience or resistance. Many soldiers expressed commitment to honor, or izzat, regiment, and emperor, while also revealing frustration over pay disparities, racial hierarchies, harsh conditions, and censorship. These private writings illuminate shifting political awareness shaped by exposure to Europe and unequal treatment within the imperial system. By analyzing both expressions of devotion and the more subtle signals of dissatisfaction, this paper contends that wartime service fostered a gradual transformation in political consciousness that would later intersect with broader currents of Indian nationalism.

Part of the Narrative: Books, Grief, and Legacy
Virtual Presentation (Microsoft Teams)
Session 4 at 12:00pm – 1:00pm
Undergraduate Student(s): Addi McDowell
Research Mentor(s): Paul Dover, Brian Swain, & Tamara Livingston

For my Honors Capstone, I have decided to complete a 20-25 page research paper dedicated to the exploration of grief in the loss of books, both in their physical form and their contained knowledge. Regardless of the means behind the loss of one's books, such an event elicits a unique form of grief that reflects the deep emotional, intellectual, and symbolic connections readers form *with literature and knowledge. The destruction of knowledge, intentional or accidental, disrupts personal identity, collective memory, and cultural continuity, revealing that the grief behind lost texts is often a mourning of lost voices and histories. Books are, in a sense, living presences with incredible and diverse value. Since the invention of the book, it has been clear that humans often feel a deep connection to the knowledge they and their ancestors collected. As vehicles for individual and cultural legacy, books often become family heirlooms, treasured collectibles, and extensions of oneself. They can become bastions of the community through library collections, schools, and universities. When one loses a precious book, a collection, or an entire library, it can often feel like a piece of the person, the people, and/or the community has been permanently lost. In my paper, I will explore how readers form attachments to books, psychologically, physically, and emotionally through the use of various historical examples. All of my research comes from peer-reviewed, scholarly secondary sources and credible and relevant primary sources; my personal reference collection on book history and analytical bibliography has been of great use during this project. I will also complete an accompanying exhibit that expands on examples in the paper, adds more examples, and presents the interviews I conducted as part of this project.*

Communication and Media

Capturing Stories, Sharing Voices: Documentary Production on a Family with Sickle Cell Disease in Uganda and Navigating Film Festivals
Poster #6 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Lathem Barbree, Arianna Rosa, & Ella Harward-Grant
Research Mentor(s): Sangsun Choi

This project explores the intersection of academic theory and professional practice through active participation in the Kennesaw Film Festival (KFF) as well as helping Professor Sangsun Choi with the post-production and planning of his documentary. Which included doing research on various documentary styles and learning the process of documentary filmmaking through collaboration with Professor Choi. The team worked together to engage in PR opportunities; advertising for the fourth annual Film Festival, utilizing virtual design when creating merchandise, and finding new ways to engage with students as well as encourage film submissions. Furthermore, our group engaged in a comprehensive study of professional film festival structures while taking on active crew roles in the execution of the KFF. Our research involved analyzing the operational frameworks of established festivals to inform our behind-the-scenes work in planning, coordination, and film festival logistics. The Kennesaw Film Festival serves as a vital platform for showcasing student creativity, connecting emerging filmmakers with a wider audience. By working directly with submissions, scheduling, and audience engagement, we gained first-hand experience in the complexities of arts management.

Furthermore, the festival's judging panel, composed of KSU alumni, faculty, and industry professionals, provided a unique feedback loop that bridges the gap between classroom learning and industry standards. This experience demonstrates how student-led event management not only strengthens technical production and organizational skills but also fosters professional communication with filmmakers and the community. Our poster will detail the workflow of festival coordination and the value of immersive learning in media studies.

Observational Mode: Theories, Applications, and Considerations in Cross-Cultural Documentary Production
Virtual Presentation (Microsoft Teams)
Session 1 at 2:00pm – 3:00pm
Undergraduate Student(s): Isabelle Loyd
Research Mentor(s): Sangsun Choi

This study explores the theories, applications, and considerations when utilizing the observational mode in cross-cultural contexts by analyzing both theoretical frameworks and their implementation in current documentaries. Documentary film functions as a communicative form that bridges differences in language, culture, and perception. There are six main modes of documentary style: expository, observational, poetic, participatory, reflexive, and performative (Nichols, 2009). Specifically, the observational mode is unique in its hands-off values. By exploring nonverbal communicative cinematic elements (such as framing, rhythm, color, and embodied performances), the study investigates the potential effects of these rhetorical strategies on audience understanding and empathy when faced with linguistic barriers. The research also examines what practical considerations arise when filmmakers adopt an observational approach in cross-cultural contexts. The study will combine literature-based analysis with independent observation. Both critically acclaimed and non-critically acclaimed documentaries will serve as application case examples. Principles found in this study will also be applied to a currently ongoing cross-cultural documentary series being conducted at Kennesaw State University which focuses on underrepresented public health topics in Uganda. This research aims to contribute to the broader understanding of documentary film as a communicative form, emphasizing its potential to foster intercultural dialogue. By analyzing observational strategies as tools of empathy and ethical communication, the study offers insights for both documentary filmmakers and communication educators. Further applications of these findings on currently ongoing documentaries will allow the results of this research to be further analyzed and promote intercultural storytelling.

Pirated Content: The Impacts of Piracy on University Students
Poster #28 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Kate Norris

Research Mentor(s): Ian Dunham

This study focuses specifically on academic piracy. Academic piracy, for the purpose of this study, refers to the unauthorized access/ downloading/ or distribution of copyrighted scholarly materials. This includes things such as textbooks, academic journals, research papers and novels. The pirating of academic materials has become increasingly prevalent, specifically within higher education as the cost of academic materials continue to rise. The issue is that there is a lack of localized data concerning the prevalence and impact of academic piracy at Kennesaw State University and on its student population. The purpose of this study is to investigate how academic piracy impacts KSU students through financial stress, academic performance, and ethical perception. This research specifically aims to identify the primary reasons students turn to "shadow libraries" such as Anna's Archive and Z-Library. A survey was distributed among platforms meant for KSU students this includes YikYak, the KSU subreddit, and Discord forums dedicated to KSU students. Once a convenience sample of approximately 100 students completes the survey, it will close. The survey utilized likert scale questions to measure student perception of academic piracy as well as the frequency of their piracy related habits. The results are expected to indicate that a majority of students resort to piracy due to external factors such as financial barriers, limited access to library services, and ease of accessibility. The data will also be able to draw correlation between certain majors and the frequency of unauthorized access to content.

Rebranding the Children's Museum of Atlanta using public relations principles
Poster #9 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Kristen Burns
Research Mentor(s): Amber Hutchins & Pauline Howes

The Children's Museum of Atlanta has been educating children with hands-on-learning since 1988. In 2015, the organization rebranded into what was a modern idea of imaginative education, but as social media evolves, the museum is no longer able to keep up with the times. Today, the museum lacks an engaging social media presence and other promotional channels. This project will use scholarly contributions to develop a campaign rooted in fun, innovative learning. Through a refreshed branding campaign, highlighted through public relations and design essentials, this project will present a hypothetical brand campaign that can reignite the interest of recurring patrons and invite new patrons of the museum.

College of Science and Mathematics

Chemistry and Biochemistry

AI- Driven Design of p53- Mimetic Peptide Analogs for Targeting MDM2 in Cancer
Poster #17 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Leandro Guadalupe Lopez Torres
Research Mentor(s): Mohammad Abdul Halim

In almost 50% of human cancers, the overexpression or hyperactivation of MDM2 plays a crucial role in undermining p53 function. By binding to the N-terminus of p53, MDM2 effectively inhibits its transcriptional activity and accelerates its degradation, highlighting its significant impact on cancer progression. Peptide activators of P53 present a powerful alternative, effectively antagonizing MDM2 with high affinities, unlike small molecule inhibitors that are generally limited to specificity for MDM2. The goal of this research project is to develop effective analogs of p53 peptide to block the active sites of MDM2. With the use of artificial intelligence, it was possible to generate 9 different peptide sequences. To model these analogs, their peptide sequence was inserted into AlphaFold to generate 3D models. The models were processed through HDOCK, to evaluate the binding affinity and interaction with MDM2. The top three analogs were determined by the binding affinity obtained from HDOCK. The original peptide and best analog 9 were synthesized using a rink-amide resin. Once the peptides were done being synthesized, the resin was also cleaved by a cocktail containing 95%TFA, 2.5%HPLC, and 2.5%TIPS. Then, the solution was filtered, and nitrogen was blown into it to evaporate excess TFA. Next, the filtered peptide solution was mixed with cold ether to precipitate the peptide. After lyophilization, the synthesized peptides were characterized by liquid chromatography and mass spectrometry. The parent peptide showed intense peaks corresponding to $[M+H]^+$ at m/z 1520.85, $[M+2H]^{+2}$ at m/z 760.43, and $[M+3H]^{+3}$ at m/z 507.63, respectively which agreed with the theoretical mass of the peptide. In future, inhibiting efficiency of the best analogs will be tested by LCMS based binding assay against MDM2.

Analysis of Academic Proficiency in Mathematics and Quantitative Skills by Gender and Work Status
Poster #15 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Sarrah Janad & Mishkat Abdullahi
Research Mentor(s): Chris Dockery

While existing studies establish a relationship between school performance and employment status, recent research reveals that gender also plays a role in influencing how well students perform academically. This study aims to investigate and compare student performances between self-identified female and male students who have reported their employment status as either employed or unemployed. For the Fall 2025 semester, 2861 of 7816 eligible students completed responses within the "M" (Mathematics and Quantitative Reasoning) domain. Undergraduate students at Kennesaw State University were invited to participate in a survey with the questions developed to gauge proficiency levels in the core IMPACTS Curriculum with measures determined by department faculty with the rankings being Highly Proficient (HP), Proficient (P), and Not Proficient (NP). Demographic data such as race, ethnicity, gender, primary language, transfer status, first generation status, academic home college, and employment status was collected as an optional portion of the survey. Results will explore how employment status and gender affect performance in the Mathematic and Quantitative Skills domain at Kennesaw State University. The data analysis between these variables will be presented with the expectation to help build a more comprehensive understanding of how demographic data relates to academic proficiency. These results will be presented to help situate resources to better reach demographic groups who have historically underperformed compared to peers.

Analysis of Alcoholic Samples using UV-Vis and Other Analytical Methods

Poster #19 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Shayla Kelley
Research Mentor(s): Wei Zhou

Alcohol is the most widely consumed drug in the world. As such, it is vitally important that consumers not only receive accurate labelling of the contents in their alcoholic beverages, but also receive beverages that are free of any potential contamination. One form of particular interest is copper contamination, which is often attributed to leaching from distillation setups used in alcohol production. Copper toxicity can cause a host of health issues, such as Wilson's disease and neurological impairment. While modern setups include many safeguards and purification measures to remove copper from their products, the risk of potential contamination is never zero. As such, methods to quantify copper contamination are of vital importance. Cuprizone, a chelating dye, can be used to create a blue hue in a solution containing copper ions. By employing UV-Vis spectroscopy, cuprizone can be used to quantify potential copper contamination in a variety of liquid samples. Furthermore, other potential contaminants, such as unwanted alcohols like methanol and butanol, may also be present in these samples. For this purpose, gas chromatography-mass spectroscopy can provide interesting qualitative results of other contaminants in these samples. Here, we utilize UV-Vis and other analytical methods to assess the safety of various alcohols from local and international markets.

Analytical Assessment of Neonicotinoid Residues in Georgia Honey
Poster #19 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Rusty Hooper
Research Mentor(s): Christopher Sumner

Honeybees in both agricultural and urban/suburban landscapes face ever increasing pressure from the widespread use of neonicotinoids as insecticides, yet the specific chemical profile of residential exposure remains largely uncharacterized. This study investigates the prevalence of key neonicotinoids across different land-use areas of Georgia. Using honey samples from local neighborhoods in Metro-Atlanta and sourcing honey from areas near heavy agricultural sites, chemical profiles for both regions will be generated and compared to discern significant differences between the presence of neonicotinoids across both regions. The key chemicals will be extracted from the honey using the AOAC 2007.01 QuEChERS method featuring a specialized clean-up method (PSA/C18) to isolate trace-level analytes from the complex honey matrix. Analysis will take a dual platform approach by using Ultra-Performance Liquid Chromatography (UPLC) and Gas Chromatography-Mass Spectrometry (GC-MS) to identify and quantify the presence of neonicotinoids in honey samples. By identifying which neonicotinoids are prevalent in urban and rural honey, this research will assist in pinpointing land-use-specific pollinator stressors in the state and offer data to local conservation and pesticide management policy. The results of this study will be presented at the Spring Student Scholar Symposium.

Are High-End Fragrances Chemically Superior? A Comparative Study Analyzing Aromatic Compounds in High-End Perfumes and Their More Affordable Counterparts Using GC-MS
Poster #25 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Tiffany Register & Taylor Welch
Research Mentor(s): Christopher Sumner

High-end perfumes come at a high price point with the assumption that they are better quality, offer longevity, and have a level of exclusivity to be desired by consumers. Is it chemically worth the extra money? The objective of this study is to test various luxury brand eau de parfums (EDP) and their dupes for quality and quantity of aromatic compounds as well as their relative rates of chemical degradation. To measure the quality and quantity of the compounds responsible for each scent, their data outputs from a gas chromatography-mass spectrometer (GC-MS) will be analyzed for compound identity and strength. To measure their chemical degradation, each perfume with be sprayed on the in a controlled setting and tested for strength using a GC-MS across various time intervals. The data will be compiled on the poster to cleanly compare the *numerical data and summarize whether or not high-end fragrances are truly worth their price tags.*

Artificial Intelligence-Assisted Design, Modelling and Synthesis of NAP Peptide Analogs to Inhibit Amyloid-β Fibril Formation
Poster #15 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Juwairiyah Hafsah
Research Mentor(s): Mohammad Abdul Halim

Alzheimer's Disease is the most prevalent neurodegenerative disease today, affecting the lives of countless patients and their families. A supported indicator for Alzheimer's Disease is the formation of Amyloid-β (Aβ) plaques, misfolded proteins in the brain. While FDA approved antibody treatments exist and recipients can show improvement, they may not be able to alleviate worsening symptoms. Peptide therapeutics, which occupy a therapeutic niche between large biologics and small molecules, are gaining increasing popularity, however, the therapeutic potential of peptides has not yet been capitalized. This project seeks to generate and model analogous peptides from the parent peptide NAPVSIPQ using two AI-assisted tools including ChatGPT and AlphaFold; and to test how effectively these analogs inhibit Amyloid-β fibril formation. Eight analogs were generated and modelled. Molecular docking was performed using HDOCK platform, with the analogous peptide as the ligand and the NMR structure of ABeta as the receptor. The best three analogs including NAP:3 (NAPVSIPR, docking score -119.4), NAP:7 (KAPVSIPQ, docking score -125.07), and NAP:9 (NAPVTIPQ, docking score -132.6) were selected based on docking scores, a numerical value that measures the binding affinity between the ligand and the receptor. These analogs were then synthesized through solid phase peptide synthesis using a rink-amide resin. With peptide synthesis completed, each sample was dried using ethyl ether and the resin was cleaved using a solution that contained 95% trifluoracetic acid (TFA). After filtering the peptide solution, TFA was removed using nitrogen gas and precipitation was induced using cold ethyl ether. The peptide solutions were then frozen and lyophilized, yielding a peptide powder. The purity and mass of the peptides were confirmed by liquid chromatography and mass spectrometry. The inhibition efficacy for these analogs will be tested using a fibril reduction assay.

Artificial Intelligence-Guided Temporin L Analog Design Targeting the Main Protease of SARS-CoV-2
Poster #31 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Jasmine Nguyen
Research Mentor(s): Mohammad Abdul Halim

Covid-19 is a life-threatening contagious respiratory disease caused by the SARS-CoV-2 Virus. The catastrophic global events of this pandemic showcased the need for effective treatments for patients. Peptide-based therapeutics have gained attention for their high target specificity, potency, anti-viral qualities, and relatively low side effects. Antiviral peptides have been shown to disrupt the viral replication process by inhibiting the main protease of SARS-CoV-2. Previous studies from our group showed that the antiviral peptide Temporin L (TL), derived from Lithobates species' frog skin, can moderately inhibit the main protease of SARS-CoV-2. The goal of this study is to utilize artificial intelligence on designing potent analogs of TL which can strongly inhibit the main protease of SARS-CoV-2. TL parent sequence (FVQWFSKFLGRIL) was entered as a prompt into ChatGpt, a generative artificial intelligence chatbot, to design the most potent analogs. Another AI-based tool, AlphaFold, was used to model the 3D structures of these analogs. Subsequently, molecular docking simulations were then conducted via HDock to analyze binding affinity and interaction between analog peptides with the main protease. Among these analogs, the best peptide was chosen to synthesize with high-swelling Rink Amide resin using a Liberty Blue Peptide Synthesizer. Deprotection and cleavage from the resin were performed with the use of high TFA. The separated peptides were precipitated using cold ether, filtered and lyophilized. Reversed-phase high performance liquid chromatography (RP-HPLC) coupled with Orbitrap Exploris mass spectrometry was used to characterize the peptide. The LCMS result demonstrated that the best analog was eluted at 0.86 min and showed two distinct peaks at m/z 812.99 and 542.32 corresponded to $[M+2H]^{2+}$ and $[M+3H]^{3+}$, respectively which agreed with the theoretical mass of the peptide. Future works will focus on evaluating the inhibition efficiency of these AI-guided analogs against the main proteases of SARS-CoV-2.

Beyond Assumptions: Analyzing the Mathematical Readiness of First-Generation College Students

Poster #8 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Andrea Chavez Espinoza, Shray Bhatnagar, Andres Arteaga, Hariz Mansuri
Research Mentor(s): Chris Dockery

First-generation students can enter college with fewer resources and guidance, resulting in less familiarity with institutional expectations, affecting performance in various courses. Recent research describes first-generation students as missing the "educational and financial resources to succeed" (Musawar, 2025). Our research seeks to explore the possibility of learning gaps between first generation students and non-first-generation students due to limited academic guidance alongside an interrupted or unequal formal schooling prior to entering the U.S school system, leading to different levels of readiness when facing college courses. Data was collected through surveying students that were enrolled in core IMPACTS classes, measuring the proficiency of the Mathematics and Quantitative Skills learning outcome of each class, asking as *well optional demographic question. Data from Math 1001, 1111, and Stat 1401 were assigned as our entry-level math courses and Math 1113 and Math 1190 as our upper-level math courses (based on the prerequisite structure in the course catalog). We focus on analyzing the percentage of first-generation students and non-first-generation students proficiency level in these various courses. Across most courses, with the exception being Math 1111, the first-generation group demonstrated equal or slightly higher percentages of Highly Proficient compared to the non-first-generation group (Math 1001 (85.71% vs 70.37%), Math 1111 (46.00% vs 47.19%), Math 1113 (35.82% vs 33.14%), Math 1190. (29.85% vs 23.91%) and Stat 1401 (60.4% vs 49.6%). The "Not proficient" percentages showed to be slightly lower in the first-generation group and distribution was similar across groups in many instances. The findings of this study largely challenge the assumption that first-generation students enter college mathematics at a disadvantage. Across most courses analyzed, first-generation students performed comparably to slightly better than their peer, suggesting that interrupted schooling or limited prior academic guidance does not necessarily transform into quantifiable underperformance at the college level.*

Activity Profiling of Highly Conserved MKNK1/2 Isoforms with p38 and Kemptide Across Varying pH Conditions
Poster #21 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Mo Loewe & Hannah Petyak
Research Mentor(s): Carol Chrestensen

Mitogen-activated protein kinase–interacting serine/threonine kinases 1 and 2 (MKNK1 and MKNK2) regulate cap-dependent translation through phosphorylation of eukaryotic initiation factor 4E (eIF4E) and are implicated in cancer, diabetes, and immune regulation despite being nonessential for normal development. Although the two kinases share high sequence identity and strong conservation across vertebrates, emerging evidence suggests meaningful biochemical differences among their isoforms. This study examined five MKNK1/2 isoforms, with particular focus on MKNK1-medium, to evaluate their catalytic activity under controlled biochemical conditions. Specifically, we assessed isoform-specific activation by the upstream MAP kinase p38 and quantified phosphorylation of the model substrate kemptide across a range of pH environments. Desalting and purification of the E1 construct yielded high-quality protein suitable for these activity assays.

Buffer Testing Magnesium with Calamagite while using EGTA as an Inhibitor for Calcium
Poster #33 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Tylus Moore
Research Mentor(s): Marina Koether

Calmagite solution, when used at a ph buffer around 10-12 with magnesium, is often used in clinical assays. It acts as a metallochromic indicator with a red complex as it fuses with magnesium. Typically EGTA blocks calcium to prevent it from interacting with the magnesium as a masking effect. Our focus is to find at which ph works best for absorbance including the standard and the analyte with a calibration curve. We wanted to create a 1%MW weight of NaOH and Na2HPO4 to have the grams amounts for our bottled buffers (Acid-Base) This was done after determining amounts by making an ice table with NaOH,Na2HPO4 and Na3PO4. Then I diluted each to 1L and then was allotted into 100ml bottles as separate acid and bases. We then created buffers at 11.0, 11.2, 11.4 and 10.8. Then we started on the calmagite solution by getting the moles of calmagite into solution in 500ml. This was diluted to 1L of water and into a 150ml round bottom flask. We wanted 1.1415g of EGTA as we took .003mol of the molar mass to get the targeted EGTA amount in a 500ml bottle. This was so we could have 5 1-5ppm cone bottom test tubes at 1ppm increasing increments with various concentrations of EGTA with a standard. Our further research also would include the calcium interference in related to the detection limits one the correct ph is chosen from the calibration curves.

Chemical Pressure Effect in the Magnetocaloric Candidate CrNiP
Oral Presentation (Prillaman Hall, Indoor Plaza)
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 promising magnetocaloric candidates. These materials have shown to exhibit a strong magnetostructural coupling resulting in a large entropy change typically over a wide temperature region, optimal for magnetic refrigeration technology. In this talk I will present the results of the chemical pressure effects on the MM′X alloy magnetocaloric candidate, CrNiP. With Sb or S substitution on the P atomic site in CrNiP, a spectrum of positive and negative chemical pressure is created where the material undergoes a structural transition from the hexagonal Ni2In-type to the orthorhombic TiNiSi-type and finally to the hexagonal FeP2-type structure. Subsequently, this significantly alters the magnetic behavior, resulting in either or coexisting antiferromagnetic and ferromagnetic order. Our results reveal chemical pressure as an advantageous tool to tune the structural and magnetic behavior in the MM′X alloy CrNiP and ultimately provide a source of control over the magnetocaloric properties.

Co-factor Free Peptoid Crystalline Nanomaterials as Artificial Carbonic Anhydrase Mimics for Promoted CO2 Hydration and Sequestration
Poster #13 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Maria Casco Hidalgo & Jonathan Gil
Research Mentor(s): Progyateg Chakma

Carbon dioxide (CO2) is one of the most common greenhouse gases, becoming increasingly abundant over time. The increased presence of CO2 in the atmosphere is believed to contribute significantly to the severe climate issues faced today. To address this growing issue, Carbonic Anhydrase (CA) enzymes have been investigated for their ability to capture and convert CO2 into carbonate ions. However, CAs suffer from intrinsic limitations, including poor stability and high operation costs, limiting their application in industrial scale. Recently, extensive research has focused on developing artificial CA mimics, where the goal is to mimic the active sites of CA while demonstrating higher stability. However, these mimics are still limited for industrial applications due to their poor stability and limited flexibility under extreme conditions as they rely on the coordination of a metal ion such as Zinc ions and a ligand to mimic the active sites of CA. Our research aims to develop metal-free, highly programmable assembled peptoid nanomaterials, as a CA mimic that will demonstrate and maintain catalytic activity through varying thermal and chemical environment. To achieve this, a series of sequence-defined amphiphilic peptoid sequences with varying hydrophilic and hydrophobic sidechains and CA mimetic functionality were designed and synthesized. The peptoids will be purified using High Performance Liquid Chromatography (HPLC) and self-assembled into hierarchical nanomaterials. The catalytic activity of these supramolecular peptoid materials will be measured by monitoring the hydrolysis of 4-nitrophenyl acetate, a model reaction used to evaluate the efficiency of CA mimics, using UV-Vis spectroscopy. The quality of the crystalline structures made through self-assembly will be analyzed using atomic force microscopy (AFM), scanning electron microscopy (SEM), and transmission electron microscopy (TEM). We envision that our design principles will be fundamental in developing a new generation of cofactor-free artificial CA mimics.

Comparative Analysis of Hops α-Acid Differences Between Alcoholic and Non-Alcoholic IPAs Produced by Flash Evaporation and Yeast Fermentation
Poster #31 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Jaqueline Martinez Balderas, Ethan Huang, & Chris Barackman
Research Mentor(s): Christopher Sumner

The production of nonalcoholic IPAs in industry is made by post fermentation alcohol removal or modified yeast fermentation methods. Two common approaches are flash evaporation which removes ethanol after fermentation and fermentation using a specialized maltose negative yeast strain that limits alcohol production. While both methods produce beer containing <0.5% ABV, they may alter hops derived bittering compounds and VOCs responsible for aroma and flavor. This study analytically examines how dealcoholizing strategy influences bitterness and VOC retention across several IPA styles. Commercial IPAs representing three categories were analyzed: traditional alcoholic IPAs, nonalcoholic IPAs produced by flash evaporation, and nonalcoholic IPAs produced by yeast fermentation n=15. Bitterness was quantified after liquid-liquid extraction, using the IBU spectrophotometric method by a UV-Vis. Hops derived iso-α acid were then further quantified using HPLC with external calibration. The VOCs flavonoids were isolated by liquid-liquid extraction and identified using GC/MS. The alcoholic IPAs exhibited and average bitterness of 51.8 ± 1.6 IBU and iso-α acid concentrations of 45.4 ± 1.1 mg/L. Nonalcoholic IPAs produced by yeast showed moderately reduced bitterness 40.9 ± 1.4 IBU and iso-α acid concentrations of 36.2 ± 1.0 mg/L. In contrast flash evaporated nonalcoholic IPAs showed significantly lower results averaging 29.7 ± 1.7 IBU and 26.5 ± 1.2 mg/L iso-α acids. GC/MS analysis identified key aroma compounds including ethyl hexanoate, isoamyl acetate, and linalool. Total VOC concentrations in flash evaporated IPAs were reduced by approximately 33% relative to alcoholic controls. One way ANOVA test indicated that there were statistically significant differences among the production methods for both bitterness and VOC abundance p <0.01. These results suggest that thermal alcohol removal processes yield less hops derived from bittering and aroma compounds while fermentation methods better preserve the chemical profile of beer.

Creating Extended Viologens for Photoredox Catalysis and Bio-tag Applications
Poster #14 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Dakota Greenwell, Chelsea Pate
Research Mentor(s): Tyler Adams

Fluorescent and redox active molecules, like viologens, are significant for applications in biological tagging and photoredox catalysis. Viologens are a class of organic molecules that are often fluorescent, color-changing, and can reversibly gain/lose electrons. This makes them strong candidates for imaging, sensors, and driving chemical reactions forward with light. Researchers have a strong interest in this class of molecules to be used in medical technology, medicinal chemistry, and alternative energy. The Adams Lab focuses on extended viologens, which possess these properties, but have the potential to be tuned for defined applications, tracking exact biological processes and driving precise chemical reactions with light. Currently, a small library of compounds are currently being synthesized, characterized, and tested for use in these applications. By changing different parts of the extended viologen molecule, the color, *fluorescence, and redox properties can be specifically picked for high-efficiency photoredox-catalyzed reactions and watching cellular processes under a microscope. The pivotal role of fluorescent molecules in bio-tagging applications enables researchers to be able to discover new biological insights by acting as a highly sensitive, selective labels that turn minuscule molecular processes into visible, quantifiable images. The research in bio-tag applications and photoredox catalysis, which is being conducted, will help in medicine, biology, materials products, and other related fields, while allowing for easier, cheaper, and more fluent discoveries in the near future.*

Design of a 3-D Helmholtz Coil to Balance the Geomagnetic Field
Virtual Presentation (Microsoft Teams)
Session 2 at 12:00pm – 1:00pm
Undergraduate Student(s): Christan King
Research Mentor(s): Lu Kang

The geomagnetic field is a magnetic field at the strength of 0.25 - 0.65 Gauss surrounding the Earth's surface due to the movement of molten iron in the Earth's outer core. Since the moving charges can be affected by this magnetic field due to the Lorentz force, collisions of charged particles in a plasma beam ruin the spectral resolution with an increased collision line width. A Helmholtz coil will be used to annihilate the Earth's magnetic field. Due to the expense of creating the typical spherical shaped Helmholtz coil, a more cost-effective cubic shaped 3-D Helmholtz coil cage was theorized by the use of 3-D modeling, the Biot-Savart law, geometry, and trigonometry. A wooden, 3-D Helmholtz coil was successfully created, showcasing the ability to use mathematics and physics to reduce the cost of construction.

Determination of Vitamin C in Fresh and Dried Produce Using UV/Vis Spectroscopy
Poster #43 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Jade Valeris & Joy McLeod
Research Mentor(s): Wei Zhou

Ascorbic acid, also known as vitamin C, is an essential nutrient that supports human physiological functions and aids in maintaining overall health. Fresh oranges are commonly known for containing a high amount of vitamin C. People may assume that dried fruit contains less vitamin C than fresh fruit because the compound degrades with time and decomposes at high temperatures. We are interested in quantitative comparison of vitamin C's content in different fruits and vegetables, dried or fresh. In our study, UV/Visible spectroscopy is used to measure the absorbance of potassium permanganate at 526 nm after a standard solution of potassium permanganate has reacted with the vitamin C present in a test solution. A standard addition calibration curve is constructed using standard solutions of potassium permanganate and ascorbic acid. Method validation tests will be performed on the resulting calibration curve, and *the curve is then used to quantify vitamin C in the various produce samples [1]. Paired fresh and dry samples are being analyzed in this experiment. The main objectives are to validate this general method and compare content of vitamin C in fresh versus dry produce samples. We will investigate if drying produce samples at 75 degrees Celsius for ~8 hours will significantly degrade the vitamin C present. This can be valuable information for improving human health, especially for those in need of an increased level of vitamin C in their diet. [1] Momtenor, B. L., & Tomulto N. (2024). UV-Vis spectrophotometric determination of commercial ascorbic acid concentration: A detailed laboratory activity protocol for students. ResearchGate. http://dx.doi.org/10.17504/protocols.io.x54v92qmpl3e/v1*

Developing Peptide Analogs Using Artificial Intelligence Tools to Treat Parkinson's Diseases

Poster #43 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Ericka Tate & Jackson Kohn
Research Mentor(s): Mohammad Abdul Halim

Parkinson's Disease (PD) is the second most common neurodegenerative disease following Alzheimer's. PD is characterized by the damage and eventual death of neurons resulting in symptoms such as motor disfunction and cognitive decline. The neuron damage has been linked to the protein alpha synuclein, a protein that forms the Lewy Body structures found on the neurons of people with PD. Therapeutic peptides have shown promise in the treatment of Parkinson's Disease. The goal of this study was to design and model peptide analogs using Artificial Intelligence assisted tools including ChatGPT and Alpha-fold, respectively. Two peptides, including KISVRV and DGIVAGVKA, were shown to moderately reduce fibril formation of alpha synuclein chosen as user 'prompt' to generate potent analogs using ChatGPT. Three-dimensional structural models were predicted with AlphaFold. The HDOCK platform was utilized to assess the binding affinity and interaction of the peptide analogs with alpha synuclein. Two analogs which showed the highest binding affinities were selected to synthesize using standard solid-phase peptide synthesis (SPPS) methods on a rink-amide resin to provide the correct C-terminal amidation. Amino acid coupling was performed stepwise to construct the peptide sequence, followed by release of the peptide from the resin using a trifluoroacetic acid (TFA)-based cleavage cocktail. The peptide solution was filtered, and excess TFA was removed by using a stream of nitrogen gas. Peptide precipitation was performed using cold diethyl ether, and the solid product was collected and purified. Finally, the purified peptides were lyophilized to obtain as dry powder. The molecular weight of the synthesized analogs was verified by the LCMS method, which confirmed successful synthesis. These analogs will be assessed for their ability to bind alpha synuclein and reduce fibril formation.

Electrochemical Performance and Magnetocaloric Effect in a Breathing Spinel Material

Poster #17 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Graduate Student(s): Destyni Herbert
Research Mentor(s): Madalynn Marshall

Spinel oxides are promising multifunctional materials whose physical properties are strongly influenced by cation ordering and lattice distortions. In this work, we investigate the electrochemical performance and magnetocaloric response of a spinel compound with a pronounced structural distortion. Working electrodes of these materials have been fabricated using both carbon tape and etched-aluminum substrates for electrochemical performance measurements, including cyclic voltammetry. Ex-situ SEM/EDX and powder X-ray diffraction measurements have been performed to assess structural stability and morphological changes. Furthermore, the magnetic entropy change, the adiabatic temperature change and the relative cooling power from magnetization and heat capacity measurements have been determined revealing the influence of the distortion on the magnetic behavior which can provide a potential source of tunability over the magnetocaloric effect. By correlating structural distortions with charge storage behavior and magnetic entropy variations, this study highlights how subtle crystallographic modifications can alter both electrochemical and magnetic functionalities in spinel oxides, opening pathways for their use in next-generation energy and cooling technologies.

Enzyme Kinetics and Inhibition using Liquid Chromatography coupled with Mass Spectrometry for the Main Protease of Rhinovirus
Poster #36 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Shubh Patel
Research Mentor(s): Mohammad Abdul Halim

Targeted enzyme inhibition is a powerful strategy that introduces specific molecules to block viral enzyme pathways, effectively disrupting the function of harmful viruses and offering a promising avenue for treatment. Enzyme kinetics and inhibition measurements are commonly conducted using a Fluorescence Resonance Energy Transfer (FRET) assay. However, fluorescent assays can sometimes produce false-positive results due to background fluorescence from the fluorogenic substrate, which interferes with the optical signal. As an alternative to fluorescence resonance energy transfer (FRET), selected ion monitoring (SIM) coupled with liquid chromatography-mass spectrometry (LC-MS) offers a convenient option. This method provides exceptional sensitivity and reliability by analyzing the mass-to-charge (m/z) ratios of product ions generated by protease activity on the substrate. Furthermore, this technique does not require a chromophore, significantly lowering the cost of fluorescent substrates. Enzyme-substrate reactions were conducted at varying substrate concentrations for 90 minutes, both in the absence *of a peptide inhibitor and with increasing peptide inhibitor concentration. A calibration curve for the product was developed, and the product's velocity was obtained from SIM based LCMS assay. Michaelis-Menten kinetics results showed that the velocity of product formation significantly decreased as the concentration of the Temporin L analog (TLP1) peptide inhibitor increased. Lineweaver-Burk plots were used to obtain Vmax and Km. The Lineweaver-Burk Plot revealed that Vmax decreased as TLP1 concentration increased. However, Km values remained unchanged as TLP1 concentration increased from 5 µM to 30 µM. This result showed that the TLP1 peptide can act as a noncompetitive inhibitor that binds both the free main protease enzyme and the 3Cpro-substrate complex at an allosteric site.*

Evaluation of the Inhibition of MAP Kinase-Interacting Serine/Threonine-Protein Kinase 2 MKNK2 Short by Glutathione

Poster #17 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Octavia Kaham & Jiselle Jackson
Research Mentor(s): Carol Chrestensen

MAP kinase-interacting serine/threonine-protein kinase 2 short (MKNK2 short) is a key regulatory protein in cell growth, differentiation, and protein synthesis pathways. Due to its role in cellular processes that, when dysregulated, are implicated in multiple cancers, MKNK2 short has been identified as a potential target for cancer therapeutics. Our research aims to explore how the protein MKNK2 short can be regulated by the activity of MAP Kinase (MAPK) signaling pathways under oxidative stress. Batch-method GST tagged purification and kinase assays evaluated how varying concentrations of glutathione, a reducing agent, impact the activity of MKNK2 short in the presence of kemptide, a peptide similar to the predicted ideal substrate sequence of MKNKs. We hypothesize that oxidative changes brought on by changing glutathione concentration will inhibit phosphorylated MKNK2 short. This research provides a baseline to assess how other substrates through oxidation-reduction mechanisms can control the level of phosphorylation as a key post-translational modulator of enzymatic activity.

Examining Academic Outcomes and Learning Perceptions Among Transfer Students in Core IMPACTS Courses

Poster #25 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Sanjiv Murugaprasad, Alexis Smith, & Victoria Pilorge
Research Mentor(s): Chris Dockery

Transfer students show a major and increasing demographic in higher education, and their academic experiences and the impact of these experiences on education can benefit from additional research. This study aims to examine academic outcomes of transfer students in core

IMPACTS courses in Kennesaw State University. IMPACTS is a curriculum that aims to establish a common general education model. However, academic experiences of students, especially transfer students, vary due to different academic backgrounds, transferred credits, and academic preparation. Institutional academic performance (measured by proficiency level) and student perception surveys can be used to compare academic outcomes of transfer and non-transfer students in core IMPACTS courses. Academic outcomes are assessed comparing student's self-reported GPA and IMPACTS proficiency score (Highly Proficient, Proficient, Not Proficient). Initial findings show that while academic grade performance of transfer and non-transfer students does not show significant differences, academic experiences of transfer students are unique and challenging. At the same time, academic experiences of transfer students show potential that might positively affect academic persistence. By examining patterns of achievement in quantifiable educational results and learning experience, this research can help to create a greater understanding of how IMPACTS courses affect transfer students. The results of the research can inform policy, teaching, and support services that can benefit the equity, retention, and success of the transfer of students within the general education structures.

GC/MS Identification and Quantification of D-Limonene and Linalool as Allergens Present in Various Fragrance Samples

Poster #31 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Ariana Mitchell & Caitlyn Salmon
Research Mentor(s): Wei Zhou

D-Limonene (R-(+)-limonene, $C_{10}H_{16}$) is a naturally occurring fragrant terpene found in fruits, flowers, and aromatic herbs, responsible for the characteristic fresh citrus scent of oranges, lemons, and related fruits. It is widely employed in perfumes, colognes, soaps, shampoos, and cleaning products for its bright, uplifting aroma. Both D-limonene and its oxidized derivatives are recognized as potential allergens in fragrance products. Linalool (C10H18O) is also a naturally occurring fragrant terpene found in flowers, and it contributes to a floral with a hint of spice scent found in basil. It is used in commercial perfumes, aromatherapy, and soap for its lavender scent and anti-inflammatory properties. Along with coumarin, benzyl alcohol, and other compounds, D-limonene and linalool are among the 26 fragrance allergens identified by the European Union Cosmetics Regulation, causing respiratory allergic reactions. These substances must be declared on product labels if their concentrations exceed 10 –100 ppm. However, no regulatory limit exists for their maximum allowable concentration in the EU or under U.S. FDA regulations. In this study, we quantitatively analyze D-limonene and linalool in various commercial fragrance products using gas chromatography–mass spectrometry (GC/MS). We are quantifying them in various fragrance products such as perfume, body mist, and room spray samples. Methanol is used as a sample solvent and sample preparation. External calibration and quantification using bromobenzene as the internal standard compounds are being studied. An *elution process of 22 minutes has been developed and will be applied to all standard solutions of these two compounds and various fragrance samples.*

Identification and Quantification of Curcumin in Various Turmeric Products Using LC/MS
Poster #29 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Ariana Mitchell
Research Mentor(s): Wei Zhou

Liquid chromatography-mass spectrometry (LC/MS) is a powerful analytical technique used to separate and quantify different compounds. Curcumin (C21H20O6), the active ingredient in turmeric (Curcuma longa), is a compound with certain polarity due to two phenolic hydroxy groups, diketone, and methoxy groups. It is a golden-yellow spice that has been harnessed in producing spices, dyes, and a variety of health supplements and benefits. Curcumin gives turmeric its yellow color, anti-inflammatory, and pain-relieving properties. Curcumin can also be sold separately and used as a dietary supplement or as a cosmetic ingredient. Previous research has been able to identify different turmerones present in various samples of turmeric by gas chromatography-mass spectrometry (GC/MS). This study aims to identify and quantify curcumin in various turmeric samples, including capsules, ground turmeric, and turmeric rhizomes using LC/MS. Samples were diluted using a dilution factor of 5-10 with methanol as the extracting solvent. Ultrasonication for 10 minutes was used, and samples were filtered using a 0.45 μm filter membrane to improve extraction. Extracted solutions from eight various samples are currently being analyzed. External calibration of curcumin will be used to determine and compare the amount of turmeric in these various products. An elution process of less than 25 minutes has been developed and will be applied to all standard solutions and turmeric product samples.

Intermolecular Forces Effect on the Kinetics of Dissolution
Virtual Presentation (Microsoft Teams)
Session 2 at 12:00pm – 1:00pm
Undergraduate Student(s): Suhad Arvid
Research Mentor(s): Marina Koether

This study examines the effect of intermolecular forces and effects of ion size on the kinetics of isomalt dissolution. The main research question examined whether cation and/or anion size influences the dissolution rate of isomalt in aqueous salt solutions. Dissolution experiments were done at 25°C, 35°C, and 45°C using a stirring rate of 100 rpm. Isomalt drops were dropped into the water and different salt solutions, and mass loss was recorded over time until the isomalt disappeared. The dissolution rate was determined from finding the slope from mass versus time *plots, and activation energies were calculated using Arrhenius analysis. Pure water showed the highest activation energy of 29.50 kJ/mol, while all other salt solutions showed lower activation energies, including Sodium chloride 22.86J/mol, Potassium chloride 20.61 kJ/mol, Potassium bromide 24.75 kJ/mol, and Magnesium bromide·6H_2O 20.30 kJ/mol. The results show that both cation identity and anion size influence activation energy and the dissolution rate of the isomalt. Larger ions and ions with higher charge density altered the dissolution kinetics, likely due to differences in ion dipole interactions and hydration shell structure. Overall, the findings support the hypothesis that anion and/or cation size influence the dissolution rate of isomalt, a sugar substitute.*

Investigating the Phosphorylation of the MKNK1 (Short) Isoform Using p38 Variants to Determine if the p38 DEF Pocket is Required
Poster #31 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Nishad Pandya & Fatima Salman
Research Mentor(s): Carol Chrestensen

MAP kinase-interacting serine/threonine-protein kinase 1 (MKNK1-Short) is a zinc-binding protein integral for cell proliferation and signaling. This physiological kinase regulates translation by phosphorylation of eukaryotic initiation factor 4E (eIF4E), which initiates eukaryotic translation by binding to the 5′-mRNA cap. The truncated isoform MKNK1 (Short) lacks the MAPK-binding site present in other isoforms, yet the isoform remains relevant and integral in regulation. Purification and quantitative analyses of MKNK1 (Short) were performed to enable further biochemical analyses. This endeavor aims to study whether the MKNK1 (Short) mechanism utilizes the DEF docking pocket for kinase interaction instead of the MAPK site. The protein was isolated from cell lysate using affinity chromatography with Glutathione Agarose resin. The protein concentration was quantified using the Bradford assay against a BSA standard curve. The protein purity and molecular weight were verified using SDS-PAGE. The p38 MAPK was used for an in vitro phosphorylation assay to observe the phosphorylation of the isoform on an electrophoresis gel. Electrophoretic analysis of the isoform with mutant p38 and ERK, which exclusively bind through the DEF pocket, will test whether the phosphorylation of the short isoform occurs via the DEF domain. This optimized method for studying substrate selectivity provides a reliable procedure for future biochemical research endeavors with MKNK1 (Short). It is hypothesized that MKNK1 (Short) bypasses the common MAPK-binding site and proceeds with docking via the DEF pocket.

Investigation of Vibrational Anharmonicity in Small Ions and the Effect of Proton Motion on Hydrogen-Bonded Spectra
Poster #23 (Convocation Center, VyStar Arena)
11:00am – 11:45am

Undergraduate Student(s): Brian Kervin
Graduate Student(s): Anna James
Research Mentor(s): Martina Kaledin

Accurately predicting the vibrational signatures of small, hydrogen-containing ions remains a significant challenge in computational chemistry because of the characteristic anharmonicity of their potential energy surfaces. This study provides a computational analysis of the vibrational spectra of three ions: H_3,$^+$ H_3O,$^+$ and H_3O_2,$^-$ as well as their deuterium isotopologues. The $H_3O_2^-$ ion serves as a critical model for understanding hydrogen bonding and the complexities of proton transfer. The primary difficulty in characterizing these systems comes from the "floppy" nature of the H^+ proton. The large-amplitude, non-linear motion of the proton deviates significantly from the harmonic oscillator approximation, making standard frequency calculations insufficient. We emphasize that accounting for anharmonicity is a necessity for these ions, as the molecular vibrations are heavily influenced by the flat, wide potentials associated with delocalized protons. We evaluate the performance of second-order Møller-Plesset perturbation theory (MP2) and coupled-cluster theory (CCSD) with various Dunning-style correlation-consistent basis sets. Our findings highlight the critical role of basis set effects, particularly the inclusion of diffuse and polarization functions, in accurately describing proton motion. Computational results are rigorously compared with available experimental data. Our study compares the treatment of anharmonicity via vibrational perturbation theory (VPT2) and variational methods (VCI). While CCSD and VCI methods appear accurate compared to experimental data, they are computationally demanding. The VPT2 method tends to overestimate the vibrational anharmonicity, especially for delocalized modes. Deuterium (D) substitution significantly lowers vibrational frequencies due to its greater mass, resulting in redshifts in IR/Raman bands and reduced band intensities. The effect of H/D isotopic substitution helps us understand the potential energy surfaces of these "floppy" ions. Deuterated species like D_3^+ and D_3O^+ show markedly reduced anharmonicity compared to their hydrogenated counterparts. Our benchmark study provides data for assessing the accuracy of molecular dynamics simulations that incorporate quantum effects.

Isolation and Biochemical Characterization of the MKNK2 Long Isoform in the MAPK Signaling Pathway
Poster #34 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Lizzie Oliver & Ryan Boutcher
Research Mentor(s): Carol Chrestensen

In response to extracellular signals, cells will respond with a cascade of kinase activity commonly known as mitogen activated protein kinase (MAPK) signaling pathway. MAPK signaling pathways control aspects of the cell including cell proliferation, inflammation, and apoptosis.

Dysregulation of these pathways is implicated in many infamous diseases such as cancer, Parkinson's, and amyotrophic lateral sclerosis (ALS). Substrates downstream of MAPK are known as MAP kinase interacting serine/threonine kinases (MKNK) which exist as paralogs denoted as MKNK1 and MKNK2, each of which has a set of isoforms. These isoforms exhibit differing characteristics such as differences in their MAPK binding domains, nuclear export signals, and overall length which have influence on each isoform functional activity levels. Thus, the objective for this research is to characterize the MKNK2 long isoform through a series of experiments. In these experiments, the MKNK2 long isoform was shown to be expressed in Escherichia coli, which was purified using a GST-tag column, a form of affinity chromatography. It was later analyzed for kinase activity, phosphorylation, and protein concentration. The quantification of protein was performed via Bradford assays and UV spectrophotometry by Take3 Plate. Purification efficiency will be tested via SDS-PAGE; kinase activity was tested using peptide-based assays and electrophoretic mobility analysis by Agarose Gel electrophoresis. Through both qualitative and quantitative analysis, these experiments will show insight into MKNK2 Long isoform characteristics helping explain isoform function in the MAP kinase pathway.

A Mechanochemical Approach to Transition Metal Complexes
Poster #33 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Graduate Student(s): Ryan Oldham
Undergraduate Student(s): Chase House, Ryan Ashuri, & Melike Ozcelik
Research Mentor(s): Daniela Tapu

Catalysts drive green and sustainable chemistry by speeding reactions without being consumed, enabling the production of medicines, plastics, fertilizers, fuels, and more. N-heterocyclic carbenes (NHCs) have proven to be excellent ligands for a variety of transition metal catalysts due to being readily available and electronically and sterically tunable. However, some NHC precursors are poorly soluble in the reaction medium and their corresponding transition metal complexes are hard to obtain via classical reactions involving solvents. To overcome this synthetic drawback, this project explores a novel approach of producing NHC-transition metal-based catalysts through mechanochemical methods. Mechanochemistry offers solvent-free or solvent-minimized alternatives to traditional reactions, reducing environmental impact while often enhancing reaction efficiency, selectivity, and scalability. Several NHC precursors were screened via ball-milling technology to produce the targeted transition metal complexes. Our results show that mechanochemistry is a suitable method for the synthesis of a variety of NHC-transition metals that are not accessible through the classical reactions involving solvents. The full characterization of the new complexes via spectroscopic methods such as NMR spectroscopy will be presented.

New U-Shaped Ligands and Their Corresponding Metal Complexes
Poster #27 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Graduate Student(s): Ryan Oldham
Undergraduate Student(s): Landry King & Aidan Heeman
Research Mentor(s): Daniela Tapu

The development of new metal-mediated two- and three-dimensional materials is a vibrant and rapidly expanding area of research. These compounds can function as versatile materials capable of performing cavity-directed catalytic transformations, molecular recognition and guest encapsulation, drug delivery, and chemical sensing, among other applications. The key to further progress in this field is the development of tunable molecular scaffolds capable of bridging transition metals across a variety of structural motifs, thereby enabling precise control over geometry, electronic environment, and reactivity. Carbenes are ideal candidates as scaffolds for the synthesis of these types of materials because they combine high stability, great coordination versatility, and tunability. We will report on our progress towards the development of a novel class of U-shaped carbenes for incorporation into bimetallic and supramolecular complexes. The synthesis and characterization of these new compounds will be reported.

Optimizing DNA Recovery from Hard Tissues for Forensic Identification
Poster #41 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): James Smith & Tessa Pham
Research Mentor(s): Kai Shen

In missing person and unidentified remains investigations, bone and teeth often represent the only recoverable biological material. However, DNA extraction from these hard tissues is difficult due to environmental degradation, mineralization, and the presence of PCR inhibitors. These challenges frequently limit the success of downstream STR profiling. This project aims to improve human identification outcomes by optimizing DNA extraction parameters for pulverized bone. By systematically modifying vendor-recommended conditions, the study evaluates whether alternative incubation and decalcification strategies can increase DNA yield and purity beyond standard protocols. Pulverized bone samples were processed using multiple commercial extraction kits (Promega and Qiagen). Incubation temperatures and durations were varied to assess their impact on DNA release from the mineralized matrix. Additional experiments tested the feasibility of performing secondary extractions on previously decalcified samples to maximize recovery from limited casework material. Preliminary findings indicate that specific deviations from manufacturer protocols substantially increase DNA yield while maintaining high purity (A260/A280 > 1.7), suggesting minimal protein contamination. Secondary extractions also produced measurable DNA quantities, demonstrating their potential *value in low-template scenarios. Collectively, these findings support a reproducible and efficient workflow that strengthens human identification and kinship analysis, providing forensic scientists with a more reliable toolkit for resolving cold cases.*

Positional Effects of Electron-Deficient Heterocycles on the Emission and Aggregation Behavior of polycyclic-1,2-BN-heteroarenes
Poster #31 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Skylor Seetaram
Graduate Student(s): Blaise Williams
Research Mentor(s): Carl Saint-Louis

Incorporation of a boron–nitrogen (B–N) unit into polycyclic aromatic hydrocarbons generates azaborines, a versatile class of heteroarenes that combine strong absorption, high photochemical stability, and tunable emission. Among them, nitro-substituted polycyclic-1,2-BN-heteroarenes (PBNHs) have emerged as promising electron-deficient n-type frameworks for organic optoelectronic devices. However, the introduction of –NO groups often promotes strong π–π stacking, which induces aggregation-caused quenching (ACQ) and severely compromises fluorescence efficiency. To overcome this limitation, we designed and synthesized a series of PBNHs incorporating electron-deficient heterocycles at distinct positions on the pyrrolidinone hemisphere. By systematically varying heterocycle placement and introducing sterically demanding substituents, we sought to distort molecular planarity, suppress intermolecular stacking, and induce aggregation-induced emission enhancement (AIEE). Comprehensive spectroscopic studies revealed that the positional orientation of electron-deficient heterocycles exerts a pronounced influence on photophysical behavior, modulating emission efficiency, spectral response, and aggregation tendencies. Several derivatives exhibited reduced ACQ, and in select cases, clear AIEE activity while preserving favorable absorption and stability. These findings demonstrate that positional control of electron-deficient heterocycles is a powerful strategy for tailoring the optical properties of BN-based chromophores. This design principle enables the development of next-generation electron-deficient AIE-active azaborine materials with significant potential in sensing, adaptive photonics, and optoelectronic applications.

Potency Quantification and Side-Product Identification of Expired Hydrocodone
Poster #5 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Alan Berryman & Alex Provost
Research Mentor(s): Christopher Sumner

The FDA generally uses a 5-year window for the lifespan of prescription medication analysis. This research project is uniquely valuable because it will evaluate a drug that is more than 20 years past its expiration date. Beyond molecular characterization, this research will elucidate risks associated with the ingestion of such expired drugs. These risks may affect not only individuals who have been prescribed these medications and may retain them past their expiration date, but also people who may misuse them due to limited access to safer or medically supervised alternatives. This project aims to understand the lasting effects of continued degradation of hydrocodone prescriptions, which are often packaged with acetaminophen (also written as APAP). Using UPLC and caffeine internal standards, we determined that the remaining concentrations of the active ingredients had decreased dramatically and identified multiple hazardous degradation byproducts formed through environmental exposure or excipient interactions. The distribution coefficients (logD) and lipophilic character (logP) remained largely unchanged since they are ratios and are not tied directly to potency.

Pre-Twisted Molecular Geometry's Effect on the Optical Properties of Nitrophenyl Substituted Polycyclic 1,2-BN Heteroarenes
Poster #20 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Lilianna Kocai
Research Mentor(s): Carl Saint-Louis & Lingaraju Gorla

Incorporating a three-coordinate boron center into the structure of polycyclic aromatic hydrocarbons by replacing one of the C=C bonds with a B-N bond creates a more planar scaffold. These flat-structured heterocycles partially substituted with a boron-nitrogen bond known as aromatic azaborines, are highly regarded for their unique optoelectronic properties such as photochemical stability, high molar absorption coefficient, and high fluorescent quantum yields, as well as large Stokes shifts and tunable absorption/emission spectra, making them excellent candidates for a variety of applications such organic light-emitting diodes (OLEDs). Adding a -NO2 group as a strong electron-accepting group to the scaffold of aromatic azaborines, particularly polycyclic-1,2-BN-heteroarenes (PBNHs), in an effort to redshift their absorbance and emission and create electron-deficient n-type organic conjugates, results in significant emission quenching due to intersystem crossing. Another issue with -NO2-substituted PBNHs is that they aggregate at high concentrations due to strong intermolecular π-π stacking interactions. In turn, aggregate formation causes emission quenching, also known as Aggregation-Caused Quenching (ACQ). This practical limitation poses significant challenges for -NO2-substituted PBNHs' use in many applications. We hypothesized that increasing the steric interactions through the PBNH scaffold and creating a larger twist in the molecular geometry by including bulkier moieties such as methyl groups will result in -NO2-phenyl substituted PBNHs with aggregation-induced emission (AIE), solvatochromism and thermochromism properties. These findings will aid in the development of more improved future

AIE-active PBNHs, as well as the understanding of how molecular geometry influences these compounds' optoelectronic properties.

Programmable Crosslinking of Peptoid Nanomaterials through Dynamic Supramolecular and Covalent Motifs for Increased and Tunable Mechanical Properties
Poster #46 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Graduate Student(s): Kyle Whitaker
Undergraduate Student(s): Makayla Youmans & Grace Nintin
Research Mentor(s): Progyateg Chakma

Peptoids, or N-substituted glycines, are a new class of biomimetic polymers that possess the chemical diversity and robustness of synthetic polymers, and the complexity and sequence control of biopolymers like peptides and enzymes. Peptoids exhibit ordered folding behavior like polypeptides, where self-assembly into secondary structures is dictated by side-chain chemistry rather than by a complex folding mechanism governed by hydrogen bonding that is typical of peptides. This allows for the formation of hierarchal peptoid nanomaterials, including nanosheets, nanotubes, nanoribbons, helices, and vesicles. Limited efforts have been made to improve mechanical properties and introduce new functionalities to peptoid assemblies via reversible crosslinking. In this work, we explore the impact of crosslinking on the material properties of peptoids by introducing monomers that can undergo stimuli-responsive, reversible, non-covalent or covalent crosslinking. Here, non-covalent or supramolecular reversible crosslinking will be achieved through metal-ligand coordination facilitated by biomimetic catechol-functionalized monomers in the presence of a metal cation, while covalent reversible crosslinking will be achieved through the incorporation of dynamic thiol-Michael chemistry. A series of sequence-defined amphiphilic peptoids will be synthesized via a solid-phase sub-monomer strategy and purified using preparative high-performance liquid chromatography (HPLC). Purified peptoids will then be self-assembled into highly crystalline nanosheets or nanotubes. Finally, the effects of crosslinking on programmable peptoid nanomaterials will be evaluated via macro- and micromechanical characterizations, including atomic force microscopy (AFM) and rheology. This study will present a platform for the use of peptoid nanomaterials for stimuli-responsive smart materials for coating and biomedical applications.

Purification and Enzymatic Analysis of MKNK1 and p38 alphaMAP Kinase Protein Activity through Phosphorylation Based Reactions
Poster #16 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Emily Clarke & Julia Franz
Research Mentor(s): Carol Chrestensen

Mitogen-activated protein (MAP) kinases play a significant role in regulating cellular stress responses and protein translation. In this study, p38 MAP kinase will be used to test phosphorylation and protein activity. A peptide-based kinase assay was performed using a p38-specific substrate known as p38tide in the presence of ATP and kinase buffer. After incubation, samples were analyzed using agarose gel electrophoresis, where enzyme-treated samples showed mobility differences compared to controls. This confirms that phosphorylation had occurred and that the kinase was active under our experimental conditions. To verify the quality of the p38 preparation, we measured protein concentration and purity level using both a Bradford assay and Take3 spectrophotometric analysis. Both methods produced consistent concentration values of approximately 1.4–1.5 mg/mL. These results showed us that the enzyme was sufficiently concentrated and could efficiently complete phosphorylation. Next we investigated MKNK1 and performed batch purification to isolate the protein. A sample of each step during purification was set aside for gel-based analysis. Additionally, Bradford reagent was used to confirm the presence of enzymes after our elution. The purified MKNK1 will be run on a gel prior to presentation to confirm protein presence and ensure it is ready for enzymatic studies. Future work will focus on phosphorylation testing of MKNK1 using our active p38 alpha.

Purification of the MKNK2 Short Isoform and Characterization of Kinase Activity with and without GST Tag
Poster #28 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Abi Locklear & Mia Burford
Research Mentor(s): Carol Chrestensen

Mitogen-activated protein kinase interacting kinases 1 and 2 (MKNK1 and 2) are serine/threonine kinases that regulate translation through phosphorylation of eukaryotic initiation factor 4E (eIF4E) and interactions with eIF4G. Alternative splicing of MKNK2 produces two isoforms that are thought to have differing regulatory properties and intrinsic kinase activity. The present study aimed to evaluate whether the MKNK2 short isoform (MKNK2b) could be recombinantly expressed in Escherichia coli, purified in soluble form, and assessed for kinase activity in vitro. GST-tagged MKNK2b was expressed in E. coli and purified using glutathione affinity chromatography. Elution fractions were then screened by a qualitative Bradford assay to identify protein-containing samples and further analyzed by SDS-PAGE to assess enrichment of the fusion protein. Following affinity purification, the GST tag was removed by protease cleavage, and the activity of the tag-free MNK2b was compared to the GST-fused protein to evaluate potential tag-dependent effects on phosphorylation and catalytic function. The results demonstrated successful recovery of soluble GST-MNK2b in selected elution fractions, which were suitable for downstream functional analysis. These findings suggest a biochemical framework for examining intrinsic properties of MKNK2 isoforms in a controlled system. Future studies incorporating additional chromatographic steps may further *improve protein homogeneity and enable more precise functional comparisons among MKNK isoforms relevant to translational control and disease processes.*

Qualitative and Quantitative Analysis of THC Seltzers using Gas Chromatography/Mass Spectroscopy and Fluorescence Spectroscopy
Poster #8 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Mia Burford & Anna Gray
Research Mentor(s): Christopher Sumner

The rise of unregulated, commercially produced THC-infused products, including beverages, has raised concerns about product consistency and consumer safety. This study uses fluorescence spectroscopy and gas chromatography/mass spectrometry (GC/MS) to measure THC and identify other chemicals in selected seltzers. Fluorescence spectroscopy provided THC level estimates based on characteristic excitation–emission behavior, while GC/MS confirms the identity of THC and compounds including other cannabinoids, residual solvents, and chemical additives. Measured THC often reveals frequent mislabeling of concentration. GC/MS also detected terpenes, flavorings, residual solvents, and possible degradation products, further complicating the product. This combined approach shows fluorescence spectroscopy's value as an initial screening tool for accurate quantification, supported by GC/MS for ingredient list accuracy. This study's findings support the need for standardized testing and regulation to ensure accurate labeling, quality, and consumer safety in the THC product market.

Regulation of the Long MKNK1 Isoform by p38 MAPK, Oxidative Stress and Zinc
Poster #40 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Paula Ruiz Villalobos & Maria Perdomo
Research Mentor(s): Carol Chrestensen

MKNK1 and MKNK2 (MNK1/2) are protein kinases that regulate protein synthesis by phosphorylating eIF4E, a key regulator of translation initiation. These kinases receive signals from upstream MAPKs (p38 and/or ERK) which are activated by mitogens, cytokines, or stress. MKNK1 has three isoforms with MKNK1-1 being the longest, caused by an insertion that is absence in the other two isoforms. We hypothesize this insertion enables unique regulation. The objectives are to determine if p38 activates the long MKNK1 isoform and test how oxidative stress and zinc affect its kinase activity. p38 MAPK, a stress-responsive kinase, activates MKNK1/2 via D-domain docking. The MKNK1-1 insertion may affect activation efficiency. GST-tagged MKNK1-1 was expressed in E. coli and purified by glutathione affinity chromatography. In vitro kinase assays coupled with SDS-PAGE mobility shift analysis were used to evaluate activation and activity. Expected results include p38 + ATP causing upward *mobility shift of MKNK1-1 (phosphorylation detection), additionally, if activated we anticipate phosphorylation of kemptide visualized using agarose electrophoresis. Kemptide phosphorylation will be used to test how H_2O_2 and zinc treatments may enhance, suppress or inhibit MKNK1 activity. These studies will establish baseline MKNK1-1 regulation for isoform comparison and clarify its role in stress-responsive signaling pathways.*

Response of a Distorted Kagome Material to Chemical Pressure
Poster #21 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Andres Jones Fajardo
Research Mentor(s): Madalynn Marshall

Distorted kagome lattice materials have become especially exciting candidates for next-generation magnetic topological systems due to their unique geometry that promotes unusual electronic behavior, intricate band topology, and strong magnetic frustration. When combined with intrinsic magnetism, these distortions lift degeneracies in ways that can stabilize topological phases such as Chern insulators, Weyl semimetals, or anomalous Hall states. The REAgGe (RE= rare earth) family of materials, with noncentrosymmetric P-62m space group, hosts a distorted kagome lattice in the network of rare-earth ions and have gained significant attention as potential magnetic topological candidates. Manipulating these materials through pressure, magnetic fields, strain, and other techniques creates new opportunities to explore the connections between magnetism, electronic topology, and crystalline symmetry. Here we have investigated the effects of chemical pressure in the REAgGe family by the partial or complete substitution of Si on the Ge atomic site. Single crystalline materials have been synthesized and characterized using X-ray diffraction and SEM/EDX techniques. A positive chemical pressure effect is observed and analysis of the magnetization points to a possible effect of chemical pressure on the physical properties of these materials. These results will provide deeper insight into the relationship between magnetism and topology, paving the way for advances in quantum materials and technology.

Response of the Distorted Kagome Material DyAgGe to Chemical Pressure
Poster #15 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Rusty Hooper & Andres Jones
Graduate Student(s): Nishat Tasnim
Research Mentor(s): Madalynn Marshall & Chetan Dhital

The chemical tunability of Kagome lattice materials is crucial for understanding the interplay between magnetism and electronic topology, especially for the practical application of sustainable energy technology. While the magnetic properties of the hexagonal ZrNiAl-type structures

DyAgGe and DyAgSi are well-documented, the effects of chemical doping have gone unexplored within this structure. In this study, a polycrystalline $DyAgGe_{0.5}Si_{0.5}$ sample was prepared with a mixture of Si and Ge on both the atomic 2d and 1a site to study the effects of chemical pressure on the magnetic properties of the sample. After synthesis, a Physical Property Measurement System (PPMS) was used to analyze the magnetic susceptibility and magnetization of $DyAgGe_{0.5}Si_{0.5}$. A resulting Néel temperature of T_N ~ 5 K, which was markedly lower than the T_N of both DyAgGe and DyAgSi parent compounds. This finding suggests a degree of magnetic frustration emerges in $DyAgGe_{0.5}Si_{0.5}$. These findings support that the tuning of these materials through stoichiometric doping is a viable pathway in the pursuit of the synthesis of materials for energy-related technologies.

Snake Oil Science: A Qualitative Survey of Variably Legitimate Products via GC-MS
Poster #25 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Shayla Kelley & Adrian Felix
Research Mentor(s): Christopher Sumner

With the ever-rising costs of healthcare in our nation, more and more people find themselves turning to alternative solutions to their ailments. Unfortunately, many of these alternative medicines do not have substantial scientific merit. At best, this can often lead to consumers wasting their time and money, and, at worst, can lead to consumers subjecting themselves to harmful practices. One extremely common form of alternative medicine, due to its affordability and accessibility, is dietary supplements. The dietary supplement industry operates under comparatively limited regulatory oversight, allowing manufacturers to market products with misleading label claims and/or toxic components without pre-market approval. This study seeks to qualitatively characterize several commercially available goods marketed as supplements, including methylene blue, a black walnut blend, chlorine dioxide, colloidal silver, and more. Analysis is conducted using Gas Chromatography-Mass Spectrometry (GC-MS) for identification of volatile and semi-volatile organic substances. The findings of this investigation aim to directly address concerns of consumer safety and supplement label accuracy by identifying potentially harmful ingredients and confirming or denying the presence of advertised substances.

Structure/Property Relationship of Thiophene Extended Viologens
Poster #47 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Graduate Student(s): Yasmeen Williams
Undergraduate Student(s): Amber Newton & Cole Suplee
Research Mentor(s): Tyler Adams

Viologens, 4,4′-bipyridiniums, are conjugated compounds that can gain electrons, change color, and fluoresce in useful ways. Because of these properties, they are being studied for uses such as: smart windows, batteries, and sensors. By adjusting parts of the molecule, like side chains that extend from the main structure, we can change the color and sensitivity. In this study, we focus on viologens with different conjugated bridges, like a thiophene between the two pyridiniums, to extend conjugation. We tested different versions of the viologens to see how their color, fluorescence, and electrical characteristics change. Using soluble side groups on the two pyridiniums, we aim for high water solubility for easy and inexpensive implementation into aqueous organic redox flow batteries (AORFBs) and other applications. Here, we explore the structure and property relationship of extended viologens by varying the conjugated bridge between the pyridiniums in the extended viologens. By incorporating more double bonds and extending the conjugation, the color and fluorescence become red shifted and have different redox properties for improved use in AORFBs.

Synthesis of Biomolecule-Linked Extended Viologens for Redox-Responsive Optical Tracking

Poster #10 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Jacob Erasmus
Research Mentor(s): Tyler Adams

Viologens are a class of molecules defined by the presence of two charged pyridine rings, with varying groups between and attached to them. They are investigated for their unique optical properties, such as electrochromism, solvatochromism, photochromism, (color change with electricity, solvent, and light, respectively), and others. These unique properties come from their ability to reversibly gain and lose electrons, changing optical properties in each form. This makes them an ideal choice for tracking biological systems, because not only can they track the molecule they bind to, but they can also track change in their environment. Viologens have also been found to be highly tunable depending on their structure, varying fluorescence, color, and redox properties, making them a prime molecule for many applications. In this study, we suggest a synthetic route of attaching molecules used in biological processes to a previously well-studied extended Viologen. This extended viologen base is the dipyridal thiazolo [5,4-d]thiazole (Py2TTz), chosen for its ease of synthesis, stability, and reliable optical properties. One route investigated is commonly referred to as "click chemistry" due to its ability to "click" two otherwise unrelated molecules, emphasizing efficiency and simplicity. Click chemistry requires the attachment of an alkyne and an azide to each separate molecule, respectively. We investigated the synthesis of a 1-azido-glucose, and an N-butyne viologen, which was then clicked to form the final glucose-viologen. All syntheses were confirmed using proton NMR spectroscopy, and optical properties were examined using absorbance and fluorescence spectroscopy. Future *applications of this newly synthesized molecule could be in-vitro and in-vivo enzyme tracking, DNA/RNA linking, and other cellular staining.*

Synthetic Pathways for High-Quality Breathing Selenide Spinels: Implications for Magnetocaloric Refrigeration Materials
Poster #24 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Shayla Kelley, Hamida Hassan
Graduate Student(s): Rupali Mangotra
Research Mentor(s): Madalynn Marshall

The magnetocaloric effect is described as the ability of a material to heat or cool its surroundings when a magnetic field is adiabatically applied or removed due to a spin-induced change in entropy. This effect has been widely employed in magnetocaloric refrigeration, where a material is magnetized to release heat, which is subsequently removed, and then de-magnetized to absorb heat and create a cooling effect. It is widely theorized that magnetic frustration can enhance the magnetocaloric effects, as the change in entropy is much greater. One family, the breathing spinels (AACr4X8) are of great interest to this field due to their highly tunable distorted geometrically frustrated pyrochlore lattice capable of inducing magnetic frustration and a wide variety of magnetic behavior. CuACr4Se8 (A = In, Ga, Al) is one such spinel belonging to the selenide spinels, which are valued for their superior magnetic interactions between selenium and chromium. Currently, synthesis of the CuACr4Se8 materials is complicated by the formation of a binary CrSe second phase impurity, which may influence the magnetocaloric properties of the material.Here we explore methods for optimizing growth conditions to improve upon crystalline quality. This investigation will provide new insight into how the magnetocaloric properties of the CuACr4Se8 materials are affected by secondary phase formation and how synthetic methods can be tailored for optimal magnetocaloric properties.

Testing the Ability of MKNK Isoforms to Alter the Kinase Activity of p38
Poster #43 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Savanna Washington & Shalerra Sonnier
Research Mentor(s): Carol Chrestensen

Protein kinases are key enzymes that regulate cell growth and proliferation. They do this by phosphorylating specific target proteins and by amplifying intracellular signaling pathways involved in cellular regulation. Among these are the MKNK1 and MKNK2 kinases, also known as MAP kinase–interacting serine/threonine kinases 1 and 2, which regulate mRNA translation. Outside sources indicate that these MAPKAP kinases are activated through phosphorylation at threonine residues T250 and T255. This activation is mediated by upstream kinases such as ERK *and p38 MAPK. One of the four major MAP kinase subgroups, the p38 family, serves as a central nexus of signal transduction and is vital for processes such as inflammation, differentiation, and stress responses. MKNK1/2 plays important roles in stress response and growth signaling. Dysregulation of these kinases has been linked to oncogenic signaling, predominantly in stomach and lung adenocarcinomas. We hypothesize that the structural and compositional differences between the isoforms of MKNK1 and MKNK2 would influence p38 phosphorylation activity, which will lead to a difference in kinase activity. In our study, we quantified protein concentration using a microplate Bradford assay and kinase activity of p38 was evaluated by measuring phosphorylation of a peptide substrate using agarose gel electrophoresis. Future work will focus on the purification of a specified MNK protein isoform to help test our hypothesis.*

Three Years of Documenting Microfiber and Trace Metal Content in Lake Allatoona Sand

Poster #10 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Daniel Farris
Research Mentor(s): Marina Koether

Microfibers and trace metals are present on all beaches. In Lake Allatoona, a man-made lake, one of the greatest contributors is a wastewater plant upstream. The increasing concentration of microfibers and trace metals is an environmental concern. The purpose of this study is to determine any year-over-year increases in microfibers and trace metals. In addition, the purpose of this research is to find any trends as to where microfibers and metals are found in Lake Allatoona. The methods begin with obtaining sand samples. Sand samples are taken from six beaches at the start of every year during low water levels in a spot that would be underwater during high water levels. The sand is stored in a fridge and then dried in an oven before use. Three samples are portioned out for each beach site. The samples are flooded with a salt solution and run through a series of sieves, density separations, oxidation reactions, and placed inside a gravity funnel. Liquid not containing microfibers is discarded, and the remaining solution is filtered through filter paper using a vacuum filtration system. The filter papers containing the microfibers are stored in petri dishes. All microfibers are counted on the filter paper using a microscope. The results will include all microfiber concentrations and correlations between years and location. X-Ray Fluorescence (XRF) sample pucks are filled with the unused original dried sand and scanned using an XRF instrument. The XRF measures the composition of all trace metals in the sample. Trace metals of interest will be documented in our findings. Year-over-year changes will be presented with potential explanations.

Topochemical Photodimerization Facilitated by Crystal Engineering in Supramolecular Peptoid Assemblies

Poster #16 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Tania Juarez, Joel Samuels, & Edhereveno Crown
Research Mentor(s): Progyateg Chakma

In this project we are developing highly programmable hierarchical peptoid nanomaterials as templates for topochemical [2+2] photodimerization, leading to covalent reinforcement and enhanced material properties. [2+2] photocycloaddition in the crystal lattice or solid state is a reaction between photoactive olefins to form strained cyclobutene. In solid-state material this reaction offers many advantages, such as high predictability, regional selectivity, and stereo specificity, yet facile integration into functional materials beyond solid-state remains challenging. Peptoids (poly-N-substituted glycines) are a new class of sequence-defined synthetic polymers that serve as a bridge between synthetic and biological polymers through their characteristics of sequence definition, functionality, customizability from biological polymers, chemical diversity, and robustness. Unlike peptides, peptoids' backbone sidechains are attached to that of a nitrogen atom instead of that of a carbon. This change results in increased chemical diversity, stability, and decreased protease degradation. Peptoids have proven to have a highly diverse palette for creating various crystalline nanostructures, such as nanosheets and nanotubes with precise packing and morphological control. We are designing and synthesizing a series of highly programmable, photoreactive, olefin-functionalized peptoid sequences that self-assemble into highly crystalline nanomaterials, enabling intermolecular topochemical [2+2] photocycloaddition. All peptoids were synthesized following a solid-phase submonomer synthetic strategy and characterized and purified by high-performance liquid chromatography (HPLC) and LC-mass spectroscopy (LC-MS). Evaporation-induced self-assembly is used to obtain highly crystalline nanostructures, which were characterized using several microscopy techniques, including atomic force microscopy (AFM) and transmission electron microscopy (TEM). Finally, self-assembly-enabled intermolecular photodimerization will be studied using UV-Vis spectroscopy and nuclear magnetic resonance (NMR), and the impact on material properties will be assessed via micromechanical characterization. We envision that our strategy will bridge topochemical [2+2] cycloaddition in solid-state and soft materials and enable a systematic study of covalent reinforcement in supramolecular peptoid nanostructures, with potential applications in artificial membranes and smart coatings.

Toward the Synthesis and Complexation of a New Star-Shaped NHC
Poster #40 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Holt Schadler, Bret Schadler, Selina Huynh, & Khang Tran
Research Mentor(s): Deniela Tapu

Since Arduengo reported the first carbene in 1991, N-heterocyclic carbenes (NHCs) have become highly valuable ligands in homogeneous catalyst design, owing to their remarkable structural and electronic tunability and their strong ability to coordinate metal centers. Essential to the advancement of NHC-based materials has been the design and synthesis of new materials featuring multiple NHC moieties capable of functioning independently of each other. These multitopic NHCs are not only structurally intriguing but also serve as versatile building blocks for creating new polymers, self-assembled materials, and recyclable catalysts. Within this context, this project targets a star-shaped tris (NHC) ligand in which the three carbenes are connected by an extended p-delocalized polyaromatic. Given the high affinity of NHCs for a broad range of metal centers, this new D3h-symmetry system has the potential to function as a versatile building block for the preparation of a wide variety of star-shaped trimetallic complexes and supramolecular structures. Our efforts toward the synthesis and spectral and structural characterization of this new carbene and its corresponding trimetallic complexes will be presented.

Tuning Polycyclic 1,2 BN Heteroarene Photophysics via Electron Deficient Heterocycle Substitutions
Poster #45 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Graduate Student(s): Blaise Williams
Research Mentor(s): Carl Saint-Louis

Polycyclic aromatic hydrocarbons (PAHs) are widely studied for their unique optical properties. These properties can be enhanced by replacing a C=C bond with an isoelectronic B–N bond, yielding planar heterocycles known as aromatic azaborines (AAs). In particular, incorporating a nitro (–NO_2) group into polycyclic 1,2-BN-heteroarenes (PBNHs) generates electron-deficient, n-type conjugated systems with red-shifted absorption and emission. However, strongly electron-withdrawing groups such as –NO_2 often induce aggregation-caused quenching (ACQ), limiting emissive performance. Our previous work demonstrated that introducing twisted molecular geometries in NO_2-substituted PBNHs can suppress ACQ and promote aggregation-induced emission (AIE), although solubility constraints still hindered optimal optical behavior. To address these limitations, we replaced strongly electron-withdrawing substituent like the –NO_2 group with larger, moderately electron-deficient heterocycles, including benzoxadiazole, benzothiadiazole, and benzoselenadiazole derivatives. This strategy significantly improves solubility and enables comprehensive photophysical characterization. Spectroscopic studies reveal pronounced solvatochromism, thermochromism, halochromism, and anion responsiveness, demonstrating strong environmental sensitivity. Furthermore, these electron-deficient PBNHs were successfully incorporated into stimuli-responsive devices, such as rewritable and erasable materials. Overall, this work expands the tunability of PBNHs through moderately electron-

deficient heterocycle substitution and highlights the promise of BN-based materials for advanced optoelectronic, sensing, and adaptive device applications.

Ecology, Evolution, and Organismal Biology

Assessing Soil Microeukaryotic Biodiversity Using Environmental DNA Approaches
Poster #48 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Jasmine On, Alejandro Coronado, Rosalyn Stanford, Juliana Hayhome, Kaylee Thomas
Research Mentor(s): Tiago Pereira

Microeukaryotic organisms, particularly nematodes, are highly abundant and diverse in soil ecosystems, where they fulfill critical ecological roles. Their spatial distribution is shaped by various environmental factors, such as soil texture, nutrient levels, and vegetation. Despite their ubiquity, there is limited understanding of microeukaryotic biodiversity in soil habitats, especially within natural systems. Environmental DNA (eDNA) metabarcoding is a promising method to enhance our knowledge of soil microeukaryotic communities. Compared to traditional morphology-based taxonomy, eDNA metabarcoding can be more cost-effective, faster, and may provide greater resolution, including the detection of rare species. In this study, we used eDNA metabarcoding (18S rRNA) to characterize microeukaryotic and nematode communities across various soil habitats in the Shipley-Skinner Reserve, Southern CA, USA. We also compared diversity patterns using two DNA extraction methods: raw soil and Baermann funnels, the latter is specifically designed to recover higher nematode abundance and diversity. Preliminary analyses show that soil microeukaryotic diversity patterns are method-dependent. Using the raw soil dataset, higher alpha-diversity (Shannon and Simpson indices) was found in habitats with greater soil bulk density. Conversely, in the Baermann funnel dataset, these indices were higher in habitats with lower soil bulk density. As a result, beta-diversity patterns, as seen in the nMDS ordinations, also varied, especially in the sample overlap across different soil habitats. As expected, nematodes were more abundant in the Baermann funnel samples, while fungi dominated the raw soil DNA sequences. Furthermore, our analysis revealed that nematode community composition (at family and genus levels) varied considerably between DNA extraction methods. These findings underscore the importance of understanding the nuances of different eDNA metabarcoding methods to accurately assess soil microeukaryotic and nematode biodiversity.

Biodiversity of Local Litter-dwelling Spiders on the Family Level
Poster #24 (Convocation Center, VyStar Arena)
10:00am – 10:45am

Undergraduate Student(s): Riley Laurion
Research Mentor(s): Thomas McElroy

Spiders are a large, highly successful group of predatory arachnids, comprising the Order Araneae, with a worldwide distribution. As they are a diverse and specialized group of invertebrates, spiders can be used to track the health of an ecosystem, and ecologists can use the presence of certain spider groups to infer about the abundance of their preferred prey and predator groups. This ecological survey focuses on documenting the local diversity of spiders at the family level in three locations throughout Cherokee and Cobb County Georgia. Sites were chosen primarily for their qualitative differences in land use, moisture level, and tree composition to study changes in spider diversity between habitats close in proximity but of varying conditions. Spiders were collected at the study sites during the spring and summer in three separate collections per site—a total of nine collections—using leaf litter panning in a 2.86m by 6.86m space. Live specimens were photographed, released, and identified afterwards. Data of family diversity and abundance was then compiled in Excel and analyzed in R (version 4.5.2) to calculate relative abundance, Shannon indices, Bray-Curtis and Jaccard dissimilarities, and ANOSIM test values. All three locations were found to have statistically significant ($p < 0.05$) differences in spider diversity. Spiders from 15 families were identified with different abundances within each site. Phrurolithidae was detected consistently throughout all sites and collections, and Lycosidae had the most uneven distribution between sites. The largest abundance and diversity of collected spiders was seen in the site with the least anthropological disturbance, highest moisture levels, and most even tree composition, though multiple families appeared only in drier, more disturbed locations. It can be inferred from this that specific families of spiders or their prey prefer different leaf litter types and moisture levels, and some spider families are uniquely tolerant to human disturbance.

Ecosystem Productivity and Fish Community Assembly Across Freshwater and Marine Ecosystems in Georgia
Poster #7 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Halimah Budeir
Research Mentor(s): Nicholas Green

Fish are the most abundant vertebrate consumers in freshwater and marine ecosystems, and their diversity and life history strategies shape the communities in which they reside. Fishes exhibit extraordinary degrees of adaptive radiation, resulting in very high biodiversity even within small communities. One important factor in fish community assembly is ecosystem productivity, including the availability of plants for foraging. Plant availability determines the viability of herbivory as a feeding strategy. In systems with abundant plant resources, herbivory and omnivory may be viable strategies for many species. In contrast, when plant availability is *limited, fish communities are expected to shift toward more carnivorous feeding habits. Because marine systems generally contain less macrophyte biomass for fishes than freshwater systems, they may differ from freshwater fish assemblages in the relative proportion of species exploiting herbivory as a strategy. To test the hypothesis that resource availability drives community assembly, we compared fish assemblages from two ecosystems: a freshwater rivershed in Georgia and marine communities along the Georgia coast. Species-specific trophic level estimates were used to characterize diet across fish assemblages. These trophic classifications were combined with regional fish monitoring data to estimate community trophic structure, including abundance-weighted mean trophic level. Preliminary analyses suggest that the marine fish assemblage tended to have a greater abundance-weighted mean trophic level, indicating less reliance on herbivory and omnivory by marine fish compared to fish in the freshwater assemblages. This pattern supports the hypothesis that differences in primary producer availability influence trophic organization in aquatic fish communities.*

Morphological Variation in the Lingual Glands of Wild American Alligator Populations

Poster #2 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Graduate Student(s): Benjamin Angalet
Undergraduate Student(s): Chelsea Holmes, Chloe Segars, Kamryn Moss, & Chase Cheeks
Research Mentor(s): Nicholas Green

American alligators (Alligator mississippiensis) inhabit a wide variety of aquatic ecosystems, including swamps, freshwater ponds, and estuarine rivers. As apex predators, the individual health and population viability of alligators is crucial to the conservation of ecosystems they inhabit. Understanding how alligators and similar species meet osmoregulatory challenges will become critical over the next 100 years as sea levels rise, and many coastal habitats are expected to become more saline. Crocodilians living in salt- or brackish water such as the saltwater crocodile (Crocodylus porosus) face considerable osmoregulatory challenges in maintaining homeostasis with respect to plasma salt concentration. In addition to the kidneys and cloaca found in all crocodilians, saltwater crocodiles possess a salt-secreting lingual gland whose morphology and function are less understood in the American alligator. We investigated anatomy, physiology, and potential function these lingual glands in four American alligator populations exposed to varying salinity levels. At each of our four sites (Jekyll Island, Sapelo Island, Okefenokee NWR, and Banks Lake NWR), we captured wild alligators and collected plasma ion concentrations and lingual tissue samples for histological analysis. Morphological and histological assessments of tissue biopsies were processed via light and electron microscopy to identify inter-population differences. Preliminary results show that coastal populations of alligators do not have elevated plasma salt concentrations despite their exposure to saline *habitats. Further results of the study will enrich our understanding of alligator physiology and lingual gland function in estuarine habitats. Additional findings will also clarify the evolutionary novelty and significance of the alligator lingual gland. This 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.*

Schwann Cells and Cutaneous Nerve Regeneration in Spiny Mice
Poster #4 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Sienna Bennett & Stefania Salazar
Research Mentor(s): Justin Varholick

In most mammals, when the skin is severely damaged (e.g., burns, gunshot wounds, or surgery), the nerves and other structures will not fully recover. Specifically, the nerves will regenerate sporadically and lack nerve bundles and sheathing. Some of these nerves, cutaneous nerves, are associated with sensory pathways in the skin. Thus, when the skin is injured, poor nerve recovery can lead to hypo or hyper sensation. Recently our lab showed that spiny mice (Acomys), can regenerate skin with cutaneous nerves in bundles without scarring, while standard lab mice (Mus) healed skin with scarring and had poor and sporadic cutaneous nerve recovery (Varholick et al., 2025). Many different cells take part in the healing or regeneration of skin and cutaneous nerves. For example, Schwann cells facilitate functional recovery by clearing debris and forming a scaffold to guide nerve regeneration post injury. Here we used immunohistochemistry (IHC) to determine the number and location of Schwann cells (Sox10) and cutaneous nerves (RT97) during (10, 14, 21, 35, and 44+ days post injury) and after skin regeneration. We anticipated to find more Schwann cells in healing Acomys tissue than in healing Mus tissue during regeneration and once regeneration was complete. By understanding this difference in the quantity of Schwann cells, we have started to understand how Acomys can recover cutaneous nerves while most mammals cannot.

Mathematics

A Partial Symmetrization Flow Related to the Pólya–Szegő Conjecture
Poster #35 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Abdallah Saad
Research Mentor(s): Emanuel Indrei

The relationship between symmetry and optimization is of particular importance in many fields. The Pólya–Szegő conjecture, for instance, suggests that regular polygons have an advantageous relationship with principal frequencies, reflecting the broader connection between symmetry and optimization. In the construction of various irregular polygons, it became possible to visualize the effect that partial symmetrization has upon the shapes of those polygons. In analyzing the results of applying multiple iterations of symmetrization upon those polygons, it became possible to identify the ways in which the shapes of those polygons changed. Each of these results indicated that symmetrization leads to a polygon that exhibits more equilaterality and geometric balance than the initial polygon. These findings provide insight into the ways in which increasing symmetry can influence principal frequency.

Age-Structured Health-Education Smoking Dynamics with a Weak Allee Effect: Initiation, Schooling, Aging, and Threshold Analysis
Poster #48 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Ben Wood
Research Mentor(s): Pengcheng Xiao

Smoking initiation and cessation have long been influenced by age, education, and social interactions. To better capture these dynamics, we are developing an age-structured mathematical model that incorporates these factors to study transitions among smoking behavior states. The model also includes a weak Allee effect to represent reduced initiation pressure when smoking prevalence is low. This project contributes to the study of smoking dynamics by combining age structure, education related to smoking, and population aging to complete threshold analysis. The model captures how schooling and cross-age social influences affect smoking initiation and cessation, providing a controlled way to analyze prevention strategies targeting different age groups and education levels. We construct a system of ordinary differential equations representing transitions among susceptible individuals, smokers, quitters, and smokers with smoking-related disease, stratified by age and education status. These factors are incorporated through transition rates and flow terms, allowing analysis of system properties including positivity, boundedness, equilibrium points, and possible bifurcations, with the goal of deriving a threshold quantity governing smoking persistence. The project will provide analytical results, including equilibrium points and threshold expressions depending on initiation and age-mixing parameters, to examine how these factors shape smoking dynamics. These findings will support prevention strategies focused on youth education and social influences, contribute to future public health modeling and assessment efforts, and will be prepared for submission to AIMS Mathematics for publication.

Almgren's Problem
Poster #13 (Convocation Center, VyStar Arena)

10:00am – 10:45am
Undergraduate Student(s): Abel Escobar
Research Mentor(s): Emanuel Indrei

This project studies a one-dimensional optimization problem motivated by Almgren's work on energy-minimizing shapes that arise in models of crystal formation. It is in these models where minimizing an energy functional under constraints helps to offer an explanation as to why certain geometric shapes appear in nature. Through a basic simplification of the setting, this Almgren problem is much more easy to approach. I focus on a simplified setting in which the goal is to position an interval of fixed length along a curve so that the area under the curve is minimized, assuming the function is strictly decreasing on negative values and strictly increasing on positive values. This setup captures an important structural feature of more complex variational problems and provides insight into how optimal configurations can be localized. Using tools from calculus, including the Fundamental Theorem of Calculus, the Intermediate Value Theorem, and the First Derivative Test, I prove that a minimizing interval exists and show that the optimal interval must contain the origin. This localization result is significant because it reduces the search for optimal configurations and reflects behavior observed in higher-dimensional versions of the Almgren problem. Due to the complexity of the problem, MATLAB (a computer software program for mathematics) was used to simulate the area functional and visualize how the minimum changes as the interval shifts, allowing computational experiments to support and illustrate the analytical results. By combining mathematical reasoning with computational methods, this project demonstrates how simplified models can provide meaningful insight into complex geometric optimization problems. The groundwork laid here helps when one seeks to study further these Almgren-type problems in higher dimensions.

Between the Integers: Exploring the Foundations of Fractional Calculus
Poster #20 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Samuel Gomeyac
Research Mentor(s): Somayeh Mashayekhi

Ordinary calculus is a type of mathematical analysis that refers to the concepts of differentiation and integration through integer orders. However, instead of using integers, what if non-integers or fractions are introduced in the order? This project aims to answer this question by providing a foundational explanation of fractional calculus, exploring the physical significance of fractional integrals and derivatives, and considering real world applications of this method. This research starts by establishing the fundamental principles of ordinary differentiation and integration by laying out their definition, physical significance, and applications. The simplified processes for solving derivatives and integrals are also provided. Moving on to the process of fractional *calculus, the different definitions such as the Riemann-Liouville definition and functions like the Gamma function are provided to illustrate the complexity in solving fractional derivatives and integers. In contrast to ordinary calculus, fractional calculus has no "set" or general definition for solving. While fractional calculus has not been fully discovered, it is a powerful method that can be applied to various scenarios in medicine or engineering.*

Geometric Graph-based Transformer Model for Drug-Target Affinity Prediction
Poster #21 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Sameer Kadasinghanahalli & Chase Wiggins
Research Mentor(s): Masud Rana

One of the most challenging obstacles in the process of drug discovery is predicting how drug molecules will interact with their target proteins. These interactions are quantified using binding affinities. Being able to accurately predict binding affinities enables researchers to identify promising drug candidates, while reducing the need for expensive experiments. In recent years, researchers have turned to machine learning models to predict binding affinities due to their speed and efficiency to query large datasets. Additionally, graph-based models can be used to represent atomic interactions that are modeled as nodes and edges. Previous studies have shown that integrating atom classification and graph theory help capture relationships between protein and ligand atoms, producing geometric features that can be used in machine learning models to learn patterns from diverse datasets. Our project aims to develop a model that integrates these geometrically-informed features into the Transformer model to further improve binding affinity predictions. Transformer models use attention mechanisms to learn relationships between features by assigning weights that reflect their importance and capture dependencies in these features. We validated our model against standard benchmark datasets such as CASF-2016. Numerical results of our experiments show that our model outperforms other state-of-the-art modes in predicting protein-ligand binding affinities.

Machine Learning in Theme Parks: Making Your Visit Better
Virtual Presentation (Microsoft Teams)
Session 3 at 1:00pm – 2:00pm
Undergraduate Student(s): Nat Yan
Research Mentor(s): Min Wang & Zhu Cao

The purpose of this research is to study and model ride wait times in major theme parks across the United States. This project focuses on understanding the patterns in population flow-specifically how wait times vary across different rides, parks, and times of day. By collecting real wait-time data at five-minute intervals, we conducted a statistical analysis to estimate average wait time and identify trends that can support future decision-making. To demonstrate how *these insights could be used in practice, we combined our wait-time analysis with Google Maps route-planning services. Using example scenarios, we illustrated how integrating travel time with predicted ride wait times could guide visitors toward more efficient route choice inside a theme park. This showcases a potential application of our research and highlights how machine learning models may eventually enhance both operational efficiency and guest experience.*

The Polya-Szego Conjecture
Poster #42 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Abdallah Saad
Research Mentor(s): Emanuel Indrei

The relationship between symmetry and optimization is of particular importance in many fields. The Pólya–Szegő conjecture, for instance, suggests that regular polygons have an advantageous relationship with principal frequencies, reflecting the broader connection between symmetry and optimization. In the construction of various irregular polygons, it became possible to visualize the effect that partial symmetrization has upon the shapes of those polygons. In analyzing the results of applying multiple iterations of symmetrization upon those polygons, it became possible to identify the ways in which the shapes of those polygons changed. Each of these results indicated that symmetrization leads to a polygon that exhibits more equilaterality and geometric balance than the initial polygon. These findings provide insight into the ways in which increasing symmetry can influence principal frequency.

Predicting Residue B-factors with Geometric Graph-Based Machine Learning
Oral Presentation (Prillaman Hall, Indoor Plaza)
9:00am – 9:50am
Undergraduate Student(s): Alyssa Brooks
Research Mentor(s): Masud Rana

Understanding protein structural properties is imperative to improving drug design and, in turn, enhancing how our immune systems react to various diseases and viruses. B-factors play a vital role in this effort by measuring atomic flexibility inside a protein, which can influence drug potency. Various machine learning models have been developed to predict B-factors of protein residues. However, accurate predictions remain challenging. Our study entails designing a geometric graph-based machine learning model that can accurately predict residue B-factors. Through weighted colored subgraph representations of 3D protein structures, our model captures atomic physical and chemical interactions. Multiple machine learning models, including Ridge Regression, Random Forests (RF), and Gradient Boosting Decision Trees (GBDT), were paired with geometric features and trained on a dataset of 364 proteins. Several cross-validation processes, including Leave-One-Out techniques, were carried out to make blind *predictions of B-factors for each protein in the dataset. The Ridge Regression and GBDT models performed with the highest accuracy, achieving mean correlations of 0.74 and 0.77 between true residue B-factors and predicted B-factors, respectively. The precision achieved with both models fosters better understanding of protein structures, which can influence improvements in drug design.*

On the Equivalence of Weak and Integral Formulations for a Variable-Coefficient Helmholtz Equation with Measure Potentials

Poster #36 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Nischal Regmi
Research Mentor(s): Eric Stachura

Helmholtz-type differential equations are of central importance in mathematical physics and spectral theory, and recent developments have extended the study of these equations to settings with fractal measures and non-classical Laplacians. In fact, the work of Bird, Ngai, and Teplyaev has provided basic results for fractal measures of Laplacians. However, much of the existing literature focuses on constant-coefficient operators and does not address the variable-coefficient setting. In this project we investigate a one-dimensional Helmholtz-type equation with a spatially varying coefficient k(x) in the presence of a measure of potential. Our goal is to extend the analytical framework used in the fractal Laplacian literature to operators with variable coefficients. The problem is reformulated as a Volterra–Stieltjes integral equation, which allows integration with respect to general measures and accommodates singular or fractal structures. Using this formulation, we analyze the existence and differentiability properties of solutions and establish relationships between weak formulations and integral representations. Our analysis shows that under suitable regularity assumptions on $k(x)$ *and the measure* μ*, the weak formulation of the equation is equivalent to a Volterra–Stieltjes integral formulation. We further derive derivative identities that connect these formulations and provide an analogue of a key result from the work of Bird–Ngai–Teplyaev in the variable-coefficient setting. These results extend the theory of differential equations associated with fractal measures and provide a framework for analyzing variable-coefficient Helmholtz operators in measure-based or fractal environments.*

The Wright–Fisher and Coalescent Models: Forward- and Backward-Time Perspectives on Genetic Drift

Poster #38 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Anna Preston
Research Mentor(s): Somayeh Mashayekhi

The aim of understanding how genetics vary through time is a central question within population genetics. Two widely studied frameworks that we can use to study this process are the Wright-Fisher model and the coalescent model. They both describe the same evolutionary dynamics but from different perspectives. The Wright-Fisher model examines genetic drift forward in time by following how allele frequencies change across generations, while coalescent theory starts backward in time by tracing lineages using ancestry data. This project investigates the relationship between these two perspectives by examining the Wright-Fisher model utilizing a transition matrix and interpreting the resulting dynamics through a coalescent framework. A finite population case study was used to construct the transition matrix governing allele frequency changes throughout generations; this allowed probabilities of fixation and loss to be examined under genetic drift. By examining how allele frequencies evolve through this stochastic process and how lineages coalesce when we trace them back through time, the analysis underlines the conceptual connection between forward-time population dynamics and backward-time genealogical processes. The results exemplified how transition matrices provide a concise mathematical description of Wright-Fisher dynamics while also revealing the underlying genealogical structure outlined by coalescent theory. This shows how two widely used models in population genetics offer complementary perspectives on genetic drift and provides a clear bridge between forward-time allele frequency models and backward-time ancestry-based approaches.

Molecular and Cellular Biology

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

Poster #9 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Oliver Buckley, Levi Brigham, Journey Lark, Yoo Jung Kim, Arman Ahmed
Research Mentor(s): Soon Goo Lee & Kunie Yoshinaga-Sakurai

The bacterial pathogen Pseudomonas syringae manipulates auxin physiology in Arabidopsis thaliana to promote infection and disease. A key strategy involves synthesis of indole-3-acetic acid (IAA), which disrupts normal plant hormone signaling. Using microbial genome sequences and computational analysis tools, we previously identified three aldehyde dehydrogenases (ALDs) from P. syringae involved in the IAA biosynthetic pathway. Recent studies demonstrated that NAD-dependent aldehyde dehydrogenase A (AldA) is the primary enzyme responsible for producing pathogenic IAA from indole-3-acetaldehyde (IAAld). While all three ALD proteins share a common reaction mechanism, their substrate specificities vary significantly. Here, we investigated the three-dimensional structures and biochemical activities *of AldA and aldehyde dehydrogenase B (AldB). We expressed and purified recombinant wild-type and 12 mutant AldA and AldB proteins using nickel-affinity and size-exclusion chromatography to analyze the effects of alterations in the aldehyde substrate-binding site. To understand the roles of active-site residues and substrate specificity in these two wild-type proteins, we performed steady-state kinetic analyses using IAAld and other aromatic aldehyde substrates to measure their activities and changes in substrate specificity. Using X-ray crystallography to analyze the three-dimensional structure of AldB together with its biochemical properties, we identified key structural features and charge distributions in the active site that underlie its activity and affinity for IAAld and related substrates. This research provides insights into the evolution of enzyme function and molecular architecture within the IAA biosynthetic pathway of the bacterial pathogen P. syringae.*

Biochemical and Structural Analysis of Phosphoethanolamine N-methyltransferase from Ancylostoma ceylanicum

Poster #34 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Joseph Pittman, Christine Moultrie-Hall, Walter Mcready, Kareigh Gammon, Chris Serrano, & Soyoung Lee
Graduate Student(s): Md Tanjil Islam Shovon & Md Al Hafiz
Research Mentor(s): Soon Goo Lee & Kuni Yoshinaga Sakurai

Hookworm infection remains a major neglected tropical disease, causing anemia and malnutrition in millions of people worldwide through chronic intestinal blood loss. The increasing concern of anthelmintic drug resistance highlights the urgent need to identify new therapeutic targets that are essential to the parasite but absent in mammals. Phosphoethanolamine N-methyltransferase 1 (PMT1), a key enzyme in the phosphatidylcholine biosynthetic pathway, is highly conserved across parasitic nematodes and is not encoded in mammalian genomes, making it a promising target for selective drug development. PMT1 catalyzes the committed step of the nematode-specific phosphobase pathway by methylating phosphoethanolamine to phosphomonomethylethanolamine using S-adenosylmethionine (SAM) as the methyl donor. To investigate the biochemical and structural properties of PMT1 from the human hookworm Ancylostoma ceylanicum, recombinant AcPMT1 was heterologously expressed in Escherichia coli and purified using Ni2+-NTA affinity chromatography followed by size-exclusion chromatography (SEC). SDS-PAGE analysis confirmed successful purification, showing a prominent band at the expected molecular weight of AcPMT1. Large-scale protein production enabled high-throughput crystallization screening of both the apo form and the SAM-bound complex using vapor-diffusion methods. Supported by the KSU First-Year Scholars Program, we screened more than 1,000 crystallization conditions during Fall 2024 and Spring 2025 and are currently optimizing promising crystal hits. X-ray diffraction data will be collected at synchrotron facilities once diffraction-quality crystals are obtained. Determination of the

AcPMT1 structure will provide fundamental insight into this hookworm-specific enzyme and support structure-guided design of selective inhibitors to improve the treatment and control of hookworm infections.

Broad expression regulation in egg chamber cells from the ecdysone and JAK/STAT signaling pathway in Drosophila
Poster #3 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Andrea Bello-Gamez
Research Mentor(s): Dongyu Jia

During oogenesis, epithelial cells in the follicular epithelium of Drosophila egg chamber undergo changes from cuboidal to the flattened and stretched squamous shape. Following the transition, our lab previously reported that a few key components of the ecdysone and JAK/STAT pathways regulate the transcription factor Broad (Br) to control the morphological changes of squamous cells (SC). However, it was still unclear whether all or partial components of the pathway regulate Br to impact SCs. To further understand how the two pathways affect Br expression, we utilized anterior follicle cell specific A90-Gal4, UAS RFP flies to knock down all components of ecdysone and JAK/STAT pathways one by one to visualize their effects on Br expression and SCs accumulation in stage 10 anterior follicle cells. Ecdysone pathway component UAS- EcR-B1 DN had a strong Br regulation in all SCs with strong accumulation at the anterior terminal. Downstream gene UAS-Eip75B also showed a strong Br upregulation in anterior SC. Contrarily, pathway component UAS-EcR-B2 DN showed no Br upregulation in SCs but had slight SC accumulation at the anterior. JAK/STAT pathway components UAS-dome RNAi and UAS-Stat92E RNAi presented weak Br upregulation in some SCs with cluster accumulation, whereas pathway component UAS-hop RNAi and positive regulator UAS-Cnot4 RNAi presented no Br upregulation with clustered SC accumulation. While many genes regulate both Br regulation and SC accumulation, some genes only impact one, suggesting Br regulation and SC accumulation are not interdependent.

Cannabis Exposure During Pregnancy Alters the Function of Brain Receptors Involved in Learning and Memory
Poster #10 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Allisa George & Kylie Tenhouse
Research Mentor(s): Vishnu Suppiramaniam & Kawsar Chowdhury

Exposure to cannabis during pregnancy may affect how the brain develops in offspring. However, it is unclear how the main active compound in cannabis, Δ^9-tetrahydrocannabinol (THC), influences the basic functioning of brain communication systems in the offspring. Brain *cells communicate with one another through chemical signals. One of the most important communication systems involves glutamate receptors, particularly the α-amino-3-hydroxy-5-methyl-4-isoxazolepropionic acid (AMPA) subtype, which plays a critical role in learning and memory. In this study, we investigated whether exposure to THC during pregnancy changes how these AMPA receptors function at a very fundamental level. Pregnant rats were given a moderate dose of THC or a control solution during pregnancy and early development. Later, we examined brain tissue from their adolescent offspring, focusing on the hippocampus, a brain region important for memory. Using specialized electrophysiological techniques, we measured how individual AMPA receptor channels opened and closed. We found that prenatal THC exposure changed how these receptors behaved. In offspring exposed to THC, the AMPA receptor channels opened less frequently compared with those from control animals. We also observed disruptions in the normal patterns of channel activity, including changes in the frequency and duration of bursts. Additionally, the coordinated or cooperative activity between receptor channels that was seen in control animals, which was required for memory formation, was no longer present after prenatal THC exposure. Together, these findings demonstrate that exposure to THC before birth can directly alter the fundamental behavior of key brain receptors involved in memory formation. Changes at this microscopic level of brain signaling may help explain how prenatal cannabis exposure affects brain function and contributes to learning and memory deficits later in life. Understanding these mechanisms is important for guiding the development of therapeutic strategies aimed at mitigating THC-induced cognitive impairments in offspring.*

The Conserved SYLS Motif Is Essential for Akirin Function in Early Myogenesis
Poster #1 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Graduate Student(s): Shaila Akter
Research Mentor(s): Anton Bryantsev

Akirin is a small adaptor protein that associates with multiple protein complexes and participates in processes ranging from transcription activation to nuclear import. How one protein supports such diverse functions remains unclear. A highly conserved SYLS motif at Akirin's C-terminus is preserved from flies to humans. In human cells, the corresponding region binds the 20S proteasome to promote nuclear import. We investigated Akirin function during adult myogenesis, focusing on the SYLS motif. RNAi-mediated knockdown of akirin using the muscle driver Mef2-Gal4 produced thin, weak muscles and complete pharate lethality. Muscle specification and differentiation appeared normal, but fibers were markedly smaller. Knockdown with a late muscle driver (fln-Gal4) had no effect. In contrast, the early myoblast driver (1151-Gal4) reproduced the phenotype. Temporal induction using a temperature-sensitive Mef2TS driver confirmed that Akirin is required during early myogenesis. Overexpression of wild-type akirin had no detectable effect. However, overexpression of a SYLS-deleted variant (ΔSYLS) caused partial lethality and muscle dysfunction, consistent with a dominant-negative effect. An

RNAi-immune Akirin construct has been generated to test SYLS function in rescue experiments. Together, our data show that Akirin acts in myoblasts and that its conserved SYLS motif is essential, possibly by enabling proteasome-mediated nuclear translocation.

Developmental Analysis of mep-1 and lin-35 RNAi Knockdown in Wild Type and met-2 mutant C. elegans
Poster #33 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Michael Novak, Kaylan Parkes, Jeremiah Rhyant, & Kristin Tran
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 the nematode, C. elegans, H3K4me (a modification associated with active transcription) is removed by the H3K4 demethylase, SPR-5, and H3K9me (a modification associated with transcriptional repression) is subsequently added by the histone methyltransferase, MET-2. Recently, it was demonstrated that SPR-5; MET-2 maternal reprogramming antagonizes the H3K36 methyltransferase, MES-4, which maintains a transcriptional memory of a subset of germline genes between generations. Maternal loss of SPR-5 and MET-2 results in ectopic expression of MES-4 germline genes in somatic tissues and a severe developmental delay. In addition, knocking down the DREAM or MEC NuRD transcriptional repressor complexes specifically exacerbates the developmental delay and the ectopic expression of germline genes in the soma caused by loss of SPR-5 and MET-2. Whether epistatic effects on developmental progression occur upon knockdown of DREAM or MEC NuRD complexes in spr-5 and met-2 single mutants has not been examined. To test this in our 4390K CURE course, we used RNA interference (RNAi) to knock down DREAM complex member, lin-35, or MEC NuRD complex member, mep-1, in either spr-5 or met-2 single mutants. We then examined the developmental progression of progeny from each double mutant combination. Our experiments are currently ongoing, and we are excited to share these results at the 30th Annual Symposium of Student Scholars.

Development of GM Peanuts using Chitinase and Glucanase Genes against Aspergillus flavus in Georgia Peanuts
Poster #25 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Aniyah Lewis

Graduate Student(s): Saima Shafique
Research Mentor(s): Premila Achar

The State of Georgia is known to produce about 50% of the national peanut supply, contributing in making the United States the third largest peanut producer in the world after India and China. A. flavus produces aflatoxin (AFB1), which is among the most carcinogenic naturally occurring compounds known to pose significant health risks to humans. This study aims to develop transgenic peanut lines through Agrobacterium tumefaciens-mediated transformation, introducing pathogenesis-related (PR) protein genes encoding chitinase and β-1,3-glucanase enzymes known to degrade fungal cell walls and enhance resistance AFB1. Embryogenesis was performed by culturing sterilized peanut embryos on Murashige and Skoog (MS) medium. For callus formation, embryos were co-cultivated with A. tumefaciens. Transformed embryos were cultured on MS media containing 3mg/L of 2,4-D for callus induction, followed by shoot and root regeneration on media supplemented with 1mg/L Benzyladenine (BA) and 1mg/L Indole-3-Butyric Acid (IBA), respectively. Untreated samples served as control and experiments were done in replicates. Transgenic peanuts were used for colorimetric assay described in (Chenault et al., 2002). Successful callus induction and regeneration of shoots and roots that survived antibiotic selection, suggesting potential transgene integration. Embryogenesis was successful at 98%. Colorimetric assay is in progress. Our results, so far obtained, show that transformed peanuts with PR proteins may alleviate Aspergillus contamination and the production of AFB1 in peanuts, and may minimize costs in peanut production in Georgia.

Examining Epistatic Effects on Developmental Progression in spr-5 and met-2 Mutants by Knocking Down NuRD and DREAM Transcriptional Repressor Complexes in C. elegans
Poster #20 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Suki Lewis & Phillip Cooper
Research Mentor(s): Brandon Carpenter

To prevent inappropriate germline gene expression in somatic cells, Caenorhabditis elegans rely on the critical and highly specialized maternal epigenetic reprogrammers SPR-5, an H3K4me1/2 demethylase, and MET-2, an H3K9 methyltransferase. Together, these enzymes reset inherited chromatin states at fertilization to safeguard somatic identity. Previous research has shown that the DREAM transcriptional repressor complex and the MEC NuRD chromatin-remodeling complex act somatically to reinforce SPR-5/MET-2 maternal reprogramming. Notably, loss of either the DREAM or MEC NuRD complex in an spr-5; met-2 double mutant converts a characteristic L2 larval delay into a severe L1 arrest. Despite this finding, the epistatic impacts of these somatic reinforcers on spr-5 and met-2 single mutant development has not been examined.

To test this, we used RNA interference (RNAi) to knock down DREAM complex member, lin-35, or MEC NuRD complex member, mep-1, in either spr-5 or met-2 single mutants. We then examined the developmental progression of progeny from each double mutant combination. Our experiments are ongoing, but we are excited to share these results at the 30th Annual Symposium of Student Scholars.

Examining the Developmental Effects of Knocking Down of DREAM and NuRD Complexes in met-2 mutants C. elegans

Poster #44 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Iris VanSweden, Monay Winston, & Simon Yohannes
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 the nematode, C. elegans, H3K4me (a modification associated with active transcription) is removed by the H3K4 demethylase, SPR-5, and H3K9me (a modification associated with transcriptional repression) is subsequently added by the histone methyltransferase, MET-2. Recently, it was demonstrated that SPR-5; MET-2 maternal reprogramming antagonizes the H3K36 methyltransferase, MES-4, which maintains a transcriptional memory of a subset of germline genes between generations. Maternal loss of SPR-5 and MET-2 results in ectopic expression of MES-4 germline genes in somatic tissues and a severe developmental delay. In addition, knocking down the DREAM or MEC NuRD transcriptional repressor complexes specifically exacerbates the developmental delay and the ectopic expression of germline genes in the soma caused by loss of SPR-5 and MET-2. Whether epistatic effects on developmental progression occur upon knockdown of DREAM or MEC NuRD complexes in spr-5 and met-2 single mutants has not been examined. To test this in our 4390K CURE course, we used RNA interference (RNAi) to knock down DREAM complex member, lin-35, or MEC NuRD complex member, mep-1, in either spr-5 or met-2 single mutants. We then examined the developmental progression of progeny from each double mutant combination. Our experiments are currently ongoing, and we are excited to share these results at the 30th Annual Symposium of Student Scholars.

Examining the Effects of Knocking Down lin-35 and mep-1 on met-2 Mutant Development

Poster #30 (Convocation Center, VyStar Arena)
11:00am – 11:45am

Undergraduate Student(s): Kendall Messman, Andres Muradas, Fatoumata Njie, & Ethan Moss
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 the nematode, C. elegans, H3K4me (a modification associated with active transcription) is removed by the H3K4 demethylase, SPR-5, and H3K9me (a modification associated with transcriptional repression) is subsequently added by the histone methyltransferase, MET-2. Recently, it was demonstrated that SPR-5; MET-2 maternal reprogramming antagonizes the H3K36 methyltransferase, MES-4, which maintains a transcriptional memory of a subset of germline genes between generations. Maternal loss of SPR-5 and MET-2 results in ectopic expression of MES-4 germline genes in somatic tissues and a severe developmental delay. In addition, knocking down the DREAM or MEC NuRD transcriptional repressor complexes specifically exacerbates the developmental delay and the ectopic expression of germline genes in the soma caused by loss of SPR-5 and MET-2. Whether epistatic effects on developmental progression occur upon knockdown of DREAM or MEC NuRD complexes in spr-5 and met-2 single mutants has not been examined. To test this in our 4390K CURE course, we used RNA interference (RNAi) to knock down DREAM complex member, lin-35, or MEC NuRD complex member, mep-1, in either spr-5 or met-2 single mutants. We then examined the developmental progression of progeny from each double mutant combination. Our experiments are currently ongoing, and we are excited to share these results at the 30th Annual Symposium of Student Scholars.

Elucidation of the Biosynthetic Pathway of Arsmidomycin (ASM), a Novel Arsenic-containing Antibiotic
Poster #25 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Nyomi Mann
Graduate Student(s): Rajia Sultana
Research Mentor(s): Masafumi Yoshinaga

Rapid emergence and spread of antimicrobial resistance (AMR) underscores the urgent need for new potent antibiotics. Although infamous for its toxicity, arsenic paradoxically has been used as therapeutics since ancient times. Recently, a soil bacterium was shown to produce a novel arsenic-containing antibiotic named arsinothricin (AST). AST, an arsenic-containing non-proteiogenic amino acid, is a potent broad-spectrum antibiotic while sparing human cells, *highlighting the potential of arsenic-based natural products as a new source of antimicrobial agents. AST is biosynthesized via two steps catalyzed by two S-adenosylmethionine (SAM)-dependent enzymes ArsL and ArsM. ArsL- guided genome mining was conducted to discover further novel arsenic-containing antibiotics, leading to discovery of novel arsL-containing biosynthetic gene clusters (BGCs) from Bacillus cereus and Anoxybacillus calidus. These clusters commonly contain two additional genes, named ars1 and ars2 that are annotated to encode a 4-carboxymuconolactone decarboxylase and biotin carboxylase, respectively. Given that ArsL converts inorganic arsenite [As(III)] to hydroxyarsinothricin (AST-OH), a non-methylated AST precursor, we propose that Ars1 decarboxylates AST-OH while Ars2 carboxylates the amine group of the decarboxylated intermediate, producing arsmidomycin (ASM), an arsenic analog of the phosphonate antibiotic fosmidomycin. Liquid chromatography (LC) coupled with inductively coupled plasma mass spectrometry (ICP-MS) analysis showed that when cultured with As (III), these bacteria both produce unknown arsenic species in addition to AST-OH, supporting our proposed biosynthetic pathway. To validate the pathway, we constructed Escherichia coli strains that heterologously express arsL, ars1, and ars2 individually or in combination. We are currently confirming expression of each gene by western blot, as well as their arsenic biotransforming activity by LC-ICP-MS. We are also testing various ArsL homologs to identify the most suitable homolog for E. coli to facilitate our current in vivo study.*

Exploration for AsRiPPs, Arsenic-Sontaining Ribosomally Synthesized and Post-Translationally Modified Peptides

Poster #42 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Meyarah Speight
Graduate Student(s): Md Tanjil Islam Shovon, Kayla Macdonald
Research Mentor(s): Masafumi Yoshinaga

Antimicrobial resistance is a major threat to global public health. There is broad consensus that new antibiotic scaffolds and mechanisms are needed to curb global resistance. Although arsenic is regarded as toxic, it has a rich history in medicinal use for treating leukemia, syphilis, psoriasis, and various skin affections. The recent discovery of the organoarsenical arsinothricin (AST), which shows broad antimicrobial activity with low cytotoxicity, further supports the possibility that arsenic-based compounds may serve as useful antimicrobial agents. Our objective is to expand this area by identifying additional arsenic-containing antibiotics. When using genome mining with arsM, an arsenic methyltransferase gene, as a molecular probe, a novel biosynthetic gene cluster (BGC) was identified in Microbispora rosea. In addition to arsM, the cluster has a gene encoding a SPASM-domain radical S-adenosylmethionine (rSAM) enzyme, which is often involved in the maturation of ribosomally synthesized and post-translationally modified peptides (RiPPs), as well as a putative precursor peptide gene. Given that RiPP pathways often yield diverse bioactive molecules, we hypothesize that this BGC produces a RiPP *containing a methylated arsenical. We name the predicted product an arsenic-containing RiPP (AsRiPP). When cultured with arsenite, M. rosea produced an organic arsenic species. The organic arsenic species crudely purified from large-scale cultures by gel filtration column chromatography exhibited moderate antimicrobial activity, supporting our hypothesis that the BGC directs the biosynthesis of an arsenic-containing antibiotic. In parallel, to investigate the AsRiPP biosynthetic pathway, we constructed Escherichia coli strains expressing the precursor peptide gene solely or in combination with the other BGC gene(s). Culture condition was optimized and gene expression confirmed by western blot. Our current effort is to purify intact and modified precursor peptides from large-scale culture of each construct for mass spectrometry (MS)- and NMR (nuclear magnetic resonance)-based structural analysis.*

Evaluation of Cotton Byproduct as an Alternative Mushroom Casing Layer
Poster #13 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Arnik Dedani
Research Mentor(s): Christopher Cornelison

The edible mushroom Agaricus bisporus (portabella/button mushrooms) represent the most widely cultivated mushroom variety worldwide. Currently, this industry relies on peat-moss for casing layers, an essential component for enabling the transition from vegetative growth to mushroom formation. However, the industry faces hurdles due to rising costs transporting peat, alongside environmental concerns of nonrenewable peat harvest. Recognizing these vulnerabilities, the Agaricus industry has sought a viable alternative to peat-moss. Because specific moisture holding and structural properties are crucial for an alternative to replicate, there is no definitive alternative yet for commercial use. Cotton-gin byproduct is an abundant waste material across the southern United States. Here we investigate if cotton gin byproduct could be a sustainable and cost-effective replacement for peat in mushroom casing layers. The initial research assessed the physical characteristics of the cotton byproduct, including latent pH levels, moisture-holding capacity, material density, and resistance to competitive mold growth. For these metrics crucial to casing materials, cotton byproduct was found to have equivalent or even improved properties to peat. To validate this for mushroom fruiting, Agrocybe aegerita mushrooms were cultivated in trays to evaluate the cotton-byproduct's ability to effectively deliver moisture and stimulate fruiting results. Furthermore, to test the material's application within the Agaricus sector, we conducted trials using Agaricus blazei, comparing its colonization and fruiting efficiency against industry-standard peat casings. Cotton-byproduct was found to improve mushroom growth for the Agrocybe aegerita, boosting the fruiting consistency and yields for mushrooms. For Agaricus blazei, which require a casing layer, cotton byproduct was found to induce mushroom fruiting to a similar capacity as peat-based casing layers, without the need for buffering supplements. This suggests the potential application of *cotton-byproducts as a casing material in the Agaricus bisporus industry, though further research is needed to confirm it as a reliable alternative to cotton byproduct.*

Functional Analysis of the Role of cnd-1 in Neuromuscular Patterning and Development

Poster #9 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Alex Brown
Research Mentor(s): Martin Hudson

Neurological disorders such as schizophrenia and autism have been increasingly associated with genetic factors, including genes encoding transcription factors involved in neural development. One such gene, Neuro-D, plays a critical role in early neuronal and pancreatic cell differentiation. The nematode Caenorhabditis elegans serves as a valuable model organism for studying neural development due to its simple, well-characterized nervous system and rapid life cycle. In C. elegans, the homolog of Neuro-D, cnd-1, has been shown to regulate the expression of ceh-5, a Vax2-like homeobox transcription factor, in RME head motoneurons and PVQ interneurons, and to function alongside the Hox gene ceh-13 in specifying DD-class embryonic ventral nerve cord motoneuron fate. Despite these insights, the interaction between DD Neurons and muscle arms is unclear, how cnd-1 plays a role in this process, and the larger implications of this work remain unclear. To address this, we designed an approach to create a strain of C.elegans containing both cnd-1 and the fluorescence reporter myo-3::GFP, allowing for anatomical viewing through a microscope of the muscle arm and wall. Our study aims to compare the muscle cell morphology of cnd-1 elegans to our control strain of wild type myo-3::GFP C.elegans. Initial data has shown evidence of differing anatomical structure of the muscle arms and muscle arm connection to DD neurons in cnd-1 mutants. We expect to continue to see this trend as more cnd-1 mutants are scoured.

Functional Screening for Regulators that Convert Mef2 from Activator to Repressor

Poster #46 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Monay Winston
Research Mentor(s): Anton Bryantsev

Transcription factors control gene expression and define developmental outcomes. Understanding their regulatory networks is central to developmental biology. Myocyte Enhancer Factor 2 (Mef2) is essential for muscle development in flies and humans. In Drosophila, it activates the structural actin gene Act57B. However, Act57B is expressed selectively in certain muscles, whereas Mef2 is expressed in all muscles. This mismatch suggests the presence of additional factors that modulate transcriptional activity of the Mef2 protein. We hypothesize that specific factors can switch Mef2 from an activator to a repressor. To test this idea, we established an in vitro assay using Drosophila S2 cells. Mef2 is introduced into S2 cells by transfection, *where it activates a genetic reporter construct (C9) driven by Act57B regulatory elements. This system enables direct and quantitative measurement of Mef2-dependent activation. As proof of principle, we co-transfected Holes-in-muscle (Him). Him blocks Mef2-mediated activation of C9. We will now use this system to functionally test other muscle-selective regulators with differential expression in Drosophila muscles for their potential inhibitory effects on Mef2. Our goal is to define a regulatory network that fine-tunes Mef2 activity and enables muscle fiber diversification.*

Growth Kinetics of a Virus Infecting Foodborne Bacterial Pathogen Shigella
Poster #37 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): John Roche & Victoria McDuffie
Research Mentor(s): Jean Lu

Shigella are a group of bacterial pathogens. They are one of the leading causes of bacterial diarrhea worldwide. Most cases and deaths occur in children, but the illness can happen at any age. Shigella are easily transmitted through contaminated food or water and person-to-person contact. Shigella damage gastrointestinal epithelial cells leading to the disease known as shigellosis. The symptoms include nausea, vomiting, abdominal pain, diarrhea (sometimes bloody), and fever. Effective control of Shigella is essential to food safety and public health. Bacteriophages (phages) are viruses that specifically infect bacteria. They play a crucial role in regulating bacterial populations in ecosystems. Phages have emerged as novel and promising biocontrol agents against bacterial pathogens. The objective of this study was to characterize the life cycle of a new phage infecting Shigella, specifically, to study the growth kinetics of a phage infecting Shigella dysenteriae by measuring one-step growth curve. The experiment was conducted in cucumber juice as a model food system at a multiplicity of infection (MOI) of 0.01 at 37°C. The results from this study showed that the latent period of the phage was about 20 min (including 10 min for adsorption), the rise period was about 70 min, and the average burst size was 1000 phage particles per infected cell. The one-step growth curve is essential for evaluating how effectively a phage infects host cells, providing insights into its life cycle.

Generating a Cell-Penetrating Peptide Adaptor for Purposes of Introducing Antibodies into Mammalian Cells
Poster #26 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Matt Mineo, Aryan Sorathia
High School Student(s): Eugene Kang
Graduate Student(s): Jojo Croffie
Research Mentor(s): Jonathan McMurry

Intracellular antibodies are promising therapeutic agents. However, these antibodies, such as immunoglobulin G (IgG), often require a specialized mechanism to enter cells. ZCa is a modified, calcium-dependent Z domain of protein A which contains an IgG binding site. The cell-penetrating peptide TAT was bound to ZCa to allow it entry into the cell. ZCa is expected to bind IgGs with high-affinity in the presence of calcium, and very low-affinity in its absence. This reversible binding is thought to allow for IgGs bound to the TAT-ZCa construct to be released into the cell. This work aimed to determine whether TAT-ZCa, and its related constructs, could be synthesized and purified. Genes encoding TAT-ZCa and other similar constructs have been expressed, including: His-TAT-LAH4-ZCa, TAT-LAH4-ZCa-His, TAT-ZCa-His, His-TAT-ZCa. Each construct was purified utilizing a French pressure cell press, centrifugation, and Fast Protein Liquid Chromatography (FPLC). Relevant samples were stained and heated before performing SDS-PAGE. The gels were enhanced and recorded using a Li-Cor Odyssey Imaging System. The binding of TAT-ZCa to IgG was characterized through biolayer interferometry using a FortéBio Octet Red 96e. Further testing is necessary to determine how well the other constructs bind to human IgG.

How Do We Build a Muscle? Let Me Count the Genes…
Poster #39 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Camille Santana, Charlize Esterline, & Ghazal Mohammadi
Research Mentor(s): Scott Nowak

Akirin is a nuclear cofactor that links transcription factor activity with chromatin remodeling complexes to regulate gene expression during embryonic heart development and skeletal myogenesis. In Drosophila, akirin interacts with chromatin remodelers such as CHD4 and the NuRD complex to control cardiac gene pathways, a mechanism conserved across metazoans. To identify additional factors that cooperate with akirin in myogenesis, we are investigating potential genetic interactions with Ppn (pupation prominent) and hyd (hyperplastic discs). We have begun a series of genetic interactions studies with akirin and either hyd or Ppn, focusing on early skeletal and cardiac morphogenesis. Our preliminary results have indeed demonstrated an interaction between akirin and these loci during these processes. Our results have expanded the known akirin interaction network during skeletal myogenesis and heart morphogenesis. We anticipate that these findings will contribute to understanding conserved mechanisms underlying similar congenital skeletal and cardiac musculature defects in other organisms, particularly mammals.

Identification and Characterization of Novel Arsenic-Containing Antibiotics
Poster #35 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Maggie Rainwater

Graduate Student(s): Minh Phung
Research Mentor(s): Masafumi Yoshinaga

The rise of antimicrobial resistance has brought with it a need for new and effective antibiotics. Recently, arsinothricin (AST), a non-proteinogenic analogue of glutamate, was discovered to be a broad-spectrum antibiotic that effectively inhibits bacterial glutamine synthetase. AST is biosynthesized via two steps catalyzed by ArsL and ArsM, unlike its phosphorous analogue, phosphinothricin, which requires more than a dozen steps. ArsL-guided genome mining found that many bacteria have arsL-containing biosynthetic gene clusters (BGCs) and many of their gene composition is different from the AST BGC. One of such bacteria, Anoxybacillus calidus, contains two novel genes alongside arsL, named ars1 and ars2, that are annotated to encode 4-carboxymuconolactone decarboxylase and biotin carboxylase, respectively. Given that hydroxyl AST (AST-OH), the AST precursor produced from As(III) by ArsL is an amino acid, we hypothesize that Ars1 decarboxylates AST-OH, then Ars2 carboxylates the amino group of the decarboxylated intermediate, leading to the production of an arsenic mimetic of the organophosphorus antibiotic fosmidomycin (FM), which is currently named arsmidomycin (ASM). Liquid chromatography (LC) coupled with inductively coupled plasma mass spectrometry (ICP-MS) analysis suggests that when incubated with As(III) A. calidus produces three distinct arsenic species, one of which appears to be AST-OH while the other two are unknow. Unexpectedly, crudely purified AST-OH-like peak, but not the other two, exhibits moderate antibiotic activity, suggesting that the peak contains an antibiotic, presumably ASM. LC coupled with electron spray ionization (ESI)-MS showed that the crudely purified peak is a mixture of AST-OH and a compound that has a molecular mass identical to AST-OH but distinct from AST-OH. Together, these preliminary data provide a base for our hypothesis that A. calidus produces a novel arsenic-containing antibiotic. We are currently attempting to develop LC methods to isolate the novel arsenic species for its identification and characterization.

Investigating Ras Functions in Drosophila
Virtual Presentation (Microsoft Teams)
Session 2 at 12:00pm – 1:00pm
Undergraduate Student(s): Mimi Chapman
Research Mentor(s): Dongyu Jia

Cancer research has become one of the most sought-after research fields in the past few decades. Model organisms such as Drosophila have been pivotal in advancing cancer research due to their extensive amounts of conserved genes homologous to human genes. This project consists of a bioinformatic portion that explores the evolution of global Drosophila cancer research throughout the past 35 years as well as an experimental portion that observes the effects of RasV12, a mutated oncogene, on Broad (Br) expression driven by the A90-Gal4 driver. To complete the bioinformatic portion, Histcite, a bibliometric software, analyzed publications related to

Drosophila cancer research between the years 1990 to 2025. These articles were then filtered and organized to observe general trends of research including keywords, authors, and geographic regions. It showed the regression, Perrimon N, and the United States to be top contributors, respectively, to Drosophila cancer research. To complete the experimental portion, Drosophila with the mutated oncogene RasV12 was crossed with Drosophila with the A90-Gal4 driver to observe the effects of the mutation on Br expression, border cell, and squamous cell development. Normally, as egg chambers progress through oogenesis, the epithelial cells that make up the egg chamber membrane transition from cuboidal to squamous cells. Cuboidal cells get flattened and spread out, transitioning to a squamous shape, while border cells transition to a semi-mesenchymal shape, and move from the anterior tip to the middle of the egg chamber. However, experimental findings revealed that the mutated Ras gene led to border cell migration delay, accumulation of squamous cells, as well as protrusion of squamous cells towards the middle of the anterior region of the egg chamber. This shows the effects of the mutated oncogene RasV12 on the morphological changes and movement of cells during epithelial cell development.

Investigating the Impact of Perfluorooctanesulfonic Acid (PFOS) on Aedes aegypti (Diptera: Culicidae) Immature Stage Development
Poster #44 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Aurelia Thaxton, Serenity Brister, Brooklyn Galvan, & Sarah Kelly
Research Mentor(s): Andrew Haddow

Per- and polyfluoroalkyl substances (PFAS), commonly referred to as "forever chemicals", are omnipresent in the environment due to their extensive use in the production of consumer and commercial products, such as toothpaste, non-stick pans, carpet manufacturing, and food packaging. Recently, they have even been found in popular energy drinks. The highest environmental concentrations of PFAS are primarily found near military bases, airports, and industrial facilities. PFAS-containing runoff contaminates nearby habitats where semi-aquatic insects develop, such as immature stage Aedes aegypti mosquitoes. Ae. aegypti is the primary vector of several notable arboviruses, including yellow fever, Zika, dengue, and chikungunya viruses. This study examined the effects of a common PFAS, perfluorooctanesulfonic acid (PFOS), on immature stage Ae. aegypti development following exposure to environmentally relevant concentrations. This study revealed trends that will be further detailed in the presentation. Understanding these impacts provides additional insight into how PFAS and other persistent environmental contaminants affect aquatic insect development and survival.

Knocking Down DREAM and NuRD Complexes in spr-5 Mutant C. elegans to Examine Developmental Progression
Poster #11 (Convocation Center, VyStar Arena)

12:00pm – 12:45pm
Undergraduate Student(s): Anna Cate Carter, Alayna Brooks, Hannah Barboasa, Arriana Crook
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 the nematode, C. elegans, H3K4me (a modification associated with active transcription) is removed by the H3K4 demethylase, SPR-5, and H3K9me (a modification associated with transcriptional repression) is subsequently added by the histone methyltransferase, MET-2. Recently, it was demonstrated that SPR-5; MET-2 maternal reprogramming antagonizes the H3K36 methyltransferase, MES-4, which maintains a transcriptional memory of a subset of germline genes between generations. Maternal loss of SPR-5 and MET-2 results in ectopic expression of MES-4 germline genes in somatic tissues and a severe developmental delay. In addition, knocking down the DREAM or MEC NuRD transcriptional repressor complexes specifically exacerbates the developmental delay and the ectopic expression of germline genes in the soma caused by loss of SPR-5 and MET-2. Whether epistatic effects on developmental progression occur upon knockdown of DREAM or MEC NuRD complexes in spr-5 and met-2 single mutants has not been examined. To test this in our 4390K CURE course, we used RNA interference (RNAi) to knock down DREAM complex member, lin-35, or MEC NuRD complex member, mep-1, in either spr-5 or met-2 single mutants. We then examined the developmental progression of progeny from each double mutant combination. Our experiments are currently ongoing, and we are excited to share these results at the 30th Annual Symposium of Student Scholars.

Knocking Down S-adenosylmethionine Synthases, SAMS-1 and SAMS-4, Differentially Affects Developmental Delay when Histone Methylation is Inappropriately Inherited
Poster #21 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Graduate Student(s): Sundas Johnson
Research Mentor(s): Brandon Carpenter

Epigenetic mechanisms play a crucial role in regulating gene expression and ensuring proper cellular differentiation and development. Histone methylation, particularly the interplay between activating (H3K4me) and repressive (H3K9me) marks, dictates chromatin accessibility and transcriptional activity. This study explores the significance of histone methylation dynamics in Caenorhabditis elegans (C. elegans), focusing on the roles of SPR-5 and MET-2 epigenetic *reprogramming. SPR-5, an H3K4 demethylase, and MET-2, an H3K9 methyltransferase, act synergistically to reestablish a transcriptionally ground state during germline transmission, ensuring developmental viability. Loss of SPR-5; MET-2 maternal reprogramming leads to the inappropriate inheritance of H3K4me1/2 and ectopic expression of germline genes in somatic tissues. The ectopic expression of germline genes in the soma of spr-5; met-2 mutant progeny causes a wide range of somatic defects, including developmental delay and sterility. Additionally, S-adenosylmethionine synthetases (SAMS) regulate histone methylation by modulating methyl donor availability, linking metabolic states to epigenetic control. However, whether SAMS affect the inappropriately inherited H3K4me1/2 methylation and developmental delay of spr-5; met-2 mutants has not been examined. To test this, we knockdown sams-1 and sams-4 in spr-5; met-2 mutants using RNA interference (RNAi) and examined developmental progression. We found that without choline supplementation, sams-4 knockdown exacerbates developmental delay in spr-5; met-2 mutants, with an even more pronounced delay observed following sams-1 knockdown. Notably, choline supplementation partially rescues the developmental delay of spr-5; met-2 mutant progeny upon sams-4 knockdown while sams-1 knockdown exacerbates the spr-5; met-2 developmental delay similar to what we observe without choline supplementation. Together, our work provides further mechanistic insight into how metabolic regulators, such as SAMS, influence inherited chromatin states and development.*

A Major Regulator of Germline Transcription, LSL-1, Contributes to Developmental Defects When Histone Methylation Is Inappropriately Inherited
Poster #33 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Benjamin Nguyen
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 the nematode, 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. Maternal loss of SPR-5 and MET-2 results in ectopic expression of germline genes in somatic tissues and a range of developmental phenotypes, including a severe developmental delay. Using a combination of RNA-seq and ChIP-seq experiments, a recent study identified a major regulator of germline transcription, LSL-1, that binds and turns on germline genes in the germline during development. From our own transcriptional analysis performed on C. elegans lacking SPR-5 and MET-2, we find that lsl-1 is *significantly upregulated in somatic tissues. Together these data suggest that LSL-1 may be turning on germline genes aberrantly in somatic tissue and contributing to developmental delay. To test this hypothesis, we knocked down lsl-1 using RNA interference (RNAi) and found that the developmental delay in spr-5; met-2 mutants is significantly rescued. Using RNA-seq, we further demonstrate that knocking down LSL-1 in spr-5; met-2 mutant rescues ectopic expression of MES-4 germline genes. Together, our findings provide mechanistic insight into how inappropriate inheritance of epigenetic states perturb germline versus somatic cell fates specification during development and how this perturbation contributes to developmental phenotypes.*

MEP-1 and LIN-35 function to assist SPR-5 in maintaining C. elegans germline versus somatic cell fates

Poster #12 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Rosie Dao, Metasebya Eyasu, Jonah Harper, & Ieza Fatima
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 the nematode, C. elegans, H3K4me (a modification associated with active transcription) is removed by the H3K4 demethylase, SPR-5, and H3K9me (a modification associated with transcriptional repression) is subsequently added by the histone methyltransferase, MET-2. Recently, it was demonstrated that SPR-5; MET-2 maternal reprogramming antagonizes the H3K36 methyltransferase, MES-4, which maintains a transcriptional memory of a subset of germline genes between generations. Maternal loss of SPR-5 and MET-2 results in ectopic expression of MES-4 germline genes in somatic tissues and a severe developmental delay. In addition, knocking down the DREAM or MEC NuRD transcriptional repressor complexes specifically exacerbates the developmental delay and the ectopic expression of germline genes in the soma caused by loss of SPR-5 and MET-2. Whether epistatic effects on developmental progression occur upon knockdown of DREAM or MEC NuRD complexes in spr-5 and met-2 single mutants has not been examined. To test this in our 4390K CURE course, we used RNA interference (RNAi) to knock down DREAM complex member, lin-35, or MEC NuRD complex member, mep-1, in either spr-5 or met-2 single mutants. We then examined the developmental progression of progeny from each double mutant combination. Our experiments are currently ongoing, and we are excited to share these results at the 30th Annual Symposium of Student Scholars.

Molecular Sponge Reveals the Importance of Steroid Hormone Ecdysone in Regulating Salivary Gland Morphology in Drosophila melanogaster

Oral Presentation (Prillaman Hall, Indoor Plaza)
9:00am – 9:50am
Graduate Student(s): April Ford
Research Mentor(s): Joanna Wardwell-Ozgo

Hormonal signaling controls physiological processes and is vital during metazoan development. In Drosophila melanogaster, the steroid hormone ecdysone (20E) coordinates development by activating the nuclear hormone receptor Ecdysone Receptor (EcR). EcR binds DNA and recruits coregulators to repress or activate gene expression. Existing tools lack the precision to determine how specific coregulators influence EcR's transcriptional function at individual promoters or developmental stages. To address this, we created the transgene UAS-EcRLBD, enabling tissue- and time-specific expression of EcR's ligand-binding domain (LBD). EcRLBD functions as a molecular sponge, competing for cofactor binding, including 20E, without disrupting EcR/DNA binding. EcRLBD interferes with EcR-driven regulation of promoters, tissues, and developmental processes and serves as a platform to study the regulatory roles of individual coregulators in EcR-driven biology. As a proof-of-concept, we introduced the A483T mutation into our LBD tool, UAS-EcRLBD-A483T, disrupting its interaction with the corepressor Smrter. In salivary glands, EcRLBD expression blocks secretion and expectoration of glue protein without affecting production, whereas EcRLBD-A483T does not. EcRLBD also causes morphological changes in the salivary glands, including disorganization of secretory cells, reduced cell number and nuclear size, and lumen reduction. Surprisingly, EcRLBD does not alter EcR transcriptional activity, suggesting these phenotypes are independent of coregulators bound to the LBD. Lumen reduction is partially rescued by expressing EcRLBD-A483T, indicating Smrter-mediated repression of EcR is important for proper salivary gland function. Overall, this data highlights that 20E and Smrter are essential for maintaining tissue structure and lumen integrity. Additionally, regulation of EcR activity in salivary glands may occur independently of the LBD. We plan to introduce other mutations into the LBD platform, that will complement our toolkit and enable dissection of the role of EcR-driven transcriptional activity at the promoter, cellular, tissue, and behavioral levels.

Nitrogen Supplementation of Local Agricultural Residue-Based Specialty Mushroom Substrate from Organic and Inorganic Sources

Poster #35 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Erik Olsen & Suri Cano
Graduate Student(s): Mark Sheehan
Research Mentor(s): Chris Cornelison

Specialty mushrooms are a growing industry in the United States, offering much potential for sustainable agriculture and local economic opportunity. Previous research has demonstrated the viability for the utilization of regionally-abundant agricultural-waste-resources, such as peanut- and cotton-byproducts, as a feedstock for specialty mushroom growth. This allows for significantly lowered input costs to the production process, but current agricultural byproduct-based substrate are not as productive as commercially purchased substrate. Therefore, this project seeks to improve the viability of ag-waste substrates by supplementing their primary macronutrient deficiency: nitrogen. Soy-hulls are a commercial standard for nitrogen supplementation for specialty mushrooms, and prices for this material have increased dramatically in the past years in response to this demand. Using the oyster mushroom, Pleurotus ostreatus, as a test subject, supplementation of peanut- and cotton-byproducts with soy-hulls was tested to assess the benefit of a commercially standard form of nitrogen supplementation. Additionally, supplementation of these byproducts with low levels of ammonium sulfate was tested, exploring the viability of a cost effective, concentrated form of fertilizer. The viability of higher doses of ammonium supplementation was tested in unison with a short form-composting process with the aim of microbial-assisted ammonium conversion to less-inhibitory organic proteins prior to mycelium inoculation. Early results have confirmed a concentration-dependent impact of soy-hull supplementation on bulk substrates for mushroom yields, generally requiring lower supplementation rate than is current industry standard to achieve equivalent yields. Ammonium sulfate supplementation on its own has not been found to impact specialty-mushroom yield, but when combined in unison with short-term microbial processing, has demonstrated capabilities as a cost-effective method to supplement nitrogen in bulk substrates. This may help improve the practice of utilizing a wide-range of agricultural-byproducts in the specialty mushroom industry, but further research is underway to explore the range of this application.

Nutrient Ratio Optimization for Enhanced Beta-glucan Production in Saccharomyces cerevisiae

Poster #10 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Jack Corcoran, Alex Provost, Mclain Brogdon, Chrysalia Lopez, & Sarah Price
Research Mentor(s): Chris Cornelison

Saccharomyces cerevisiae, commonly known as baker's or brewer's yeast, is widely used in the food, beverage, and biotechnology industries. Beyond its fermentation capabilities, S. cerevisiae is also a valued source of β-glucan, a polysaccharide composed of β-linked D-glucose units, which, beyond its fundamental role in structural integrity of the cell, exhibits immunomodulatory, anti-inflammatory, and enhanced probiotic activity when extracted and purified for consumption. These benefits are particularly relevant for medical applications, especially for individuals with *impaired immune function, such as patients undergoing chemotherapy. While strain-specific differences in β-glucan content have been reported, the influence of nutrient stoichiometry, particularly carbon, nitrogen, and phosphorus ratios, on β-glucan production has remained incompletely characterized. This study examines how strain variation and defined carbon-nitrogen-phosphorus media formulations influence β-glucan production in S. cerevisiae. Various laboratory and industrial strains were evaluated across a matrix of carbon-, nitrogen-, and phosphorus-modified media to investigate differential metabolic states. Cultures were propagated in rich media (yeast extract, peptone, and dextrose) and then sequentially transferred to a nutrient-starved medium. Growth dynamics were monitored using optical density (OD600) and cell counts. β-glucan was extracted using an alkaline-based protocol and quantified via aniline blue fluorescence assay. Comparative analysis across strains and nutrient ratios reveals differences in biomass accumulation and β-glucan yield. Nitrogen- and phosphorus-limited conditions are believed to result in altered growth kinetics and increased relative β-glucan content compared with controlled formulations. This research investigates whether genetic background and nutrient stoichiometry play critical roles in modulating β-glucan production in S. cerevisiae. Strategic manipulation of these ratios may provide a scalable approach to enhancing β-glucan yield for functional food and biotechnological applications.*

PFAS Pollution and Its Consequences for Semi Aquatic Invertebrate Survival and Ecosystem Health
Poster #15 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Brooklyn Galvan
Graduate Student(s): Sarah Kelly
Research Mentor(s): Andrew Haddow

Per- and polyfluoroalkyl substances (PFAS) are persistent chemicals that accumulate in aquatic environments. These "forever chemicals" are found in many everyday products, including water-resistant fabrics, food packaging, carpeting, and personal care items. High concentrations of PFAS are often detected near industrial facilities and military bases, where runoff can contaminate nearby bodies of water. Despite their widespread use, the effects of PFAS on semi-aquatic invertebrates remain poorly understood. Mosquitoes develop in aquatic habitats during their immature stages and are readily exposed to PFAS contamination. Perfluorooctanesulfonic acid (PFOS), one of the most toxic and commonly detected PFAS, is commonly found in aquatic ecosystems. In this study, immature mosquitoes were exposed to varying concentrations of PFOS, resulting in toxicological effects during development. Our results demonstrate that PFOS can disrupt mosquito development and may contribute to wider environmental effects.

Sex-Specific Effects of Exercise Revealed by the Drosophila Model
Poster #39 (Convocation Center, VyStar Arena)

4:00pm – 4:45pm
Undergraduate Student(s): Pedro Sousa Costa Dos Santos
Research Mentor(s): Anton Bryantsev

It is well documented that physical exercise has beneficial effects and helps improve over a variety of physiological processes from obesity to depression. Understanding the molecular mechanism of physical exercise was the focus of this study. Our lab has devised a simple model to study how regular physical exercise affects the state of muscle tissue, using the fruit flies, Drosophila. A special genetic modification on the studied flies makes them contract their jump muscles in response to a light stimulus through optogenetics. By running this model, we detected a sex-biased accumulation of muscle damage: females were prone to degeneration of individual muscle fibers, while males showed little of damage. Interestingly, females but not males benefitted from regular exercise by demonstrating an extended lifespan. We wanted to validate these preliminary findings with a different system. Collaborating with partners, flies were exercised on a PowerTower device that makes flies move physically, without an optogenetic component. The PowerTower training exercise was consistent with our optogenetic findings: females showed more muscle damage and longer lifespan, but males didn't. Future study and genetic experiments will determine what is the causing factor of such sex-specific response to exercise, and what is the role of muscle damage in this phenomenon.

Sizing Up the Nucleus: Do Horm
Virtual Presentation (Microsoft Teams)
Session 2 at 12:00pm – 1:00pm
Undergraduate Student(s): Taliyah Langston
Research Mentor(s): Joanna Wardwell-Ozgo

In living organisms, steroid hormone signaling is a key factor for growth. These hormones drive growth through the binding and activity of their receptors in target cells. These receptors are transcription factors that respond by altering transcriptional activity to alter cells through a signaling pathway. In Drosophila melanogaster (common fruit fly), the main hormone, 20E, binds to its receptor, Ecdysone (EcR), to regulate the development. To better understand the role of hormone signaling during development, the Wardwell-Ozgo lab developed tools that allow us to prevent hormones and other proteins from binding to EcR. We describe our efforts to examine how the activity of steroid hormone signaling affects the development of the salivary gland. The salivary gland allows the fruit fly to make an important substance known as glue that aids in survival. It was observed that when hormone signaling is disrupted in these glands, the fly is unable to secrete or expectorate glue. While we examined those tissues, we also made the observation that there were fewer cells, smaller nuclei, and tissue architecture changes when EcR signaling was disrupted. These observations led to the hypothesis that steroid hormone signaling causes a decreased number of present nuclei, lower cell counts, and architectural changes, which *affect the ability of the gland to secrete glue. To test this, images resulting from genetic crosses that disrupt EcR signaling will be analyzed for nuclear size, number, and width of the organ's lumen using the image processing software Fiji. The data generated will then be analyzed for statistical significance using the software Prism. The findings are expected to help provide quantitative data to strengthen our observations. This data will further our understanding of how hormone biology affects the formation of key organs, which may provide insight into how hormones affect analogous structures, such as mammary glands.*

Screening Essential Genes for Drosophila Squamous Cell Development
Poster #34 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Kylie Speer
Research Mentor(s): Dongyu Jia

Epithelial cells have three basic shapes: cuboidal, columnar, and squamous. Drosophila egg chambers have all three types of epithelial cells and can be used to study morphological changes within their epithelium. Cell morphological transitions are a highly interesting topic of study. In a single cell RNA (scRNA) sequencing analysis of Drosophilia egg chambers from our lab, over 300 genes were found to be highly expressed within squamous cells at stage 9 during the morphological change. We hypothesize that these highly expressed genes play a critical role in egg development, shape change, and migration. Reducing their expression may cause adverse morphological effects, which can be studied to understand signaling pathways regulating morphological changes. Using UAS-RNAi stocks ordered from Bloomington Drosophila Stock center, the top 100 genes are sequentially reduced using the established A90 Gal4, UAS RFP, Gal80ts system. A90 Gal4 is used for tissue specific expression in the anterior squamous cells. Use of Gal80ts will allow for control over specific time of expression by shifting flies to 29oC to activate Gal4, UAS expression system. Ovaries are subsequently immunostained and examined with confocal microscopy. Of the so far examined ovaries, we have seen 75% with upregulation of Broad-Core. Most of this upregulation was seen in the anterior most tips of the ovaries. 44% of the examined ovaries had squamous cell accumulation. Four of the examined ovaries had boarder cell defects. Two of those resulting in boarder cell arrival delay and two resulting in a break down of the boarder cell.

Steroid Hormone Regulation of Salivary Gland Development in Drosophila Melanogaster
Poster #8 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Ryan Boutcher
Research Mentor(s): Joanna Wardwell-Ozgo

Steroid hormone signaling plays an important role in developmental transitions in Drosophila melanogaster by regulating gene expression during metamorphosis. Exposure to the steroid hormone ecdysone activates the Ecdysone Receptor (EcR), a ligand-regulated transcription factor that controls developmental timing and organ-specific development. In addition to activating transcription of certain genes, EcR can also function as a repressor in cooperation with SMRTER, a corepressor. Because of the importance of EcR, it has been difficult to separate the requirements for activation and repression in organ development. To address this, the Wardwell-Ozgo lab developed a series of molecular tools that selectively block EcR's activating or repressing roles. Here we describe our efforts to examine EcR regulation of a larval-only organ, the salivary glands. The salivary glands release adhesive glycoproteins, called glue proteins, which are regulated by pulses of ecdysone. Glue proteins are synthesized and packaged during larval development and secreted into the lumen of the salivary glands during the larval-to-pupal transition (White Prepupae) before being expectorated in early pupal development to allow the organism to adhere to a solid surface. Salivary glands from White Prepupae were isolated by dissection, fixed in 4% paraformaldehyde to preserve the tissue structure before being washed with phosphate buffered saline (PBS). The samples were then mounted with Vectasheild in preparation for imaging. Finally, the prepared samples were analyzed using confocal fluorescence microscopy to identify any structural abnormalities stemming from alterations in EcR signaling. Our results indicate that ecdysone hormone is needed for the trafficking of the glue protein and the proper orientation of cells. This research provides a visualization of how alterations in EcR-mediated steroid hormone signaling affect the development of a larval-only organ in Drosophila melanogaster.

Studying the Developmental Effects of Knocking Down DREAM and NuRD Complexes in spr-5 Mutant C. elegans

Poster #27 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Ejona Lulaj, Jasmine Larkins, Hieu Le, & Efrain Lima
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 the nematode, C. elegans, H3K4me (a modification associated with active transcription) is removed by the H3K4 demethylase, SPR-5, and H3K9me (a modification associated with transcriptional repression) is subsequently added by the histone methyltransferase, MET-2. Recently, it was demonstrated that SPR-5; MET-2 maternal reprogramming antagonizes the H3K36 methyltransferase, MES-4, which maintains a *transcriptional memory of a subset of germline genes between generations. Maternal loss of SPR-5 and MET-2 results in ectopic expression of MES-4 germline genes in somatic tissues and a severe developmental delay. In addition, knocking down the DREAM or MEC NuRD transcriptional repressor complexes specifically exacerbates the developmental delay and the ectopic expression of germline genes in the soma caused by loss of SPR-5 and MET-2. Whether epistatic effects on developmental progression occur upon knockdown of DREAM or MEC NuRD complexes in spr-5 and met-2 single mutants has not been examined. To test this in our 4390K CURE course, we used RNA interference (RNAi) to knock down DREAM complex member, lin-35, or MEC NuRD complex member, mep-1, in either spr-5 or met-2 single mutants. We then examined the developmental progression of progeny from each double mutant combination. Our experiments are currently ongoing, and we are excited to share these results at the 30th Annual Symposium of Student Scholars.*

Testing the Potassium Channel eag Gene as a Sarcopenia Factor in the Drosophila Model

Poster #28 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Asmaa Massenburg & Preston Gilstrap
Research Mentor(s): Anton Bryantsev

Sarcopenia is an aging-related loss of muscle mass and function that promotes morbidity and mortality in the elderly, but its genetic determinants remain poorly defined. Our lab uses fruit flies to study the genetics of muscle development and aging, and we recently identified spontaneous muscle fiber degeneration (SMFD) in aged flies. This model enables genetic analysis of aging-dependent muscle decline. We performed a genome-wide association study to identify polymorphisms linked to elevated SMFD rates. A strong hit mapped to a putative promoter region of either-a-go-go (eag), which encodes a potassium channel. To test this candidate, we performed RNAi knockdown (KD) of eag. Muscle-specific knockdown disrupted flight muscle morphology and abolished flight. In jump muscle, it reduced jumping performance. In contrast, neuronal KD produced no detectable defects in muscle structure or function. Despite these functional impairments, aged flies with muscle-specific eag KD did not show increased SMFD rates compared to controls. Thus, while eag is required for normal muscle performance, it is unlikely to drive aging-associated muscle degeneration. Ongoing studies will investigate additional candidate genes within the associated genomic region.

Validating Evolutionarily Conserved Functions of Human Genes in the Drosophila Egg Chamber

Poster #13 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Makenna Dunkel

Research Mentor(s): Dongyu Jia

It is estimated that as many as 75% of human disease-causing genes have a Drosophila homolog, meaning many cancer-associated genes are evolutionarily conserved between the species. We conducted a screening of 64 human cancer-related genes which were previously identified as causing a phenotype in the Drosophila eye, and overexpressed them in the Drosophila egg chamber's somatic cells. Because the Drosophila egg chamber is composed of all three epithelial cell types, as well as a transitional type called semi-mesenchymal, it serves as a great model to further investigate cell development and epithelial morphology. Additionally, the egg chamber is semi-transparent and goes through 14 defined stages of morphological change, making deviations from the norm easily identifiable. Given the conserved functions and signaling pathways between Drosophila and human genes, we hypothesized that many of the 64 would play an oncogenic role in the egg chamber's somatic cells, leading to abnormal phenotypes. TJ-Gal4 was used to express UAS-human genes in all somatic egg chamber cells, and the Gal80ts system was used to selectively control expression timing. Egg chambers were then stained with DAPI and also Br, which is a downstream target of Notch, ecdysone and JAK/STAT. Images were then taken with confocal microscopy. We observed phenotypes such as early and late-stage degeneration, squamous cell accumulation, abnormal egg chamber shape and Broad expression defects. Our findings provide a foundation for further dissecting the molecular mechanisms and conserved signaling pathways underlying the oncogenic roles of these 64 human proto-oncogenes.

Physics

Amorphous Alumina as Ultra Stable Glass

Oral Presentation (Prillaman Hall, Indoor Plaza)
9:00am – 9:50am
Undergraduate Student(s): Dakota Carey
Research Mentor(s): Kiran Prasai

Ten years after the Laser Interferometer Gravitational-Wave Observatory (LIGO) achieved the first detection of gravitational waves, the field of gravitational-wave astronomy is flourishing, with approximately 300 detections to date. Further improvements in detector sensitivity—and the development of next-generation instruments—depend on advances across several technological areas, including the creation of mirror coatings with reduced thermal noise and optical absorption. The current LIGO optics employ ion-beam–deposited amorphous oxide coatings. Amorphous oxides, such as amorphous alumina (Al2O3), are also among the leading candidate materials to make improved-performance coatings. To evaluate whether alumina can produce improved coating performance, computer simulations of the molecular dynamics of alumina were made, replicating the deposition of alumina upon a substrate. Then a middle slab is *taken from the middle of the model for all calculations to be based on. In this talk, I will present computational results examining how deposition conditions—particularly substrate temperature—affect the atomic structure of amorphous alumina. I will also discuss whether these simulations indicate the feasibility of achieving ultra–low–mechanical-loss coatings through deposition at elevated substrate temperatures.*

Computational Modeling of Amorphous Silicon Nitride as Optical Coatings for Future Gravitational-wave Detectors
Poster #24 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Benjamin LaBell
Research Mentor(s): Kiran Prasai

The sensitivity of current gravitational-wave (GW) observatories, such as Advanced LIGO, is limited in their most sensitive frequency band (around 100 Hz) by Brownian thermal noise originating from the mirror coatings. To enhance the sensitivity of current and future detectors, coatings made from materials with reduced thermal noise are essential. Silicon Nitride is a promising candidate for the next generation; a detailed understanding of the origins of SiN_x coatings' mechanical loss and optical absorption is necessary to guide experimentalists toward optimal GW coating design. However, such understanding is currently lacking. My work in this project aims to fill this knowledge gap. To do so, I generated atomic models across various stoichiometries of SiN_x using the state-of-the-art machine learning intermolecular potential, MACE. My Molecular Dynamics simulations followed the standard "melt-quench" procedure. Then, I performed quantum calculations, specifically Density Functional Theory (DFT), to compute electronic structure. Using this data, I predict key properties like bond angles, geometric defects, optical band gap, and defect states. It has been empirically observed that Nitrogen-to-Silicon ratio, denoted to x in SiNx, is critically important parameter scientists can tune to influence coating behavior. By varying x above and below the stoichiometric level (x=1.33), I quantify its effects on the atomic structure, optical absorption, and refractive index—the key performance metrics for high-performance GW detector coatings. By identifying sources of these defects, experimentalists will be provided with a predictive framework to optimize thin-film deposition parameters—ultimately enabling the fabrication of SiN_x coatings with sub-ppm optical absorption required for next-generation GW observatories.

Molecular Dynamics Study of Optical Coating of TiO2-ZrO2-doped-GeO2 for LIGO
Virtual Presentation (Microsoft Teams)
Session 3 at 2:00pm – 3:00pm
Undergraduate Student(s): Siddhi Patel
Research Mentor(s): Kiran Prasai

Advanced LIGO made the Nobel Prize–winning first direct detection of gravitational waves from a binary black hole merger in 2015. A decade later, the detectors observed more than 340 gravitational-wave events. The next generation of observatories will greatly expand the observable universe, potentially enabling the detection of signals from the early cosmos. Achieving the design sensitivity of these future detectors—alongside advances in several other technologies—requires significant improvements in mirror coatings. In this presentation, I will be describing a computational study of a candidate mirror-coating material: amorphous GeO_2–TiO_2–ZrO_2 (GTZO). We investigate the atomic structure of amorphous GTZO using ab initio molecular dynamics (AIMD). Structural modifications induced by increasing ZrO_2 concentration are analyzed to understand whether, and how, ZrO_2 suppresses crystallization in TiO_2-doped GeO_2 coatings during post-deposition annealing. Overall, this study shows how adding ZrO_2 alters the structure of GTZO coatings and may help suppress crystallization during post-deposition annealing. These results can guide the development of improved mirror coatings for future gravitational-wave detectors, enabling the detection of signals from more distant parts of the universe.

Particle Physics on a Raspberry Pi: Machine Learning in Action
Visual Display #47 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Manoli Pratikakis
Research Mentor(s): Andreas Papaefstathiou

Machine learning and artificial intelligence have become central tools in particle physics research. At the CERN Large Hadron Collider (LHC), these methods are widely used to interpret the vast and complex data produced by particle collisions. A particularly interesting and challenging question at the LHC is how to determine the particle progenitors of jets. Jets are collimated streams of particles that form through the quantum chromodynamical radiation of either quarks or gluons, fundamental particles that are created in the highly energetic collisions. The radiation patterns of quarks and gluons differ, potentially making them distinguishable via machine learning methods inspired by image recognition. Understanding their intricate structure could elucidate the theory of Quantum Chromodynamics, and potentially lead to the discovery of new phenomena. In this project, we have built a Raspberry Pi computer equipped with an AI Kit, and used it to design analyses that apply machine learning techniques to explore the rich structure of jets at the LHC. In this presentation, we will demonstrate the workflow implemented on the device itself and present concrete results on its performance for fast quark/gluon jet discrimination.

Geer College of the Arts

Music

Analysis of Traditional Philippine Vocal Repertoire
Poster #8 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Mikkel Cullen
Research Mentor(s): Peter Fielding

This project will share analytic work assessing the scales, modes, and pitch collections of Visayan/Bisayan/Cebuano folk song repertoire of the Philippines. This work will focus on a portion of the repertoire collected by Priscilla Magdamo; materials collected under the auspices of Silliman and Indiana University which have been underutilized in modern study. Through use of Kodály-style pitch maps and post-tonal mappings, a preliminary baseline of the repertoire was created and used for broad comparison. In addition to establishing normative scalar patterns for this repertoire, preliminary pedagogical merits of the repertoire are identified for potential use in Aural Skills curriculum. This analysis showed that there are clear patterns in the repertoire that align with western music theory concepts, and it has potential for use in curriculum. These results also allow for an additional path of inquiry into why this music works so well in a theoretically foreign system. Current on-going research is working on tracking the influences of colonization and imperialism on traditional music through the collection of relevant literature and precolonial music samples.

Examining the Frequency and Structure of Compound B-Sections in Recent Popular Music
Oral Presentation (Prillaman Hall, Indoor Plaza)
3:00pm – 3:50pm
Undergraduate Student(s): V Markey, Karla Mino, & Seraphim Duarte
Research Mentor(s): Jeffrey Yunek

It is well known that pop-rock form is based on AABA quaternary forms that evolved to have opening compound A sections that featured a consistent progression from verse to chorus roles (with optional prechoruses and postchoruses). In contrast, B sections traditionally have only one contrasting role such as a bridge, interlude, solo, breakdown, or rap break. However, analyses of recent pop music have shown isolated examples of B sections with multiple roles. This raises two questions: how common are these compound B sections, and do they feature a consistent progression of roles? To address these questions, we analyzed the top 25 pop-rock songs from 2010–2015 (150 songs total) according to the roles and blends identified by de Clercq, Stroud, *Barna, and Osborn. Regarding frequency, we found that over 24% of these songs featured compound B sections. Regarding construction, we found that most compound B sections began with a dedicated B-section role before moving on to B-section blends. Accordingly, we found that recent pop-rock music often features compound B sections, and there are common progressions amongst their B-section roles. Our presentation also explores how compound B sections enhance the final chorus in (1) songs with postchoruses, in which the full chorus may be delayed until after an initial postchorus and (2) songs with riserchoruses, in which the compound B section may contain a riser role that engenders a drop-chorus blend as the final chorus.*

Theatre and Performance Studies

Hegelian Theory and A Doll's House: An Exploration of Relationships and Mutual Reciprocation

Oral Presentation (Prillaman Hall, Indoor Plaza)
3:00pm – 3:50pm
Undergraduate Student(s): Katie Hunt
Research Mentor(s): Thomas Fish

A Doll's House by Henrick Ibsen, a 1879 modernist drama, is often considered a proto-feminist play that explores gender, relationships, and identity through the relationship of husband and wife, Torvald and Nora. This presentation will be analyzing these themes using the philosophies of Hegel, a prominent philosopher of the time. Methodologically, it study examines the relationship dynamic between Nora and Torvald through a close reading of Hegel's concept of "mutual reciprocation" from The Phenomenology Of Spirit. At the end of the play, Nora rejects her roles as wife and mother when she declares that she is instead a human being. I conclude that Hegel predicts Nora's realization through his dialectic patten, demonstrating a clear influence of Hegelian philosophy throughout the play. Ultimately, the presentation provides new insights into the study of Ibsen's play as well as a dynamic perspective for performers.

Myth-odically Made Material

Visual Display #51 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Ashley Pedowitz
Research Mentor(s): Brittany Johnson

For my Honors Capstone, I am designing and constructing three original, custom costumes for a staged photo shoot featuring three ethereal archetypes: a Dark Empress, a Hot Spring Siren, and a celestial-inspired being. This project merges both fantastical storytelling with a rigorous design methodology, transforming my participants' various, personal identities into wearable art. Rather than assigning characters arbitrarily, I conducted in-depth interviews with each *participant, asking imaginative questions about their "habits", environments, and sensory worlds as if they were the creature themselves. Due to the absence of a traditional script, these conversations became my very "text" for analysis. Upon dissecting this qualitative research, I developed mood boards, design renderings, and construction plans that aimed to establish distinct personalities into silhouette, texture, and color. Each costume has its own, methodical process that involves: research, renderings, measurements, drafting, mock-ups using muslin, fittings, pattern corrections, and, of course, the final fabrication. My work, however, also extends beyond sewing and into sculptural craft; one garment incorporates hand-shaped clay and wire elements, expanding the project into interdisciplinary material exploration and motor skills. My goal within this Capstone is to demonstrate that costume design is both artistic and analytical. It requires research, problem-solving, technical precision, and whimsy! By documenting each phase (from conceptualization to the final photography) I aim to shine light on the labor and nuanced thinking behind theatrical production for audiences in and beyond the theatre community. Aligning with values of the Honors College, this project reflects intellectual curiosity, creative risk-taking, and integrative learning. It showcases how artistry can function as research in iterative, reflective, and overall-humanistic ways. Ultimately, this work invites a broader audience to reconsider costume not as decoration, but as identity made visible… an intersection of imagination, craftsmanship, and lived experiences. I look forward to completing this project!*

Dance

Anemoia: A Study of Partner Dancing
Visual Display #52 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Charlene Font & Maura Kelly
Research Mentor(s): Marsha Barsky

In the process of our work, we have explored the implications of nontraditional partnering by removing labeled roles within the work. The role of leader—normally determined by the gender hierarchy—has been left ambiguous, as we have experimented with challenging choreography normally reserved for partner dynamics with differing sizes and strength levels. Because there is more similarity in height and weight than would be present in a traditional pairing, we have been pushed to investigate new and innovative methods of lifting, using momentum, transferring weight, and leveraging movements. Within our rehearsals, we researched partnering techniques both by watching film of others as well as testing it on ourselves. This required a fair amount of trial and error, as we have continually workshopped choreography that demonstrates our capabilities as partners. Additionally, we decided to implement story-telling tactics throughout our work, utilizing the concept of a music box and characterization to depict a sense of nostalgia. The interactions between the characters are not affected by societally imposed dynamics such as gender or power *hierarchy, but rather are formed on the general basis of genuine connection, evolving as their connection builds. Based on this exploration of an almost idyllic memory, we titled the work "Anemoia", which describes a feeling of nostalgia for a time or place that has not actually been experienced. We leaned into this concept within our choreography, searching to create nostalgic imagery while also breaking boundaries that were within the reality of our past.*

Dancers as Designers: Costuming "Through the Looking Glass"
Visual Display #46 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Amber Solana
Research Mentor(s): Andrea Knowlton

This research investigates how perceptions of beauty can be challenged and transformed through a site-specific performance inspired by Lewis Carroll's Through the Looking-Glass, with a Jabberwocky costume at the center of the creative inquiry. The performance will be presented at the Smith-Gilbert Gardens, a public arboretum, in collaboration with Kennesaw State University's Department of Theatre and Performance Studies. It will culminate in a family-friendly performance open to the public. I am mentored by Andrea Knowlton, Associate Professor of Dance, and the project is led by faculty collaborators Emily Kitchen, Nicole Adkins, and Andrea Knowlton. This project builds on conversations about costume design as a research method. The Jabberwocky costume will be built from symbolic "found objects," including playing cards, trinkets, and more. These materials connect to themes from the Alice in Wonderland world and help tell the dancer's story. In dance, performers rarely have meaningful input in what they wear. This project shifts that norm by involving dancers in costume-making through guided design workshops, which support dancers' autonomy and self-expression. The project also partners with textiles major Nikki Benavent-Rivera from Kennesaw State University's School of Art and Design. Her material expertise will support construction decisions and strengthen the translation from concept to wearable form. Dancers enrolled in DANC 4490: Dance in the Environment meet every Friday morning. The class uses improvisation and composition to turn the research questions into movement. The garden will act as a collaborator, shaping pathways, textures, and spatial relationships. Audience members will be invited to interact with the costume during the performance, which allows the costume to transform in real time. The project emphasizes interdisciplinary collaboration and community engagement. It also expands performance beyond the traditional proscenium location while offering accessible reflection on beauty as something that can be reimagined.

Dancing Toward Justice: Cultural Inclusion in Parris Goebel's Green and Emotional Liberation in Pina Bausch's Café Müller
Oral Presentation (Prillaman Hall, Indoor Plaza)

3:00pm – 3:50pm
Undergraduate Student(s): Natalie Sigur
Research Mentor(s): Kristopher Pourzal

In the face of social injustice, dance can communicate sentiments of the heart that words may struggle to convey. When a choreographer has something to express, they let their bodies become the protest, forcing viewers to be in tune not just with performers but also with their own kinesthetic empathy. Through choreographic analysis, this paper explores Parris Goebel's Green and Pina Bausch's Café Müller by analyzing how each dance work reflects a social injustice. Café Müller (1978) creatively critiques patriarchal power structures in European society through post-modern bodily movements and emotional vulnerability. Green (2014) challenges Eurocentric hierarchy by centering her choreography on dance forms such as African, Indigenous, and hip-hop. Using gender and race as lenses of analysis in this research, I draw on dance scholars such as Dr. Brenda Dixon Gottschild and Dr. Julia Foulkes. Ultimately, I show how these works demonstrate choreography as a form of social justice, thus unveiling systems of oppression and constructing alternative, inclusive futures for dance.

School of Art and Design

Covered Up with Fancy Rocks and Relics: Treasures of the Carolingian Dynasty
Virtual Presentation (Microsoft Teams)
Session 4 at 12:00pm – 1:00pm
Undergraduate Student(s): Diana Eaves
Research Mentor(s): Diana McClintock, Laura Wingfield, & Rachel Vause

Emperor Charlemagne received and gifted relics in unprecedented amounts via diplomatic exchanges and used the exchange of relics to assert power as a Christian King. Reliquaries, which hold holy items, sometimes body parts or significant items belonging to someone of religious significance, were adorned with precious or semi-precious metals and stones. By examining the production and iconology of Carolingian objects, this museum exhibition proposal investigates how embodiment, materiality, and the sensory create a spiritual experience associated with holy items and that effect extended into objects associated with daily life. This proposal contributes to art history by examining sensory and material experiences in Carolingian art, which have not been researched in the exhibition's items or within much of Carolingian Dynasty. It introduces more sensory approaches to museum work, a novel and underdeveloped approach to presenting art to audiences and provides visitors with the opportunity to learn about European art history.

Dreamscape: Where Creativity Combats Negativity
Visual Display #47 (Convocation Center, VyStar Arena)

12:00pm – 12:45pm
Undergraduate Student(s): Angela Okafor
Research Mentor(s): Jeremy Speed-Schwartz

My project is to create a short film with a working title of Dreamscape, a narrative with the purpose to show an illustrative depiction of how creativity can combat negativity and self-doubt. It is a story of a girl named Twisty, a magical being who is new to a fantastical village. She is different from the townsfolk but hopes to integrate into the community. A dangerous creature decides to wreck havoc in the town, causing the environment and civilians to lose their vigor. Panic ensues, and it causes Twisty to break her only form of defense. Despite losing hope in herself, she comes to terms with the situation and figures out a way to defeat the creature and save the village. The premise of Dreamscape occurred when unfortunate life circumstances made it difficult to enjoy creating art. It was when I had time to sit down, rethink, reflect, and muster to create a character named Twisty, who is a character of hope through a twisted, dark point of my life. Development of Dreamscrape requires a team with a few people. The team goes through the animation production pipeline which includes pre-production, production, and post-production. In detail, the film goes through initial research, character and background design, script writing, and then storyboarding. Afterwards, frame-by-frame, colored clean animation is used to bring the story to life. It will finish up with sound design, composition, and final edits to ensure a lighthearted, fun animation that resonates with others. My goal is to have a finished, short animated film that not only entertains, but instead inspires and motivates the viewer to continue to create in any aspect of one's life.

Job Instability in the Animation Industry
Poster #18 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Alejandra Gordon Alvarez
Research Mentor(s): Shuchita Mishra & Erin Bahl

This investigative comic analyzes the causes of unemployment and instability in the animation industry. The central question is: why does unemployment occur so frequently in an industry that appears to be successful? While animation is considered a growing market, in reality, opportunities are very limited and highly competitive. The research examines how, during the COVID-19 pandemic, the demand for content was much higher compared to previous years. With the return to normalcy and the reintegration into the workforce, the industry underwent a restructuring that resulted in the dismissal of a significant number of employees following overhiring. Simultaneously, The Walt Disney Company's acquisition of 20th Century Fox and Blue Sky Studios, which closed its doors and laid off hundreds of employees, contributed to unemployment among animators. The comic is being used as a means of communication to raise awareness of these structural problems, gathering information on industry behavior and trends *from both academic sources and news articles. The research also addresses the workings of animation contracts and the global competition for the limited number of available positions. However, it also analyzes alternatives and animators' responses to the situation, such as freelance work and independent production, which have gained significant importance in recent years, competing with large companies. Furthermore, it demonstrates that the animation industry is a constantly evolving and adaptable field.*

Just A Scratch: Exploring Tension in Visual Storytelling
Oral Presentation (Prillaman Hall, Indoor Plaza)
3:00pm – 3:50pm
Undergraduate Student(s): Jayla Walker
Research Mentor(s): Jeremy Speed-Schwartz

This research project centers on the development of a mood-driven animated short film that follows Kai and Tessa as they close their shop one night and take a shortcut home through dark alleyways. They encounter a violent threat and are forced to reveal their true nature in an attempt to protect one another, with the story conveyed through visual storytelling and character performance. Focusing on visual storytelling in animation, the project investigates how tension, hostility, and emotion can be communicated primarily through visual means. Traditional frame-by-frame animation serves as the foundation of this study, allowing for careful control over movements, staging, and atmosphere, providing a structured way to analyze how visual components affect an audience's understanding and engagement. The project documents the full visual development of an original animated film, emphasizing how design, performance, and environmental atmosphere develop from the initial concept to the final production. The process involves concept art exploration, character and environment design, storyboarding, animatic development, and final frame-by-frame animation, supported with documentation of revisions. Specific animation techniques used in the project include keyframing and in-betweening, controlled timing and spacing to build tension, and intentional shot composition and camera movements to guide the audience's focus. Character performance was developed through pose exploration, strong body language, and repeated animation tests to convey internal emotion and conflict. Atmosphere was created through intentional lighting, color selection, environmental detail, pacing, and the use of confined compositions to build suspense. The results suggest that refined staging, expressive acting, and consistent atmospheric design improve the clarity of the narrative and the audience's engagement. Ultimately, the project demonstrates that a carefully documented visual process, combined with traditional animation techniques, effectively builds tension and communicates a story through solely visual storytelling.

Southern Static: Strategic Branding & Experiential Design
Visual Display #49 (Convocation Center, VyStar Arena)
10:00am – 10:45am

Undergraduate Student(s): Reagan Jowers
Research Mentor(s): Kristine Hwang Kim

This Honors Capstone project investigates how a fully integrated brand identity system can translate the cultural energy of Atlanta's music scene into an integrated, multi-platform festival experience. Southern Static functions as both a design investigation and an artist statement, examining how experiential branding goes beyond logos to construct an immersive societal narrative. The project engages with historical art precedents, drawing on modernist identity systems established by Paul Rand and the Bauhaus that emphasize grid structure, hierarchy, and functional typography. It also references expressive concert posters from the 1960s and 1970s that visually convey musical rhythm through color and type. Through integrating these factors with contemporary maximalist typography and digital-first branding, Southern Static seeks to establish a culturally grounded festival identity informed by Atlanta's traditions in hip-hop, R&B, rock, and electronic music. This work adds to wider discussions of regional storytelling, authenticity, and depiction within entertainment branding. The methodology merges historical research, cultural analysis, iterative sketching, digital prototyping, and 3D modeling. Techniques include vector-based logo development, typographic system construction, UX/UI design for web and mobile platforms, campaign mockups, and environmental stage modeling. This approach stresses systems thinking to achieve cohesion across print, digital, and spatial applications. The final outcome is a comprehensive brand ecosystem that demonstrates how strategic visual language can unify physical and digital experiences. This project has advanced my understanding of scalability, cultural research, and experiential continuity, positioning Southern Static as a portfolio centerpiece and a springboard for future work in entertainment brand strategy.

The Modern Pin Up, Contemporary Self-Portraiture with Vintage Flair
Visual Display #51 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Emily Greenslade
Research Mentor(s): Robert Sherer & Geo Sipp

The art of 'low brow' through pinups, memorabilia, and advertisements is an underappreciated source of inspiration for visual artists. These 'objects' that inhabit the picture, whether that is raunchy billboards or men's magazines, stimulate a strong reaction through text, photo, and color. As an artist, my goal is to experiment within these contexts to create work where the photo and the object have a symbiotic relationship, each part representing the whole. The foundation of my work draws inspiration from vintage men's 'cheesecake' magazines, pinup calendars, brothel timer matches, billboards, and flyers promoting gentlemen's clubs, and collectible objects, including keychains, drinking glasses, and more. Self-portrait artists Nikki S. Lee and Cindy

Sherman also inspire me to utilize self-portraiture narratively to tell stories about American culture, as well as pin-up model turned photographer, Bunny Yegar. My research is qualitative, focusing on the qualities and characteristics of my resources to gain depth and insight into photographic experiences. My overall research strategy is correlational and descriptive as I study characteristics and trends within my area of study. In finding the unique relationship between the photograph and the objects, I aim to blend this visual culture with fine art by utilizing self-portraiture in a contemporary context with vintage flair. My final product is a photographic portfolio including ten artworks in a magazine-style format, creating a visual experience that complements my comprehensive research and initial inspiration, as well as my research paper highlighting various objects, photographs, and artists that I find motivating in my journey to elaborate on the powerful relationship between the photo and the object and the storytelling abilities of self-portraiture.

Southern Polytechnic College of Engineering & Engineering Technology

Electrical and Computer Engineering

Coordinating and Planning Heterogeneous Robot Team Using Small Language Models
Poster #37 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Jason Thomas, David Seo, Tommy Parrish, Jaylen Jordan, & Vansh Patel
Research Mentor(s): Yan Fang

Robots often work together to complete tasks that are difficult for a single robot. In this project, we explore how a team of different robots can coordinate their actions using small language model as a planning system. Our system uses a "captain" robot that observes the environment and generates a plan describing how other robots in the team should complete a task. Each robot has different abilities: a humanoid robot can carry large objects, a hexapod robot can move across rough terrain, and a wheeled robot can quickly transport objects between locations. We demonstrate this approach with collaborative missions where the robots must retrieve objects and deliver them to a target location. In an indoor scenario, the robots coordinate to pick up two objects and transfer them to a transport vehicle. In a more challenging outdoor scenario, the system must also account for obstacles and uneven terrain when assigning tasks. The results show that even small language models can help coordinate heterogeneous robot teams by generating high-level plans that take advantage of each robot's strengths. This work highlights a promising approach for enabling intelligent teamwork in robotic systems while keeping computational requirements relatively low.

Creating an LMS Adaptive Filter
Poster #6 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Rasheed Diallo
Research Mentor(s): Sumit Chakravarty

Our project aims to develop an LMS adaptive filter that can be used for noise cancellation within headphones. The LMS adaptive filter is able to continually change its behavior based on the environment around the device. The filter can recognize unwanted signals and automatically adjust so that the output signal is similar to the desired signal. Using two microphones, one to receive the incoming audio signal and the other to receive that audio signal and noise around the device, the noise signals can be identified and cancelled allowing for the audio signal to be played *back through the headphones without unwanted noise. By utilizing these equations along with the LMS algorithm, it is possible to write a Python program that can detect and cancel noise from an audio signal. Furthermore, the LMS filter can also be used for echo cancellation and channel Adaptive Filtering using the Least Mean Square (LMS) algorithm holds significance in the field of signal processing due to its simplicity, low computational cost, and effectiveness in noise reduction, making it a versatile solution for signal processing applications. This project contributes to the field of signal processing by bridging the gap between theory and practice. By implementing the LMS algorithm, engineers and developers can find solutions to various problems in the real world.*

Design and Additive Manufacturing of Wearables for Research and Development
Poster #22 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Pieyrinne Lafortune Kameni Massop & Kevin Kellner
Research Mentor(s): Sandip Das

Wearable sensors are becoming increasingly important tools for biomedical research, clinical monitoring, and preventative healthcare. However, most existing wearable systems used in research and development remain prohibitively expensive, often exceeding $500 per device, which limits accessibility for researchers, clinicians, and consumers. This work explores the design, fabrication, and iterative optimization of low-cost wearable devices intended for physiological and biomechanical data collection in academic research and clinical trials while significantly reducing the cost. Using computer-aided design in SolidWorks, two device prototypes were developed and fabricated using additive manufacturing techniques, including fused deposition modeling (FDM) 3D printing and resin printing. The development process involved multiple design iterations to evaluate structural integrity, usability, ease of assembly, and manufacturability while maintaining affordability through inexpensive materials and modular construction. Two prototype wearable devices were developed – a shoe-mounted device and a wrist-mounted device. The shoe-mounted device houses a microcontroller, digital accelerometer, battery, power management circuit, and status indicator LEDs, and is designed to collect gait and motion data for mobility analysis. The wrist-mounted device integrates a microcontroller, body temperature sensor, photoplethysmography (PPG) sensor, an OLED display, battery, and power management circuitry to measure physiological parameters including heart rate, body temperature, and blood oxygen saturation level. This work demonstrates the feasibility of producing research-grade health monitoring wearables at a fraction of the cost of existing commercial devices, potentially enabling wider adoption in research and educational settings, as well as in clinical trials to facilitate early detection of mobility-related and physiological health conditions.

Development of a Wearable High-Density EMG Sensor and Edge AI System for Dexterous Prosthetic Control
Virtual Presentation (Microsoft Teams)
Session 1 at 4:00pm – 5:00pm
Undergraduate Student(s): Mahin Haque, Tresor Dokloh, Miles Whitehead, & Amrit Sarangi
Research Mentor(s): Coskun Tekes

Loss of hand function due to amputation or neurological injury such as stroke significantly impacts independence and quality of life. Many current prosthetic control systems rely on a small number of surface electromyography (EMG) electrodes, which limits their ability to detect subtle muscle activation patterns required for dexterous hand control. This project explores the use of high-density electromyography (HD-EMG) sensing combined with machine learning to enable more accurate decoding of hand and wrist movements from forearm muscle activity. As part of this work, we designed and developed a custom PCB interface to integrate a flexible 64-electrode HD-EMG sensor array with multi-channel biosignal acquisition hardware. This hardware platform enables high-resolution recording of spatial and temporal muscle activation patterns across the forearm. Using this system, we collected pilot datasets from subjects performing various hand and wrist motions. During data acquisition, IMU sensors mounted on the hand were used to record synchronized motion data, providing ground-truth measurements of hand orientation and movement. Current efforts focus on developing and testing machine learning models capable of predicting hand motions from HD-EMG signals. By leveraging both the detailed spatial information captured by the HD-EMG array and the synchronized motion data from the IMU, the proposed system aims to improve the accuracy and responsiveness of neural interfaces for prosthetic hand control and rehabilitation technologies. The long-term goal of this research is to enable more intuitive and reliable wearable systems for restoring dexterous hand function. The results will be presented at the Student Scholars symposium.

Exploring Next Generation Wireless Networks: Undergraduate Research on 5G Communication
Poster #2 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Juan Arauz & Krisjion Legree
Research Mentor(s): Radwa Sultan

The exponential growth in data demand, the unprecedented increase in the number of supported devices, and the strict resilience and security requirements pose significant challenges to the design of upcoming 6G networks. Accordingly, new frameworks, network architectures, and dynamic optimization techniques are crucial for ensuring the efficient use of limited communication resources. In this context, AI-driven solutions play an important role in *addressing the challenges associated with building next-generation 6G networks. Furthermore, Symbiotic Communication provides a promising framework for the efficient allocation of resources between primary and secondary networks. The main idea of symbiotic communication is to allow primary and secondary networks to initiate a symbiotic relationship based on resource and/or service sharing without compromising their Quality-of-Service (QoS). In this work, we implement a symbiotic communication framework in a single-cell network consisting of a primary transmitter-receiver pair and a Simultaneously Transmitting and Reflecting Reconfigurable Intelligent Surface (STAR-RIS)-aided secondary Device-to-Device (D2D) link. The primary communication is assumed to be subject to eavesdropping attempts. Accordingly, by initiating a resource-service symbiotic relationship between the primary and secondary transmissions and by utilizing STAR-RIS, the D2D transmission assists in enhancing the secrecy rate of the primary transmission. In return, the D2D link gains less restricted access to the primary spectrum. To analyze this symbiotic relationship, we formulate a multi-objective optimization problem that jointly maximizes the primary secrecy rate and the D2D sum rate by optimizing the STAR-RIS transmission and reflection phase responses. We apply a Reinforcement Learning (RL)-based framework to solve the resulting optimization problem in dynamic environments. Preliminary simulation results demonstrate that the proposed framework achieves encouraging performance, while ongoing work focuses on improving simulation efficiency, training stability, and convergence behavior, with results validated against a theoretical optimization benchmark.*

How The Process and Storage of Memory Can be Facilitated
Poster #31 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Austin Middleton
Research Mentor(s): Sylvia Bhattacharya

Memory disorders such as Alzheimer's disease and dementia represent a growing area of concern because they impair the brain's ability to form and retain new memories. One of the earliest signs of these disorders is synaptic dysfunction within the hippocampus, where axons and synaptic terminals become compromised and fail to properly transmit signals. This project examines whether neuromodulation, particularly implant-based electrical stimulation, may serve as an effective alternative or supplement to pharmaceutical treatment for memory-related dysfunction Within the brain. Specifically, the study investigates how electrical stimulation may facilitate memory formation within the hippocampus and associated regions such as the neocortex to Help further facilitate the formation and retention of memory's. The project will do this through a review of current research on hippocampal memory encoding, neural implants, and stimulation-based interventions, with attention to reported outcomes, mechanisms, and treatment limitations within the field. Expected findings include a clearer understanding of the extent to which *neuromodulation can improve memory function, as well as the biological, technical, and ethical barriers that currently limit its broader clinical use.*

Integration of LoRa-Based Communication and RF Energy Harvesting Between UAVs and IoT Ground Nodes

Poster #9 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Simona Eyob, Drew Haase, & Michaella Hopfner
Research Mentor(s): Sumit Chakravarty & Adeel Khalid

Many wireless communication networks are beginning to utilize unmanned aerial vehicles (UAVs) due to their ability to extend Internet of Things (IoT) coverage to inaccessible areas. In this architecture, the UAV acts as a data mule that travels between each ground node to collect data. Despite their advantages, UAV operations are limited by short onboard energy capacity and the need for reliable data transmission with ground-based IoT devices. This study examines how a Long Range (LoRa)-based UAV communication system with integrated radio frequency (RF) energy harvesting improves communication efficiency and energy sustainability. In order to build the communication system, we designed a medium access control (MAC) protocol that coordinates data transmission, acknowledgment, and power harvesting between the UAV and ground nodes. We also started laboratory experiments focusing on band-pass filters, impedance matching, frequency conversion using mixers, and scattering parameter measurements using a software-defined radio (SDR) to support the communication architecture required for reliable and energy efficient UAV operations in the project. This ongoing project establishes the foundation for an efficient UAV-IoT data collecting system that integrates LoRa communication and RF energy harvesting simultaneously.

Mechanochemically Assisted Fabrication of Solid Electrolytes and Interphases for Next-Generation All-Solid-State Lithium-Metal Batteries

Poster #46 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Santiago Acosta Zuniga & Bryce Hogan
Research Mentor(s): BeiBei Jiang

Mechanochemistry has emerged as a promising strategy for initiating polymerization without the need for bulk solvents, external heating, or complex reaction setups, offering a greener and more energy-efficient alternative to conventional polymer synthesis. In this work, mechanochemical polymerization is explored as a versatile approach to synthesize polymer-based materials for solid-state battery applications. During ball milling, mechanical impacts can activate polymerization through multiple possible mechanisms, including electron transfer generated by collisions between stainless steel balls and the milling vessel, as well as radical *formation mediated by piezoelectric nanoparticles such as $BaTiO_3$ (BTO) in combination with radical initiators like diphenyliodonium hexafluorophosphate (DPIHP). These mechanochemical pathways provide a unique platform to investigate different initiation mechanisms under solvent-minimized conditions. PEGMA-based materials are selected because their ether oxygen groups can coordinate with lithium ions, enabling ion transport within polymer electrolytes. After mechanochemical polymerization, the obtained products are processed into membranes through solvent evaporation, allowing the formation of solid electrolyte films or interfacial layers. These membranes are expected to exhibit tunable mechanical strength, favorable ionic conductivity, and stable electrochemical performance, which can be evaluated through measurements such as ionic conductivity and symmetric cell cycling. By integrating mechanochemical polymerization with membrane fabrication, this work demonstrates a potentially scalable and environmentally benign route for producing functional polymer electrolytes. More importantly, investigating different mechanochemical initiation pathways provides insights into controlling polymer structure and performance. This study highlights the potential of mechanochemically synthesized PEGMA-based materials as solid-state electrolytes or interfacial materials for next-generation lithium batteries and offers new perspectives for the design of solvent-free polymer electrolyte systems with improved electrochemical properties.*

Pre-processing Convolutional Neural Network for Cost-Effective Aerial Crop Monitoring: Computationally Efficient Vegetative Indices

Poster #6 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Tejas Bharath & Johaunna Castillo
Graduate Student(s): Daniel Byers
Research Mentor(s): Mahammad Hassan Tanveer

Vegetation indices such as the Normalized Difference Vegetation Index (NDVI) are critical remote sensing tools that give farmers actionable insights into crop health, nutrient deficiencies, and yield potential. However, current measurement methods rely on costly multispectral sensors costing upwards of $5,000, making them inaccessible to most small-scale farms. In this paper, we test an array of generative adversarial networks (GAN) and convolutional neural networks (CNN), evaluating NDVI prediction of aerial images from a Red-Green-Blue (RGB) image. We also extend previous research by proposing a CNN with pre-process filters to achieve similar performance to existing GAN-based approaches while requiring less computational time, making it particularly well-suited for decentralized imaging environments such as edge devices mounted on UAVs. The Pix2Pix and CycleGAN architectures are evaluated alongside the proposed CNN and each model validated by comparing total storage, computation time per image, and NDVI prediction accuracy across a paired RGB and NDVI aerial crop dataset. Training data is sourced from UAV flights across multiple crop types spatially aligned using ground control points, with performance measured using the structural similarity index (SSIM) to rigorously benchmark *each model against ground-truth NDVI outputs. We demonstrate that the proposed CNN achieves competitive NDVI prediction accuracy relative to more computationally expensive GAN models. The proposed computationally light framework helps a broader portion of farmers gain access to the benefits of aerial NDVI imaging by providing a lower cost of entry in both camera based and edge device hardware. Future work will focus on expanding the training dataset across a wider variety of crop types and geographic regions to further improve the model's generalization capability and robustness under diverse environmental and lighting conditions.*

Research on Attention and Brain Augmented Technology and STEM-Peer Augmented Success & Support

Virtual Presentation (Microsoft Teams)
Session 2 at 1:00pm – 2:00pm
Undergraduate Student(s): Abigail Kuk, Pranav Nelavelli, & Alyssa Dinh
Research Mentor(s): Cyril Okhio

The goal of this research is to analyze brain activity associated with attention by using Electroencephalography (EEG) technology to determine how visual and audible stimuli impact attention. An exploration of how three-dimensional 3D immersive environments impact attention and focus was carried out. In testing volunteers as participants did tests designed to determine how external stimuli and immersion impact attention. The EMOTIV 14 channel wireless EEG headset and EMOTIV Pro App were utilized to record EEG data. Participants first took an Erickson Flanker test, which is used to measure selective attention and responses to distracting stimuli. This test was run five times; once with no sound, three times with different genres of music, and again with no sound at the end. In the next two tests participants observed a cube where they cycled through non-interactive focus, no stimuli by closing their eyes, and interacting with the cube; repeated ten times. In the second test the cube was 2D, and in the third the cube was 3D, using a zSpace 3D Laptop. This allows the understanding of how an immersive environment impacts focus and attention, by comparing three-dimensional 3D and two-dimensional 2D environments. MATLAB (EEGLabs) was used to analyze and plot data. The data was on three types of brain waves associated with attention viz: Alpha, Beta, and Theta waves. The processed data was then used to create graphs and 3D images that compare activity to show what regions of the brain were most active in the experiments. This research can be used to create immersive environments that optimize focus. So, using experimental EEG data, it is possible to determine how focus is affected by stimuli and immersive environments. In addition, this research can be used to design immersive learning tools (Proofing-Ground) to create effective outcomes by improving engagement and focus.

Safe operator-based human-robot collaboration: Human-in-the-loop control for Unmanned Ground Vehicle Reactive Path Planning

Poster #22 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Emma Neville & Zaid Adil
Graduate Student(s): Daniel Byers
Research Mentor(s): Muhammad Tanveer

In the quickly developing era of autonomous systems, the integration of intelligent navigation with reliable human robot interaction is of utmost importance to allow safe human-robot collaboration. Autonomous path planning allows for complex tasks, however many unexcepted circumstances arise during operation requiring the robot to generate new paths in real-time. Currently, robots can react to avoid obstacles or generate a new path to their destination if a direction seems unpassable; however they lack contextual understanding of possible downstream hazards or scenarios in which they should abandon their goal. To compensate for this inability, we present a human-in-the-loop control architecture in which an operator can use their contextual knowledge to guide a robot's reactive path planning. As the robot travels, YOLO based machine vision searches for operators identified by specific safety jackets and logos. If an operator is spotted, Mediapipe Gesture Recognition evaluates hand signals given by the operator which can consist of a directional input (left, right) or abandon mission. The human-in-the-loop architecture takes the human input to safely reroute in the indicated direction by creating a directed artificial potential field around the operator. The subsequentially generated robot path maintains compliance with ISO safety standards of personnel detection and safety zones such as ISO 3691-4. Example scenarios are set up inside a motion capture environment in which the robot successfully identifies operators versus non-operators and if operator input is given, the real-world positions of executed path show minimal error in relation to the planned path for both accuracy and the maintained distance to the operator. Ultimately, this architecture shows real-world application for warehouse accident scene avoidance, contractor work zone navigation, and proactive hazard elimination with input from human operators.

Toward Affordable Wearable Health Monitoring: A Low-Cost IoT Physiological Sensing Platform
Poster #33 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Shlok Sohoni & Pavan Kannan
Research Mentor(s): Sandip Das

Wearable physiological sensing technologies are increasingly used in biomedical research, remote patient monitoring, and elderly healthcare. Although wearable monitoring technologies have advanced significantly, the cost of research-grade sensor nodes remains high, limiting their accessibility for academic research, prototyping environments, and large-scale health monitoring studies. This project presents the development of a low-cost, IoT-enabled physiological sensing *platform designed to provide research-capable wearable sensing while significantly reducing system cost. The proposed platform integrates heart rate and body temperature sensing within a compact and modular hardware architecture. Heart rate monitoring is implemented using a red and infrared LED-based I^2C-interfaced photoplethysmography (PPG) sensor chip, which detects variations in blood volume through optical measurements. Accurate body temperature sensing is achieved using a resistance temperature detector (RTD) coupled with a copper probe plate to improve thermal conduction during skin contact. The RTD is interfaced with an analog signal conditioning module, enabling precise digital temperature measurements suitable for physiological monitoring. A 32-bit Tensilica Xtensa LX7 microprocessor provides onboard processing capability and WiFi connectivity for acquisition and wireless transmission of sensor data, enabling integration with cloud-based data storage, visualization, and analytics platforms. The system is powered by a 1250 mAh Li-Po battery that supports more than 10 hours of continuous operation. All electronics are integrated on a carrier printed circuit board (PCB) and housed within a compact 3D-printed enclosure designed for comfortable long-duration wear. By significantly reducing hardware costs while maintaining research-oriented functionality, the proposed IoT-enabled wearable sensing platform aims to improve accessibility for biomedical research, physiological data collection, and educational experimentation, while also providing a versatile foundation for integrating additional biomedical sensors as needed.*

Industrial and Systems Engineering

Assessing the Impact of Wearable Exoskeletons on Posture and Mental Workload in Simulated Nursing Activities
Poster #19 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Gabriel Greenway, Jordan Warrington, Jinju Lee, Spencer Daniel, & Jennifer Hernandez-Taboada
Research Mentor(s): Luisa Valentina Nino de Valladares & Maria Valero de Clemente

Technological advancements such as wearable exoskeletons are increasingly being adopted in labor-intensive industries to reduce physical strain and prevent work-related musculoskeletal disorders (WMSDs). Exoskeletons have shown promise in sectors such as manufacturing and construction, where workers perform repetitive or overhead tasks. Healthcare environments present similar ergonomic challenges. Nurses routinely perform physically demanding activities that place substantial biomechanical stress on their bodies. As a result, nursing professionals experience some of the highest rates of WMSDs among healthcare occupations. Exoskeletons may offer a potential solution to mitigate these risks while supporting safety. This study investigates the impact of exoskeleton use on ergonomic posture during simulated nursing activities. Participants completed two experimental tasks: a cognitively demanding sorting task involving poker chips arranged into different color patterns, and a patient-handling simulation involving *transferring a medical mannequin between a hospital bed and a chair. Tasks were completed under two conditions: with (Exo) and without the exoskeleton (No-Exo). Task order and cognitive patterns were randomized to minimize learning effects. Kinematic data was collected using Inertial Measurement Units (IMUs). Ergonomic posture during patient handling was evaluated using the HAPO Lea application, which provides posture scores based on the Rapid Upper Limb Assessment (RULA). Mental workload during the sorting task was measured using the NASA Task Load Index (NASA-TLX). Paired-samples t-tests indicated that ergonomic posture scores were lower (p = 0.001) in the Exo (M = 66.7) than in the No-Exo condition (M = 71.1). Similarly, NASA-TLX scores were slightly higher (p = 0.016) when participants wore the exoskeleton (M = 33.16) compared to the No-Exo condition (M = 30.51). Preliminary findings suggest that while exoskeletons hold promises for reducing physical strain in healthcare, their design and integration must be carefully evaluated to ensure they do not inadvertently increase perceived workload or negatively affect posture during clinical tasks.*

Automated UAS Post Hurricane Damage Assessment Using Deep Learning
Visual Display #50 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Oluwadamilola Banjo & Mahi Karim
Graduate Student(s): Brian Hardy, Shiva Shrestha, Owais Ahmed, & Sultan Al Shafian
High School Student(s): Sam Gabriel
Research Mentor(s): Adeel Khalid, Honghui Xu, & Da Hu

After the occurrence of a hurricane, it is important to accurately evaluate damage to residential buildings and other structures in a timely manner, as damage assessment is the first step in recovery and resource allocation. Historically, Post Disaster Assessment (PDA) has relied on satellite imagery and manual ground surveys by volunteers and disaster relief organizations. However, both methods have been proven inefficient as satellites are susceptible to issues such as low spatial resolution and infrequent revisit times, and manual ground surveys are time consuming and labor intensive. In addition, relief efforts may be hindered by inefficient prioritization of assessments, delaying assistance to the most severely damaged structures. To improve the process of post-disaster damage assessment process for hurricanes, this research proposes the integration of vision processing into Unmanned Aerial Systems (UAS), to assist in the evaluation of structural damage and to automate the assessment process. The methodology includes collecting data from a city in Georgia affected by Hurricane Helene and using annotation software to annotate the data which will be then used to train a model to identify the post hurricane condition of residential structures. During the annotation process each home will be labeled under the following criteria: Destroyed, Major Damage, Minor Damage, Affected and No Damage. This approach aims to significantly improve the efficiency of assessment efforts, allowing volunteers and relief personnel to allocate more time and resources toward the affected people.

Design, Development, Implementation of UAS Checklists for Multi-Mission Operations

Poster #44 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Riley Womack
High School Student(s): Caleb Caldwell
Research Mentor(s): Adeel Khalid

Unmanned Aerial Systems (UAS) are increasingly deployed across commercial, defense, and research applications, creating a critical need for structured safety practices. Standardized checklists have been shown to reduce human error and enhance operational reliability in manned aviation, and their implementation in UAS operations provides similar benefits. Pre-flight, in-flight, and post-flight procedures outlined in checklists help prevent system failures, miscommunication, and unsafe interactions in shared airspace. Beyond safety, checklist protocols support consistent training, improve procedural adherence, and facilitate compliance with emerging regulatory requirements. As UAS undertakes more complex missions, the adoption of reliable checklist standards becomes essential for maintaining operational safety, ensuring mission success, and enabling the continued integration of UAS into modern aviation systems. This abstract and supporting paper were developed with limited assistance from an AI language model for wording and clarity, with all technical content reviewed and validated by the author.

Design and Development of the Fourth Generation Heavy Lift Kennesaw All Weather Autonomous Drone (KWAD IV)

Poster #35 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Presleigh Porter, Michaella Hopfner, Liam Begley, Joseph Stanziano, Cole Taylor, Jorge Perez, Solomon Fleury
Research Mentor(s): Adeel Khalid

The design and development of the fourth Kennesaw All Weather Autonomous Drone (KWAD IV) is the AERO Lab's submission to the DARPA Lift Competition. The central purpose of this research is to create an Unmanned Aerial System (UAS), that weighs less than 55 pounds, can lift a payload minimum of 110 pounds, and fly a 5-mile circuit carrying the external payload. A multirotor aircraft lifting a payload nearly double its weight is what makes KWAD IV a challenging and unique contribution to the aerospace industry. The KWAD IV team is actively using several disciplines to design and develop this UAS. There are students from six focus areas that collaborate to accomplish this research. The structures team uses SolidWorks to design and analyze the structural components of KWAD IV. Finite element analysis, Computational Fluid Dynamics (CFD), and strength of materials tests are used to design KWAD IV. The performance *estimation team uses MATLAB and past data to estimate the power, range, and endurance of the UAS. The results of the analysis done by the performance estimation team are used by the propulsion team to select motors, propellers, and batteries. The avionics team researches and configures an avionics layout and handles wiring. The weight and balances team tracks and ensures that KWAD IV will meet its weight requirements. Finally, the systems integration team assists in communication and final integration of each team's efforts. KWAD IV is currently in the design phase and is expected to be flight ready by April 2026.*

Distractions in Healthcare Tasks: Impacts on Mental Workload and Ergonomic Risk
Poster #51 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Jennifer Hernandez-Taboada, Ishika Vyas, & Tamaya Miller
Graduate Student(s): Aquib Reshad
Research Mentor(s): Luisa Valentina Nino de Valladares, Mark Geil, & Doreen Wagner

Work-related musculoskeletal disorders (WMSDs) remain a persistent occupational health concern in healthcare environments characterized by high cognitive and physical demands. Evidence suggests that elevated mental workload can disrupt ergonomic habits, increasing injury risk during complex clinical tasks. When clinicians experience increased cognitive load, attention to posture and body mechanics may decrease, potentially leading to awkward postures and greater musculoskeletal strain. These challenges are particularly relevant in nursing, where practitioners frequently perform technical procedures while managing multiple cognitive demands. This study investigates the relationship between psychosocial workload and ergonomic posture during a simulated task performed by nursing students. Participants conducted a nasogastric tube insertion under three psychosocial workload conditions: Baseline, Auditory, and Interruption. Participants were recorded during each procedure. Video recordings were analyzed using the Hapo Lea application, an AI based tool that evaluates posture using the Rapid Upper Limb Assessment (RULA) method and produces ergonomic scores ranging from 0 to 100, with higher values indicating better posture and lower musculoskeletal risk. After each trial, participants completed the NASA Task Load Index (NASA-TLX) to assess perceived mental workload. One-way repeated-measures ANOVA was conducted to examine the effect of psychosocial conditions on posture and perceived workload. Postural scores were highest in the Baseline condition ($M = 79.0$), followed by Interruption ($M = 73.5$) and Auditory ($M = 72.67$), although these differences were not statistically significant ($F= 1.35$, $p = 0.303$). In contrast, NASA-TLX scores showed a significant effect of condition ($F= 3.95$, $p = 0.038$), with the lowest workload reported in the Baseline condition ($M = 31.67$) compared with Auditory ($M = 39.00$) and Interruption ($M = 39.75$). Post-hoc comparisons indicated significantly higher workload during Interruption compared with Baseline ($p = 0.022$). Overall, preliminary findings suggest psychosocial disruptions increase perceived workload and may negatively influence ergonomic performance during clinical tasks.

Evaluation of LiDAR, RGB, and Thermal Sensors for UAV Detection
Poster #28 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
High School Student(s): Dheeraj Kondragunta
Undergraduate Student(s): Akshat Chitta, Sai Prannav Murali, & Joseph Stanziano
Graduate Student(s): Owais Ahmed & Daniel Byers
Research Mentor(s): Adeel Khalid

Unmanned Aerial Vehicles (UAVs) operating without authorization pose a serious risk, especially in areas like airports, military installations, and other critical infrastructure. UAVs are difficult to detect due to their small size, speed, and low altitude flight capabilities. While LiDAR, RGB imaging, and thermal sensing technologies are widely used in surveillance and object detection, limited research has directly evaluated their effectiveness in detecting UAVs of varying size at different distances. This research aims to systematically evaluate LiDAR, RGB, and thermal sensors to determine which detection modality has the highest detection accuracy for intruder UAV identification. In this project, a controlled test is established in which target UAVs of varying size are flown at varying altitudes and distances. Each sensor independently collects data on the target UAV. The data is processed using standardized algorithms to obtain evaluation metrics like detection accuracy and false positive rate. Comparative analysis is used to identify the strengths and limitations of each sensor type across distance and target UAV size. Expected results suggest that thermal imaging may outperform RGB due to background noise, while LiDAR may provide higher detection accuracy due to its nonreliance on background contrast. Findings from this study will contribute to the development of more effective counter UAV detection strategies and provide data driven recommendations for sensor selection in these strategies.

Evaluation of Medication Workflows to Reduce Nurse Fatigue and Enhance Patient Safety
Poster #17 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Jaiden Gary, Spencer Daniel, Ricardo Aguilar, & Camden Holsapple
Graduate Student(s): Aquib Reshad
Research Mentor(s): Luisa Valentina Nino de Valladares

Medication administration is one of the most vital and risky tasks that a nurse performs in an acute care environment. When the medication administration process is efficient and well-designed, it provides timely and safe patient care and reduces nurse fatigue and promotes overall staff well-being. However, when there are inefficiencies in the process, such as interruptions, *walking, and disorganization in the area, there is an increase in potential medication errors, which can cause significant stress in an already demanding nursing role. This project assesses the medication administration process in two acute care environments at a hospital in Marietta area using industrial engineering techniques, including time studies, work sampling, and Lean methodologies. The team started by creating a value stream map (VSM) and flow chart for evaluation of the process based on 30 days of structured shadowing and more than 100 hours of direct observations. Key outcomes of the project are the identification of the different sources of waste in the process. Some of them are delays due to pharmacy, interruptions, technology problems; rework and overprocessing such as duplications of medication orders due to displacement, inventory management issues; excessive motion due to equipment availability/reliability, lack of standardization, unclear workflows; and many others. To address these potential hazards, the proposed solutions include standardization of using equipment at the patient bedside, implementation of constraints to discourage multi-patient medication retrieval, and implementing of a medication administration tray at the patient bedside to alleviate workflow disruption. This will not only improve patient safety but will also satisfy Joint Commission National Patient Safety Goals by prioritizing patient identification and workflow reliability. Future steps will be conducting a formal time study that will quantify and identify value-added versus non-value-added times, which will enable data-driven improvements to enhance the overall reliability of medication administration.*

Hands-On or Virtual? Exploring the Future of Engineering Education
Virtual Presentation (Microsoft Teams)
Session 3 at 3:00pm – 4:00pm
Undergraduate Student(s): Danial Jung
Research Mentor(s): Kamyar Raoufi

Traditionally, many engineers have learned concepts through hands-on experience. This allows them to gain first-hand experience with the tools and systems that they will be working with in the field. However, with the rise of various educational media, the landscape has become much more complex and accessible. With this change, this study examines the future of engineering education across different teaching modalities: hands-on, virtual, and mixed in Programmable Logic Controllers (PLC) labs. Specifically, can an online laboratory give the same value as a hands-on class? By conducting a literature review of all pre-existing research papers, we hope to give a framework for those designing online labs in the future. As of the moment, the research is still in progress, so no definitive conclusion has been reached.

The Integration of Lean Maintenance and Industry 5.0: A Human-centered Manufacturing Case Study
Poster #11 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm

Undergraduate Student(s): Hector Santiago Corral Torres & Dana Pazhouhesh
Research Mentor(s): Parisa Pooyan

The cost of maintenance activities generally accounts for a significant portion of operational costs, and its integral role in the industrial manufacturing ecosystem cannot be overlooked. Lean thinking has been widely recognized as an effective management philosophy based on a mindset of "continuous improvement", and the adoption of its principles in the maintenance operation has offered promising pathways of economic gain. However, nowadays, the consensus of operational excellence is beyond just the traditional economic metrics and has shifted to broader societal goals of collaborative synergy between human creativity and advanced intelligent technology to gain competitive edge in the market. Industry 5.0, as a profound evolution in the industrial paradigms, has focused on bringing the human element back to the center and establishing a collaborative synergy between human creativity, sustainable practices and resilient principles. Our objective in this research is to implement a conceptual framework targeting the synergy between Industry 5.0 and Lean thinking in maintenance practices in a major manufacturing corporation. We believe providing such a framework, on how to view the prevention of waste in maintenance activities and translate that to the customer-defined value and economic gain while remaining vigilant of the adverse environmental and social impacts of such operations, can collectively facilitate the manufacturing enterprises' goal of achieving operational excellence through strategic corporate social responsibility and long-term organizational viability.

Multimodal Analysis of Patient–Nurse Interactions in Bedside vs. Virtual Nurse During Discharge Education
Poster #34 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Mithran Prakash, Rigved Bhagdikar, Lori Gude, & Isabel Castro
Research Mentor(s): Awatef Ergai

The growing nursing shortage in the United States and rapid advancements in healthcare technologies have accelerated the implementation of virtual nursing care models in hospital settings. While virtual platforms offer scalability and operational efficiency, limited empirical evidence exists regarding how patients cognitively and emotionally engage with virtual nurses compared to traditional bedside nurses during discharge education. This pilot study investigates interaction patterns during discharge education using a multimodal human factors approach. A quasi-experimental pilot study was conducted in medical-surgical units at a community hospital in the southeastern United States. Twelve hospitalized CHF patients aged 20 and older participated, with six patients receiving discharge education from a bedside nurse and six receiving education from a virtual nurse displayed on a television screen in the patient's room.

Each discharge session lasted approximately 3-7 minutes and followed standard discharge education protocols. Data collection integrated eye-tracking technology and prosodic vocal analysis. Participants wore eye-tracking glasses to capture gaze direction, fixation duration, and gaze transitions as objective indicators of visual attention and engagement. Audio recordings were analyzed for prosodic vocal features to infer emotional responses during the education session. The analyses were conducted using iMotions. Preliminary results indicate differences in engagement patterns between modalities. Bedside discharge education demonstrated more sustained eye contact and expressive non-verbal behaviors, whereas engagement during virtual sessions showed greater variability. Prosodic analysis revealed minimal small overall differences in aggregated emotional indicators across conditions. These initial findings suggest that discharge education delivery modality influences patient engagement and underscore the need for evidence-based design principles to ensure that virtual nursing models support emotional connection, comprehension, and patient-centered discharge outcomes.

Optimizing Digital Tools for Better Employee Engagement in a Nonprofit Setting
Poster #35 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Leah Rampergash, Jaaon Nelson, Ronnie Chen, & MD Hasan
Research Mentor(s): Amin Esmaeili & Nicholas Ellwanger

The project seeks to support and optimize the digital tools used within a non-profit organization. The goal is to enhance usability and accessibility within the organization. There are two areas the project will focus on within the nonprofit organization. The first goal is to improve digital platform usability and accessibility analysis. This would focus primarily on usability issues within the software the organization frequently uses. After observation and data collection possible solutions would be proposed and analyzed to determine the best course of action for the organization to take to improve their digital environment. The goal of this step is to create a more efficient system overall which will allow the nonprofit to function better. The second goal is to develop a data-driven employee engagement dashboard. The dashboard's primary purpose is to display engagement metrics across the nonprofits communication channels. After these metrics are consolidated, it could be used to predict trends and provide a basis for further research and strategic decision making. The primary purpose of these projects is to improve the digital environment of the nonprofit, improve employee experience, and provide the organization with data to draft further decisions. The project should improve the overall effectiveness of the organization and minimize unnecessary complications within their systems.

Optimizing the Efficiency of Nursing Students' Skills Testing: A Time and Motion Study
Poster #16 (Convocation Center, VyStar Arena)

11:00am – 11:45am
Undergraduate Student(s): Farah Talib, Maryella McCown, Angeline Harris, Ayannah McGee, Catherine Smith
Graduate Student(s): Aquib Reshad
Research Mentor(s): Robert Keyser

The purpose of skills testing is to assess students' competency in performing fundamental psychomotor skills, applying clinical judgment, and demonstrating professionalism in the standardized learning lab environment. Our objective is to gain a deeper understanding of the current state of skills testing regarding the duration of the skills test and identify any obstacles or delays that students encounter that might unnecessarily prolong the duration and increase the stress level of the skills test. In the results, we aim to identify the nature and root causes of delays, the most significant problem areas that require retesting, and recommend how the skills testing process can be optimized based on our findings.

Real-Time AI Segmentation for Drone-Based Disaster Triage: YOLOv11-seg on UAS Platforms
Virtual Presentation (Microsoft Teams)
[Session 3 at 3:00pm – 4:00pm]
High School Student(s): Sam Gabriel
Research Mentor(s): Adeel Khalid

In this project, AI-based image segmentation is applied to drone-acquired imagery to assess building damage caused by hurricanes and other natural disasters. A YOLOv11-SEG model is trained using pixel-level annotations of damaged structures, categorized as affected, minor, major, or destroyed. Once trained, the model can automatically predict the level of damage to buildings following a natural catastrophe. Prior research indicates that unmanned aerial systems (UAS) outperform satellite imagery for detailed structural damage assessment. In addition to YOLOv11-SEG, Convolutional Neural Networks and the RescueNet framework are trained and evaluated using post–Hurricane Helene data. The ultimate goal of this work is to provide first responders with critical, time-sensitive information to rapidly and accurately categorize building damage after a disaster.

Standardizing Operating Procedures at Local Utility Company
Poster #5 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Leisa Camejo Del Valle, Chris Walker, & Isabel Castro
Research Mentor(s): Amin Esmaeili

The project team has partnered with the utility company Marietta Power and Water to improve the consistency and efficiency of their operating procedures. A recent audit found that the operating procedures for their Warehouse have not been updated since 1999, and most of the written processes are no longer valid. The project team will analyze existing procedures, identify the inconsistencies and gaps in what's written versus their current processes, and develop a standardized framework to document their practices. Using tools such as process mapping, workflow analysis, and stakeholder interviews, the team will redesign the procedure manual to improve clarity, reduce variability, and improve efficiency.

Mechanical Engineering

AI Driven Speech Recognition for Command and Control of an Unmanned Aerial System

Oral Presentation (Prillaman Hall, Indoor Plaza)
1:00pm – 1:50pm
High School Student(s): Dheeraj Kondragunta
Undergraduate Student(s): Ram Sudharsanan
Graduate Student(s): Owais Ahmed
Research Mentor(s): Adeel Khalid

Unmanned Aerial Systems (UAS) typically depend on handheld devices for control, limiting both accessibility and operational flexibility. Advances in artificial intelligence, specifically small language models (SLMs), present an opportunity to explore speech-based drone control as a more intuitive form of human-machine interaction. This research aims to design and evaluate a complete SLM driven speech controlled UAS and to compare the effectiveness of multiple SLMs for transcribing and executing flight commands. In this work, a drone platform is developed in which a microphone captures verbal instructions and passes them through a SLM. The transcribed commands are transmitted to the drone flight controller, which initiates a confirmation loop to confirm the interpreted command with the operator before execution. The drone will perform the command only after the operator verifies it. A predefined command library including directional movement, altitude adjustment, and other command types was created as a database upon which the SLMs will be trained and tested. The SLM with the best performance, assessed on command accuracy, latency, and robustness, will be integrated into the system. The size of the SLM is taken into account, with initial results showing a clear trend with larger SLMs achieved higher command recognition at the cost of latency. Findings from this study will contribute to the development of safer and more accessible control systems for UAS, with potential future work focusing on expanded vocabularies and improved noise suppression.

Assessing the Feasibility of Developing an Educational Simulation Platform for Operational Analysis of the AP300 Small Modular Reactor
Poster #3 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Madison Brant
Research Mentor(s): Eduardo Farfan

Growing demand for clean energy generation, with increasing constraints on available land for large nuclear installations, has accelerated interest in small modular reactors. Designs such as the Westinghouse AP300 aim to address these challenges by providing scalable nuclear power solutions with reduced site footprint and enhanced deployment flexibility. Building upon the operational experience and accumulated operating hours of the AP1000 reactor, Westinghouse has proven design features and operational lessons learned to refine the AP300 SMR concept. The advanced passive safety features validated through the testing and operational experience of the AP1000 have been incorporated into the AP300 design, including inherently safe, self-actuating systems that rely on natural forces and layers of defense-in-depth to maintain reactor safety without the need for active intervention. In addition, the AP300 offers increased economic and deployment flexibility through its modular design, reduced plant footprint, and shortened construction timelines. The AP300 is currently under development and is targeted for commercial deployment in the 2030s. Several utilities and energy developers have expressed early interest in anticipation of final design certification and regulatory approval by the U.S. Nuclear Regulatory Commission. Given the interest of emerging reactor design, the development of a simulator capable of modeling and evaluating AP300s operational behavior provides significant educational and analytical value. This project investigates the feasibility of developing an AP300 simulator based on the current conceptual design released in 2023, as well as the passive safety features from the AP1000 reactor. The simulator is intended to model a range of operational and transient scenarios, enabling analysis of system responses and potential operator actions under representative conditions. As the AP300 design continues to evolve through ongoing development, the simulation framework can be updated to reflect design refinements. The platform is intended solely for educational purposes, providing students with insight into the operational characteristics and safety responses of a next-generation small modular reactor.

Automated Weed Segmentation in Law Environment Using Deep Learning
Poster #22 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Obaid Machiwalla, Krish Patel, Niko Bravo, Aiden Shultz, Filiberto Aguirre
Research Mentor(s): Sathish Gurupatham

Everybody wishes for a weed-free, healthy lawn, but the weeds won't cooperate. It takes time for manual pulling and other conventional methods of weed management, and spraying herbicides across the entire lawn wastes chemicals, time, and the environment. Although past work has investigated machine learning-enabled weed detection from data on big farms; the models presume expensive imaging hardware, stage lighting, or expert crop data, which limits their applicability to residential lawns. This work challenges such constraints through the development of a light and mobile weed-searching system on lawns using Detectron2, an advanced object detection framework. The model was then tested on the combined lawn scene dataset and was found to be 92.4% accurate, accurately labeling 89.7% of the weeds and scoring an overall F1-score of 0.91. In trials, the system accurately picked out three patches of weed with high-confidence values (0.96, 0.93, and 0.88) which comprised approximately 14% of the picture. This measurement can enable selective treatment rather than blanket spraying, with considerable cost saving in the use of chemicals. The results demonstrate that artificial intelligence has the potential to automate one of the most time-consuming procedures of lawn care—detection of weeds—in a manner that helps maintain environmental sustainability. The project is currently engaged in the completion of the system by incorporating real-time detection capability by means of smart cameras and adaptive treatment algorithms to achieve optimal chemical utilization efficiency and accuracy in suppressing weeds.

Automated Detection and Quantification of Weldment Defects Using Detectron 2
Virtual Presentation (Microsoft Teams)
Session 3 at 12:00pm – 1:00pm
Undergraduate Student(s): Ryan Woodall
Research Mentor(s): Satish Gurupatham

The process of welding is one of the principal techniques used to join metals together in the modern day. There are a number of confounding factors that can compromise the structural integrity of a weld. There is an entire field of employment known as 'weld inspection' which examines and evaluates weldments in order to ensure their compliance with safety codes. Due to its prevalence in critical fields, detecting flaws in welding is essential for maintaining the safety of the general public. In this study Detectron2, an advanced object detection and segmentation framework built on convolutional neural networks (CNNs), was leveraged to automatically detect a series of ten common defects in welds, with an eleventh category aimed at flagging anomalous deformations that do not fall into a common category for weld flaws. The Detectron2 framework, based on the Faster R-CNN architecture with a Region Proposal Network (RPN) for object detection, was selected for its ability to perform both instance of segmentation and bounding box detection. A dataset comprising, 4313 images of welds in various forms—was collected and annotated for defect detection. The network was trained using a pre-trained ResNet-50 backbone for feature extraction, followed by the RPN and Fast R-CNN heads to predict bounding boxes and class labels. The trained model demonstrated high accuracy in *detecting and segmenting flawed regions, achieving significant precision and recall on the test dataset. This methodology provides an effective, automated solution for performing a preliminary visual inspection of a weld and flagging it for further evaluation by a senior weld inspector. This could potentially reduce the work load of the weld inspection industry by allowing a prescreening of all the welds in a structure which fail the visual inspection and then focusing the attention of the professionals on the welds which require manual inspection.*

Bio-Inspired Amphibious Robot
Poster #43 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Thomas Walden, Rafael Martinez, Ryan Walker, & Krish Patel
Research Mentor(s): Ayse Tekes

Within disaster relief operations, responders are frequently required to enter unstable and hazardous environments in order to conduct search and assessment activities. These conditions expose personnel to significant risk, particularly in structurally compromised, flooded, or debris-filled areas. However, advances in robotics and autonomous systems allow robots to take risks instead of human responders. The objective of this research is to leverage the adaptability of bio-inspired design and compliant mechanisms to develop a robotic system capable of deployment across diverse and inhospitable disaster environments. By incorporating structural compliance, the robot is designed to maintain mobility and stability under variable and extreme terrain conditions. Such adaptability is critical in disaster scenarios, where environmental characteristics often deviate significantly from controlled or structured settings. Multiple design iterations of an amphibious robot were developed until robust terrestrial and aquatic locomotion was achieved. With the exception of its electronic components, the robot is entirely 3d printed plastic, allowing for compliance, easy repair, and cost-effective replication. The locomotion system consists of six S-shaped wheels engineered to flex upon ground contact and return to their original geometry through integrated compliant spring mechanisms. Coordinated motion across all six wheels ensures continuous ground contact, maintaining a minimum of three contact points at any given time. The robot's elongated body comprises three articulated sections, each supporting two wheels. Adjacent sections are connected by compliant polymer folds functioning as joints, enabling vertical articulation without excessive rigidity. In aquatic environments, the platform remains buoyant, and the six wheels function as paddles- allowing for amphibious mobility. Conclusions will be drawn based on the robot's demonstrated capacity to traverse terrains characterized by environmental diversity, extremity, and inhospitality. Performance metrics will assess the extent to which the compliant, bio-inspired design enhances mobility, resilience, and operational viability in disaster relief contexts.

Boraflex Degradation and Long-Term Sustainability of Neutron-Absorber Materials in Spent Fuel Pools
Poster #5 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Madison Brant
Research Mentor(s): Eduardo Farfan

The U.S. Nuclear Regulatory Commission (NRC) currently authorizes two primary methods for the storage of spent nuclear fuel (SNF): spent fuel pool storage and dry cask storage. Spent fuel pools serve as the initial stage of post-irradiation fuel management, providing immediate storage following removal of fuel assemblies from the reactor core. These pools maintain a minimum water depth of approximately 6 meters above stored fuel to ensure adequate radiation shielding and decay heat removal. Fuel assemblies are transferred underwater through designated canals to maintain continuous shielding and protect personnel during handling operations. Spent fuel pools remained the primary storage method until the late 1970s and early 1980s, when increased reactor operation and fuel discharge rates led to storage capacity limitations. Dry cask storage systems were subsequently developed to provide additional long-term storage capability. After sufficient cooling in spent fuel pools, typically for several years, fuel assemblies are transferred to sealed steel canisters filled with inert gas and enclosed within protective overpacks designed for safe storage and transportation. While these methods remain industry standards, ongoing research seeks to enhance long-term storage safety and performance. To accommodate increased storage demands, many facilities have adopted high-density storage racks incorporating neutron-absorbing panels to maintain subcriticality. These materials commonly rely on boron-10 as the primary neutron absorber. Boraflex®, a boron-containing polymer matrix, was among the earliest absorber materials used but later exhibited significant in-service degradation. This study examines the characteristics that distinguished Boraflex® from subsequent absorber panel materials, evaluates the mechanisms responsible for its degradation, and reviews the lessons learned by the nuclear industry to improve the durability, performance, and long-term sustainability of modern neutron-absorber technologies.

Building Intelligent Soft Muscles of Future Robots
Poster #15 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Derrick Giles, Adrian Aguilar, Toheeb Adebisi, Mohsin Waqar, & Ian Cressy
Graduate Student(s): Kwasi Debrah-Pinamang
Research Mentor(s): Raf E Ul Shougat & Dal Hyung Kim

Globally, approximately 1.6 billion individuals experience mobility impairments, motivating the continued advancement of lightweight and adaptive assistive technologies. Conventional orthotic *and exoskeletal systems, while capable of providing mechanical support, often suffer from excessive structural mass, rigid kinematics, and limited energetic efficiency. These limitations reduce user comfort and restrict natural joint articulation. In parallel, bio-inspired robotic locomotion systems seek compact, muscle-like actuators capable of compliant, high-force output to replicate biological movement patterns such as walking, grasping, crawling, or fin-based propulsion. Both assistive exosuits and biomimetic robots therefore demand actuation technologies that combine high power density with intrinsic compliance. Shape memory alloys (SMAs) provide a promising solution due to their ability to recover macroscopic strain through a diffusionless martensitic-to-austenitic phase transformation. This reversible phase change enables compact metal wires to function as artificial muscles with high work density and favorable force-to-weight characteristics. While SMAs are widely used in minimally invasive surgical tools, their integration into soft exoskeletons for joint assistance and into bio-inspired robotic actuators for locomotion remains underexplored. This study investigates SMA-based unimorph and hybrid morphing architectures for dual applications: wearable joint assistance and biologically inspired robotic actuation. A 210 mm unimorph actuator was fabricated and experimentally characterized. Experimental kinematic measurements were cross-validated against a custom MATLAB numerical framework coupling geometrically exact Cosserat rod theory with generalized logistic phase-kinetic equations to capture hysteretic transformation dynamics. The validated model enabled systematic variation of boundary conditions and thermodynamic inputs to determine optimal actuation regimes. Results demonstrate that a 21.28 mg active SMA element can displace a 3.65 g composite structure against gravity, generating approximately 150 MPa recovery stress and 2.35 N contractile force under a steady input of ~150 mA. The resulting force-to-weight ratio confirms the viability of SMAs as lightweight artificial muscles for both assistive exoskeletons and bio-inspired robotic locomotion systems.*

BURAC (Bi-modal Unmanned Remote Amphibian Craft) - Design and Analysis

Poster #19 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Mouhamadou Diop
Research Mentor(s): Adeel Khalid

Long-range coastal surveillance and monitoring of offshore infrastructure create operational needs that traditional unmanned aerial vehicles are not well suited to address. For extended maritime operations, standard multirotor and fixed-wing platforms lack the endurance, low-altitude stability, and sea-surface operational capability needed. One solution is in-ground effect (IGE) flight. When a fixed-wing aircraft flies within about one wingspan of a surface, aerodynamic interaction between the wing and the surface produces more lift and significantly less induced drag, therefore allowing for much better flight efficiency at low altitude. Though it has maritime uses, IGE flying is still underutilized in relation to autonomous, amphibious unmanned vehicles. This study fills that vacuum by creating a bi-modal unmanned vehicle that *can move between high-altitude cruise, ultra-efficient IGE gliding, and operations on the water's surface. The main goal of this vehicle is to provide ongoing autonomous surveillance of the coast. Using an end-to-end digital engineering process, the car was created. Siemens NX was used to do airframe geometry and surface modeling, and the planform was made to be stable for IGE behavior at small angles of attack. To define the aerodynamic advantage envelope and spot instability boundaries, Computational Fluid Dynamics simulations were completed to describe wing pressure distribution over a range of IGE heights. Critical structural parts (including the carbon fiber wing spars and fuselage) were examined using finite element analysis to verify structural integrity under mixed aerodynamic and hydrodynamic loading typical of operations near the surface of the water. The avionics system combines a long-range telemetry link for real-time ground station monitoring, GPS for autonomous waypoint navigation, a LiDAR-based rangefinder for closed-loop altitude hold during IGE flight, and a specialized fixed-wing flight controller running ArduPilot. To keep IGE flight steady without pilot control, custom altitude-hold logic was added, and an automatic return-to-base mechanism was built-in for mission safety. Theoretical efficiency gains inspiring the design are supported by simulation results showing a quantifiable decrease in induced drag during IGE flight in contrast to free-air settings at matching airspeeds. Under worst-case combined loading, structural analysis confirmed that the main load-bearing components had safety factors above design criteria. Ground and bench tests of the integrated avionics stack verified sensor fusion accuracy, telemetry link dependability over longer range, and adequate autonomous flight modes execution including altitude hold and return-to-base.*

Cable-Driven Adaptive Upper Limb Exoskeleton for Daily Assistance
Poster #39 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): William Thompson
Research Mentor(s): Ayse Tekes

Stroke is the leading cause of long-term disability in the United States. Adaptive upper-limb exoskeletons present several challenges. Adaptive exoskeletons must operate in various environments, accommodate variable arm motions, predict user intent in real-time, while remaining lightweight and comfortable for extended use. Previous work by the authors introduced Gen II of a full tendon-driven, wearable upper-body exoskeleton, which demonstrated the mechanical feasibility of multi-degree-of-freedom assistance. This work introduces the Daily Assistive Stroke Patient Exoskeleton (DASPE) Gen III, which aims to advance wearable upper-body assistance for daily use. The DASPE Gen III system was developed as a fully wearable, cable-driven upper-body exoskeleton with actuation distributed across the user's lower back to minimize arm-mount mass. Motion mirroring uses a distributed framework consisting of four inertial measurement units (IMUs). Two IMUs are mounted on the user's healthy arm to capture joint motion, and two are mounted on the exoskeleton to measure assistance angles.

Joint-level control is implemented using discrete-time PID controllers operating in position space. This method is compatible with the motor driver interface and improves stability. Under no load, the exoskeleton demonstrated high accuracy elbow joint tracking with an root-mean-square-error (RMSE) of about 3 degrees, indicating accurate motion mirroring during minimal tasks. As loads increased, tracking error also increased. However, performance remained stable with an average RMSE of about 7 degrees across loads. Compared to previous generations, which showed about 9 degrees RMSE during similar tasks, the DASPE Gen III demonstrated a substantial improvement in both accuracy and consistency. The results show that a fully wearable, tendon-driven upper-body exoskeleton using position-based incremental controls can reliably mirror user motion and maintain stable tracking under varying loads. While tracking accuracy decreases during rapid movements due to system lag, overall performance remains consistent and predictable, supporting the viability of daily assistance.

Cellulose Nanofillers: A Promising Class of Green Polymer Nanocomposites for Recycled Plastic Waste

Poster #42 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Paul Waruszewski
Graduate Student(s): Varbah Sorsor
Research Mentor(s): David Veazie & Eric Mintz

An October 2024 World Health Organization (WHO) brief warned that electronic waste (e-waste) was among the "fastest-growing solid waste streams" worldwide, with 62 million tons generated in 2022. A scant 22.3% "was documented as formally collected and recycled." E-waste, including industrial polymers for computer parts and other electronics, often contains toxic compounds that the general public often doesn't know that it must be disposed of properly. As a result, dangerous e-waste is routinely mixed in with household trash and sent to landfills. Landfilled buried e-waste can leach harmful chemicals into the soil, air, and groundwater, and therefore, contaminating the water supply; and plastic debris in oceans and rivers have the potential to harm and even kill wildlife that becomes entangled in it or ingest it. The use of plastics for electronics and more has generated an enormous volume of debris, the disposal of which has become a primary global concern. It has been reported that some plastics could take up to a thousand years to degrade, thus, e-waste resulting from these plastics can pose severe environmental concerns that need immediate resolution. Poly(lactic acids) (PLA) is an extensively researched biobased, biodegradable polymer with the potential to replace petroleum-based plastics as 'green' PLA nanocomposites. Cellulose, a ubiquitous biopolymer, can serve as a platform for the preparation of eco-friendly nanoparticles. Cellulose nanocrystals (CNCs) and cellulose nanofibers (CNFs), isolated from cellulose, are highly valued for their mechanical, optical, and chemical properties. The development of green composites composed of bioplastic and biopolymer that are compostable or biodegradable is most crucial to addressing questions arising *from environmental hazards and health-related problems resulting from the production of petroleum-based plastics and their waste. In this research, we will describe the development of PLA/cellulose nanocomposites and examine their physical and mechanical properties to provide an alternative to petroleum-based products.*

Computational Analysis of Flow-Induced Oscillations in a Mars Entry Capsule During Atmospheric Descent
Poster #5 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): James Banks
Research Mentor(s): Gaurav Sharma

Atmospheric entry vehicles operating in hypersonic conditions encounter highly unsteady flow environments that generate dynamic aerodynamic loads and can induce instabilities. For Mars entry missions, these flow-induced oscillations may significantly affect vehicle stability, structural loading, and overall descent performance. Understanding these behaviors is critical to improving entry system reliability and mission success. This study investigates flow-induced oscillations in a Mars entry capsule using computational fluid dynamics (CFD). The FIRE-II capsule geometry is analyzed under hypersonic conditions to examine unsteady shock structures, wake dynamics, and time-varying pressure distributions. Simulations are first conducted using an Earth atmospheric model to establish baseline flow behavior in a well-characterized environment, followed by extension to Martian atmospheric conditions. The analysis focuses on pressure fluctuations and unsteady aerodynamic forces and moments to determine whether periodic oscillatory behavior develops during descent. By identifying dominant oscillation frequencies and correlating them with wake structures and shock motion, this work contributes to improved predictive modeling of atmospheric entry environments and supports the design of more stable and resilient Mars entry systems.

Demystifying Reactor Operations Through an Immersive Nuclear Refueling Safety Simulation
Poster #25 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Paul Lacap, Lorien Brown, & Jacob Lemons
Graduate Student(s): Caitlyn Tigani
Research Mentor(s): Eduardo Farfan & Joy Li

As the world becomes increasingly dependent on sustainable, low-carbon electricity, nuclear power production is recognized as an essential source of energy, but public perception is often hindered by false beliefs surrounding safety. This project was designed to meet the educational need through the development of an immersive 3D experience, where users are placed in the role *of facility operators, focusing on the process of nuclear refueling. The experience begins in a precisely scaled Refueling Hall, where users must complete a Personal Protective Equipment (PPE) verification sequence, using an interactive dialogue system to ensure the user follows strict safety protocols before entering the reactor bay. Once the user has been granted permission, the gameplay experience revolves around the precise use of a mechanical bridge crane, used to lift spent fuel rods, including realistic machinery movements and underwater conditions. By making complex engineering processes into a safe, gamified experience, users are challenged to think spatially while ensuring safety protocols are followed. After a structured playtesting phase for determining its educational effectiveness, the ultimate aim of the project is to increase public awareness of the level of technology and safety measures employed for nuclear energy maintenance, leading to greater confidence in nuclear power generation plants.*

Design and Development of a Smart Wristband for Continuous Health Metrics Monitoring

Poster #46 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Nora Tin & Daksh Garg
Graduate Student(s): Fariha Alam
Research Mentor(s): Razvan Voicu

Health metrics are measurable physiological indicators that reflect the body's internal state and overall health. Core health metrics include heart rate, body temperature, stress response, muscular activity, blood pressure, respiration rate, fatigue, and movement patterns. Continuous monitoring of these parameters enables early detection of abnormalities, supports personalized medicine and performance tracking, and advances proactive healthcare strategies. Wearable sensors enable such monitoring through non-invasive, compact designs optimized for long-term wearability. This research focused on designing a compact, portable, and lightweight wristband prototype capable of integrating multiple wearable sensors while ensuring long-term wearability and signal integrity. Five sensors were embedded into a modular wristband platform: a photoplethysmography (PPG) sensor for heart-rate-related blood volume changes, an electrodermal activity (EDA) sensor for skin conductance and sympathetic nervous system assessment, an EMG sensor for skeletal muscle electrical activity, a temperature sensor for distal body temperature measurement, and a motion sensor for movement tracking. The design process began with precise dimensional characterization of each sensor to develop a custom housing in SolidWorks. Initial prototypes were fabricated using Polylactic Acid (PLA) to validate geometric tolerances. The final version was printed using Thermoplastic Polyurethane (TPU) to enhance flexibility, mechanical compliance, and user comfort. A primary engineering challenge involved tight dimensional tolerancing to ensure secure sensor placement without introducing mechanical stress or motion artifacts, requiring multiple design iterations. Fabrication challenges, particularly first-layer bed adhesion, were mitigated by optimizing print parameters, including *reduced first-layer speed and extended brim support, resulting in improved structural consistency and repeatability. Preliminary results demonstrate successful simultaneous acquisition of multimodal physiological signals with stable waveform morphology, reduced motion-induced artifacts, and consistent inter-sensor temporal alignment. The integrated modular design improves mechanical stability and enables improved synchronization across sensing channels, enhancing the feasibility of accurate multimodal physiological analysis for continuous health monitoring applications.*

Design and Preliminary Evaluation of a Compliant Rolling-Contact Bipedal Robot Guided by Human Motion Data

Virtual Presentation (Microsoft Teams)

Session 3 at 12:00pm – 1:00pm

Undergraduate Student(s): Regina Martinez Moctezuma & Britt Walker

Graduate Student(s): Rob Montgomery

Research Mentor(s): Ayse Tekes

Compliant mechanisms differ significantly from rigid mechanisms in the sense that they are able to better mimic nature-like movements. By taking these concepts into real-world applications, it is possible to replicate the gait cycle of a human using a belt-driven bipedal robot leg design with a rolling contact joint acting as the knee. In order to move the bipedal robot, IMU sensors are attached to a human subject, and the sensors then send motion data via Bluetooth to a computer, where it is fed into servo motors that move according to changes in the user's IMU angles. The methodology used to evaluate the accuracy of the bipedal robot involved graphing the motion data received from the IMUs attached to the user alongside IMU data collected from the physical system. Time vs. IMU position graphs for each system joint (right hip, right knee, left hip, and left knee) were compared to analyze the accuracy of the replicated movement. The results show that the bipedal robot is able to successfully mimic the gait of a human while the robot is in the air. However, future goals include allowing the leg to balance and walk on the ground without the need for external assistance while continuing to use real-life human motion data.

Design Challenges and Long-Term Safety Considerations for Deep Geological Repositories for Nuclear Waste

Poster #33 (Convocation Center, VyStar Arena)

3:00pm – 3:45pm

Undergraduate Student(s): Mencari Parrott

Research Mentor(s): Eduardo Farfan

The Yucca Mountain Nuclear Waste Repository, designated by the Nuclear Waste Policy Act Amendments of 1987, was proposed as a deep geological repository (DGR) within Yucca Mountain for the long-term disposal of spent nuclear fuel and other high-level radioactive waste *in the United States, although the facility has not been completed or placed into operation. This study examines key challenges associated with the long-term storage of nuclear and radioactive waste in deep geological repositories. Radioactive waste can remain hazardous for extended periods, ranging from decades to thousands of years depending on radionuclide inventories and half-lives. Deep geological disposal is widely considered a viable long-term management strategy because engineered barriers combined with stable geological formations provide enhanced isolation compared with surface storage systems. Repository depth and surrounding rock formations function as passive barriers that limit radionuclide migration and reduce potential exposure risks to the public and environment. Limited deployment of DGRs introduces technical, regulatory, and societal challenges that must be addressed to support broader adoption of geological disposal. This study evaluates critical factors influencing DGR design and long-term performance, including radionuclide characteristics, repository environmental conditions, and engineered barrier materials. Emphasis is placed on host rock selection, corrosion-resistant canister materials intended to prevent groundwater ingress, and barrier systems designed to mitigate radionuclide migration in the event of degradation. The results so far are that copper used in a DGR will last longest in an environment that has reduced oxygen and chloride content and relatively low temperature. The analysis is based on a comprehensive review of peer-reviewed literature and technical studies obtained through the Kennesaw State University Super Search database. Methodologies discussed include hydro-thermal–mechanical analysis, dissolution and leaching evaluations, corrosion modeling, and electrochemical testing. The objective is to identify key considerations that enhance long-term containment and safety in deep geological disposal systems.*

Designing Personalized Robots for Helping People Walk and Move — As Easy as Building Blocks

Virtual Presentation (Microsoft Teams)

Session 1 at 4:00pm – 5:00pm

Undergraduate Student(s): Aadil Tirmizi, Shay Patel, Abdullah Arif, & Aiden Woockman

Research Mentor(s): Sainan Zhang

Designing Personalized Robots for Helping People Walk and Move — As Easy as Building Blocks is a hands-on engineering project focused on developing a knee exoskeleton to assist individuals with limited mobility. Our goal is to create a modular, adaptable device that can support natural walking motion while remaining lightweight, affordable, and easy to assemble. Using SolidWorks and CAD modeling, we designed a brace structure tailored to the human knee joint, carefully considering alignment, range of motion, and user comfort. The components were fabricated through 3D printing, enabling rapid prototyping and iterative design refinement. To create an intelligent assistance system, we integrated a Raspberry Pi microcontroller with inertial measurement unit (IMU) sensors to track knee joint angle and motion in real time. The

IMU sensors capture changes in orientation and angular velocity during knee flexion and extension, and these data are processed using custom software on the Raspberry Pi. When the system detects upward knee motion, it triggers a motor to provide controlled assistive torque to support the movement. This allows the device to respond dynamically to the user rather than operating on a fixed schedule. By combining mechanical design, embedded systems, and sensor-based feedback, this project demonstrates how accessible tools and modular components can be used to build personalized robotic solutions. The result is a functional prototype that highlights the potential of low-cost, customizable exoskeleton technology to improve mobility and independence.

Development and Feasibility Assessment of a Multiphysics Molten Salt Reactor Educational Simulation Platform

Virtual Presentation (Microsoft Teams)
Session 1 at 4:00pm – 5:00pm
Undergraduate Student(s): Raul Apa
Research Mentor(s): Eduardo Farfan

Nuclear energy technologies have advanced considerably in recent decades and are expected to continue evolving to meet future demands for safe, reliable, and sustainable power generation. Among advanced reactor concepts, the Molten Salt Reactor (MSR) has gained significant attention as a promising alternative to conventional light-water reactor designs such as Boiling Water Reactors and Pressurized Water Reactors. MSRs offer several inherent advantages, including low operating pressure, enhanced passive safety characteristics, and simplified heat removal systems resulting from the use of liquid fuel or coolant salts. However, the multiphysics behavior and system-level complexity of MSR designs often present challenges for effective understanding and accessibility, particularly for students and non-specialist audiences seeking to learn the underlying operating principles. As part of this study, a comprehensive review of the existing literature on Molten Salt Reactor technologies, educational reactor simulators, and multiphysics modeling approaches will be conducted to establish the research context and identify current knowledge gaps. This project investigates the feasibility of developing a physics-based educational Molten Salt Reactor (MSR) simulator designed to support research-informed learning and system-level analysis. The proposed simulator incorporates a representative MSR architecture, including a primary reactor vessel with circulating fuel salt, coupled primary and secondary heat transport loops, an intermediate heat exchanger, and passive safety systems such as a freeze plug and drain tank. The modeling framework enables simulation of coupled multiphysics phenomena governing MSR operation, including thermal–hydraulic behavior, heat transfer, and fluid flow interactions under steady-state and transient conditions. Through virtual experimentation, users can analyze system response to operational perturbations, component malfunctions, and off-normal scenarios, with particular emphasis on inherent safety characteristics and passive shutdown mechanisms. The platform is designed to provide a *research-oriented environment for studying MSR dynamics while improving accessibility to complex advanced reactor concepts. It enables interactive, parameter-driven exploration in which users can systematically vary operating conditions and evaluate the resulting responses of both individual components and the integrated reactor system.*

The Efficacy of HVAC Noise Reduction Modification to a Classroom
Poster #7 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Justin Cloutier & Cynthia Gannon
Research Mentor(s): Richard Ruhala

The Mathematics Building at Kennesaw State University was constructed in 1962 and was later renovated to include an updated HVAC system. As part of this renovation, fan coil units were installed in the corners of each classroom. Due to limited space for acoustic treatment, several classrooms currently experience noise levels that exceed the ANSI maximum A-weighted sound level for educational spaces by up to 15 dB, creating communication and learning challenges for students and faculty. To address this issue without requiring a full HVAC system replacement, a noise-reduction solution was developed and installed last year in classroom D225. This project will evaluate the performance of that system modification by comparing current acoustic measurements with the original data to determine compliance with ANSI standards. To ensure consistency and allow for accurate comparison, sound-level measurements were taken with the newly installed noise-reduction system operating at the same vantage points previously used for sound measurements in earlier semesters. Data collection shows that the noise reduction solution decreased noise levels compared to baseline conditions, bringing the classroom closer to compliance with ANSI standards. Preliminary results show a 5-10 dB overall reduction in noise level at several locations in the classroom. More detailed results that investigate the frequency range of the background noise will determine whether the implemented solution is effective from a performance standpoint. If successful, these modifications may be applicable for mitigating similar HVAC noise issues in other classrooms with comparable constraints. If full compliance is not achieved, additional improvements will be recommended. Ultimately, this study provides KSU Facilities with data to support efforts to reduce noise levels and enhance the learning environment in the Mathematics Building.

Electrochemical Analysis of the Cumulative Degradation of Polypyrrole
Poster #36 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Graduate Student(s): Ryan Mustapha Tcheutchoua Gouafong & Duy Pham
Undergraduate Student(s): LeaNora Brown, Rishi Muthuvijayan, & Lohendra Saravana
Research Mentor(s): Ashish Aphale

Polypyrrole (PPy) is a conductive polymer that is being extensively studied for its use as an electrode material for energy storage applications. Most of these studies share similar conclusions about the limited cycling stability, in other words, facile degradation of PPy. This work's objective is to understand the degradation behavior of PPy using cyclic voltammetry (CV), electrochemical impedance spectroscopy (EIS), and galvanostatic charge-discharge (GCD) electrochemical analysis techniques. PPy electrodes are synthesized by electropolymerization using a solution of pyrrole monomer, deionized water, and sodium sulphate, and graphite foil as substrate. Supercapacitor (SC) devices were assembled using the synthesized electrodes. CV was used to determine the charge storage capacity of the SC device, GCD helps cycle the SC through a range of charge-discharge cycles, and EIS helps determine the ohmic and charge transfer resistance values of the device, which serves as a direct indication of the electrode's degradation. The fabricated device was tested and showed promising performance with a peak charge storage capacity of 48.2 F/g and a 61% retention of its capacity over 3000 charge-discharge cycles.

Esophageal Tissue Mechanics Across Regions: Biomechanical Testing and Machine Learning–Assisted Analysis
Poster #8 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Michael Duong, Ty Johnston, Noelia Bermudez, Aidan Blot
Research Mentor(s): Lei Shi

Digestive disorders can exist even when standard medical tests would say that things are normal, suggesting that subtle changes in a tissue's behavior may contribute to underlying symptoms. The esophagus goes through a lot of complex procedures during swallowing and reflux, so accurate mechanical properties are essential for its simulation, but detailed information for this specific region of tissue is limited. The Intelligent Biomechanics Lab is working to help create personalized digital twins of the gastrointestinal system by combining laboratory biomechanical testing with computer generated simulations. In this project, our current focus is on collecting the data of mechanical properties from esophagus tissue. The specimen's behavior is measured using uniaxial tensile and biaxial testing protocols on the Instron BioPuls system to graph force / deformation and stress / strain relationships. The First Year Scholars prepare the specimens and have learned how to complete testing procedures, which includes: specimen alignment, measurement of the sample's different dimensions, preconditioning the sample, and loading the specimen into the Instron machines. We also help to monitor experiments in-person or through a remote desktop to help ensure that the data is comparable across multiple trials and tissue locations. We are also given tasks to assist in training an algorithm to help process large amounts of data, flag outliers, and also picking out data and curve fittings from endoscopy videos. Results are currently pending and will be presented at the Spring Symposium of Student Scholars. The data we've collected will give important insight for building a patient specific digital twin of the esophagus, with applications in understanding esophageal function, disease *mechanisms, and treatment planning. Presently, we're working on expanding our data, more specifically our sampling, across the entire esophagus and improving our algorithm to better assist our endeavors.*

Experimental Analysis of Vibration Mitigation in a Composite Building Prototype Using Fluid Viscous Dampers, Phase III (AI-Driven Evaluation)
Poster #20 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Rishit Jain
Research Mentor(s): Simin Nasseri, Mohammad Jonaidi, & Solim Kortobi

This multi-phase research investigates vibration mitigation in a 1:10 scale composite multi-story building prototype subjected to controlled base excitation. Earlier phases involved experimental shake-table testing of steel–polymer and steel–plywood models with and without fluid viscous dampers (FVDs), alongside complementary finite element analysis (FEA) and MATLAB-based numerical modeling using classical viscoelastic formulations. In this third phase, experimentally acquired time-history data were analyzed using artificial intelligence (AI)-based regression and pattern-recognition techniques and directly compared with conventional MATLAB numerical processing. The dataset consists of acceleration and displacement time histories of the upper two floors under harmonic base excitation, representing standard structural dynamic response variables reported in scaled seismic testing literature. Results show strong agreement in dominant frequency identification and peak response prediction, while AI methods demonstrate enhanced capability for automated feature extraction and rapid parameter estimation. This phase advances the integration of experimental dynamics, computational modeling, and data-driven structural assessment.

From Tethered to Freely Moving: A Modified Brain Surgery Approach For Long term Behavior Analysis on Fruit Flies.
Poster #37 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Pranshu Patel, Gabriella Medel, & Joy Zhu
Research Mentor(s): Dal Hyung Kim

This study investigates how microsurgical techniques influence neural activity measurements in Drosophila melanogaster during locomotion. During brain surgery, tethering is essential to restrict body movement and stabilize the specimen, enabling precise dissection and improved surgical accuracy. However, most conventional fruit fly brain surgery methods are designed exclusively for tethered preparations. In these approaches, neural activity is typically observed only while the fly remains mechanically restrained. Post-surgical release is generally considered unnecessary and may even introduce additional physical damage. Consequently, long-term or *longitudinal observation of neural function and behavior in freely moving flies has remained largely impractical. To address these limitations, we compare conventional tethered techniques with a modified surgical protocol that supports post-operative release and recovery. In our approach, flies are carefully released after surgery and allowed to recover in a standard food vial environment. We then assess post-surgical viability and behavior using our tracking platform, the Transparent Omnidirectional Locomotion Compensator (TOLC), which enables naturalistic walking behavior while maintaining stable neural recording conditions. By refining the surgical process to minimize damage and improve recovery, we extend post-surgical lifespan and preserve behavioral integrity. This methodology enables longitudinal monitoring of neural activity in healthier, freely behaving flies.*

A Hands-On Research Project Using Machine Learning to Turn Endoscopy Videos into Actionable Data

Poster #15 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Ty Johnston, Michel Duong, Noelia Bermudez, Aidan Blot
Graduate Student(s): Yue Li
Research Mentor(s): Lei Shi

Digestive disorders can exist even when standard medical tests would say that things are normal, suggesting that subtle changes in a tissue's behavior may contribute to underlying symptoms. The esophagus goes through a lot of complex procedures during swallowing and reflux, so accurate mechanical properties are essential for its simulation, but detailed information for this specific region of tissue is limited. The Intelligent Biomechanics Lab is working to help create personalized digital twins of the gastrointestinal system by combining laboratory biomechanical testing with computer generated simulations. In this project, our current focus is on collecting the data of mechanical properties from esophagus tissue. The specimen's behavior is measured using uniaxial tensile and biaxial testing protocols on the Instron BioPuls system to graph force / deformation and stress / strain relationships. The First Year Scholars prepare the specimens and have learned how to complete testing procedures, which includes: specimen alignment, measurement of the sample's different dimensions, preconditioning the sample, and loading the specimen into the Instron machines. We also help to monitor experiments in-person or through a remote desktop to help ensure that the data is comparable across multiple trials and tissue locations. We are also given tasks to assist in training an algorithm to help process large amounts of data, flag outliers, and also picking out data and curve fittings from endoscopy videos. Results are currently pending and will be presented at the Spring Symposium of Student Scholars. The data we've collected will give important insight for building a patient specific digital twin of the esophagus, with applications in understanding esophageal function, disease mechanisms, and treatment planning. Presently, we're working on expanding our data, more *specifically our sampling, across the entire esophagus and improving our algorithm to better assist our endeavors.*

Hydrogen Generation in Nuclear Reactors: Mechanisms and Modern Mitigation Strategies
Poster #23 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Matthew Jones
Research Mentor(s): Eduardo Farfan

This research examines the mechanisms responsible for hydrogen generation in nuclear reactor systems and the modern mitigation strategies implemented to reduce associated safety risks. Hydrogen may be produced under both normal operating and accident conditions through multiple pathways, including zirconium-steam reactions during high-temperature fuel cladding oxidation, radiolysis of the reactor coolant, and corrosion-related processes. Elevated hydrogen concentrations can create flammable or explosive mixtures, posing a potential threat to containment integrity and, consequently, to public and environmental safety. Such risks were demonstrated during the hydrogen explosions at the Fukushima Daiichi nuclear power plant, which highlighted the importance of effective hydrogen management and mitigation systems in reactor safety design. This study reviews published research on hydrogen generation mechanisms in nuclear reactors, with emphasis on the underlying chemical processes, reactor physics phenomena, and accident conditions that promote gas production. This study further examines how contemporary reactor concepts, including small modular reactors and other advanced designs, incorporate design features and operational strategies aimed at preventing hydrogen accumulation and mitigating associated risks. The analysis is based on a comprehensive survey of peer-reviewed literature, technical reports, and documented historical accident case studies. The overall objective is to provide a systematic overview of the principal hydrogen generation pathways and the advanced safety approaches currently employed to manage hydrogen-related hazards in modern nuclear reactor systems.

Improving Aerodynamic Efficiency of a Fixed Wing Aircraft by Design and Optimization of Winglets
Poster #23 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
High School Student(s): Uchitha Kulasiri
Research Mentor(s): Adeel Khalid

The purpose of this research is to optimize the aerodynamic efficiency of a fixed-wing aircraft by introducing winglets. The winglets are designed and optimized for cruise conditions. The aircraft chosen for this study is the Cessna 208 Caravan. Aerodynamic efficiency is determined *by the lift-to-drag ratio of the aircraft. The goal is to study several types of winglets to determine the best design for the Caravan. This includes blended winglets, raked wingtips, split scimitar winglets, canted winglets, dropped tips, and end plates. The design of the wing of the aircraft will be made using precise measurements for the wing. CFD Analysis will be used to find the lift-to-drag ratio of the wing without any winglets. Each winglet will be made using various design variables such as vertical position, aspect ratio, taper ratio, type of airfoil, sweep angle, and twist. For each design variable, a baseline winglet with each variation altering in 5% increments from -20% to +20% of their original baseline values. Each altered winglet design only changes one variable at a time while keeping all other variables constant. After these winglets have been created, each winglet with the wing to find its lift-to-drag-ratio. Using this ratio, the variation of each of the variables for each winglet will be determined as the most aerodynamically efficient. After this, a scaled-down, 3D-printed model of each optimized winglet will be made. These 3D printed models will be tested for their aerodynamic efficiency in the AEROLAB Wind Tunnel. After this is complete, it will be determined which optimized winglet is the most aerodynamically efficient for the Cessna 208 Caravan.*

Interaction of Forewing Vortex Shedding and Shock Buffet in Tandem NACA 0012 Airfoils
Poster #3 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Musa Baig & Ayush Patel
Research Mentor(s): Gaurav Sharma

The development of unmanned aerial vehicles (UAVs) has led to the adoption of tandem wing configurations to improve lift-to-drag ratios and enhance high-altitude stability. However, at transonic speeds, these configurations may encounter severe aerodynamic challenges due to shock buffet. Shock buffet is characterized by unsteady shock-wave oscillations that can induce structural fatigue and degrade aerodynamic performance. An important open question in tandem wing design is how the unsteady vortex shedding from a stalled forewing interacts with the shock-induced buffet on a downstream wing. Understanding this interaction is critical for ensuring the aerodynamic stability and structural integrity of high-speed UAV configurations. This study investigates the aerodynamic interference between two NACA 0012 airfoils arranged in a tandem configuration in the transonic regime. The simulations are performed at a Mach number of 0.75 and a Reynolds number of 3×106. The forewing is pitched to a stalled angle of attack of 14∘, generating a separated wake, while the aft wing operates at 4.5∘, where shock-induced buffet may occur. The primary objective is to examine how variations in the vertical gap between the airfoils influence the interaction between upstream vortex shedding and downstream shock buffet. The longitudinal stagger between the airfoils is kept constant while the vertical displacement is varied. The results are compared against a baseline configuration consisting of a stalled forewing and a non-buffeting aft wing. The findings aim to provide insight into the *coupling between wake-induced disturbances and transonic shock oscillations in tandem configurations. Understanding this interaction may help identify configurations that mitigate buffet effects and improve the aerodynamic stability of high-speed UAV designs.*

Localized Aft-Section Reconfiguration for Transient Control of Shock-Induced Separation on a Supercritical Airfoil in Transonic Flow
Poster #2 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Aneesh Anil
Research Mentor(s): Guarav Sharma

This study investigates the transient aerodynamic behavior and flow separation characteristics of a supercritical airfoil under transonic conditions (Mach 0.8–1.2). Although supercritical airfoils are designed to delay shock formation and minimize wave drag, high-speed maneuvers can induce shock-induced separation and unsteady oscillatory behavior. This research examines whether localized angle reconfiguration in the aft section of the airfoil can mitigate separation and stabilize the flow field. Transient simulations were performed using a finite-volume solver with the SST k–ω turbulence model to capture compressibility effects and shock-boundary-layer interactions. A 1-meter chord model was analyzed, with localized geometric modification introduced near the point of maximum rear curvature to emulate adaptive aft-section deflection. The unsteady simulations enable visualization of shock motion, pressure fluctuations, and boundary layer detachment across the transonic regime. The results aim to quantify the influence of localized aft-geometry adjustments on shock strength, separation extent, and aerodynamic performance. This work contributes to the development of adaptive airfoil strategies for improved stability and efficiency in high-speed flight.

Mechanical Redesign of Elbow and Compliant Spine Integration of a Biomimetic Upper-Body Exoskeleton for Stroke Rehabilitation
Poster #38 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Jeevan Thomas & Sama Abbadi
Graduate Student(s): Connor Talley
Research Mentor(s): Ayse Tekes

This study presents the continued development and optimization of a biomimetic upper-body exoskeleton designed to assist stroke patients with impaired arm mobility. Building upon prior work, the current research focuses on creating a compliant spine and improving the elbow joint mechanism to enable rotation beyond 90 degrees while maintaining alignment and comfort.
Mechanical redesign efforts include modifying the existing elbow discs connection to improve joint articulation. A redesigned arm rail and slider system was developed so that the

whole exoskeleton elbow can move to match the position of the user's elbow to allow greater adjustability across users. Additionally, improvements were made to the arm-to-back connection interface to provide better upper-body support and effective force transmission between the exoskeleton and the user's torso. These enhancements aim to increase range of motion, comfort, and promote safer rehabilitation movements. Further development introduced a compliant spinal support structure to better integrate the device with natural torso movement. A two-column spinal interface composed of rigid links connected through compliant TPU elements was designed to provide stability and flexibility. The compliant sections allow limited bending while maintaining structural alignment and load transfer. Multiple flexure geometries were explored to balance flexibility and stability while minimizing unwanted twisting. Modeling, simulation tools like MATLAB Simscape, and physical testing of elbow and spine will be used to evaluate improvements in joint alignment and range of motion. The results will be presented at the symposium and provide a framework for continued development and clinical evaluation for biomimetic stroke rehabilitation technologies.

Microreactors as a Solution for Remote, Resilient, and Rapidly Deployable Clean Energy Systems

Poster #17 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Pablo Jr Gonzales
Research Mentor(s): Eduardo Farfan

There are numerous applications in which small-scale, reliable power generation is required, particularly in remote locations, critical infrastructure, and emergency response environments where conventional grid access is limited. Microreactors, typically defined as nuclear reactors producing up to approximately 20 MW(e), are being developed to address these needs through compact, transportable reactor systems. Although several organizations are actively pursuing development, a systematic evaluation of their design characteristics, operational capabilities, and deployment potential remains necessary to clarify their role within emerging distributed energy systems. This study investigates the technical features of representative microreactor concepts through a comparative analysis of design data, government program reports, and recent technical literature. The methodology involves identifying key parameters, including power output, fuel type, cooling systems, operational lifetime, and transportability requirements by comparing these across multiple proposed concepts. Particular attention is given to the role of tristructural isotropic (TRISO) fuel and passive safety mechanisms in supporting long-duration, low-maintenance operation in remote environments. The analysis indicates that most microreactor concepts are designed for multi-year operation without refueling, with projected core lifetimes ranging from 5 to 20 years depending on configuration and fuel enrichment. Many designs employ high-temperature gas-cooled or heat-pipe-cooled systems that enable efficient heat removal while maintaining simplified mechanical systems and reduced maintenance.

Transportability considerations strongly influence reactor size and mass, allowing deployment via rail or heavy-duty truck. These characteristics support applications including remote industrial operations, military installations, district heating, and backup power for critical infrastructure. The results suggest that microreactors offer significant advantages for distributed energy due to their compact design, extended fuel lifetimes, and reliance on inherent safety features such as negative reactivity feedback. Overall, findings indicate microreactors represent a promising technology for resilient, low-carbon power generation, while also highlighting key engineering and deployment considerations that will influence their future commercialization.

Modeling, Building, and Experimentation of Shape Memory Alloy Soft Actuator Muscle
Virtual Presentation (Microsoft Teams)
Session 3 at 12:00pm – 1:00pm
Undergraduate Student(s): Ian Cressy, Mohsin Waqar, Derrick Giles, Adrian Aguilar, & Toheeb Adebisi
Research Mentor(s): Md Shougat

Globally, approximately 1.6 billion individuals experience mobility impairments, motivating the continued advancement of lightweight and adaptive assistive technologies. Conventional orthotic and exoskeletal systems, while capable of providing mechanical support, often suffer from excessive structural mass, rigid kinematics, and limited energetic efficiency. These limitations reduce user comfort and restrict natural joint articulation. In parallel, bio-inspired robotic locomotion systems seek compact, muscle-like actuators capable of compliant, high-force output to replicate biological movement patterns such as walking, grasping, crawling, or fin-based propulsion. Both assistive exosuits and biomimetic robots therefore demand actuation technologies that combine high power density with intrinsic compliance. Shape memory alloys (SMAs) provide a promising solution due to their ability to recover macroscopic strain through a diffusionless martensitic-to-austenitic phase transformation. This reversible phase change enables compact metal wires to function as artificial muscles with high work density and favorable force-to-weight characteristics. While SMAs are widely used in minimally invasive surgical tools, their integration into soft exoskeletons for joint assistance and into bio-inspired robotic actuators for locomotion remains underexplored. This study investigates SMA-based unimorph and hybrid morphing architectures for dual applications: wearable joint assistance and biologically inspired robotic actuation. A 210 mm unimorph actuator was fabricated and experimentally characterized. Experimental kinematic measurements were cross-validated against a custom MATLAB numerical framework coupling geometrically exact Cosserat rod theory with generalized logistic phase-kinetic equations to capture hysteretic transformation dynamics. The validated model enabled systematic variation of boundary conditions and thermodynamic inputs to determine optimal actuation regimes. Results demonstrate that a 21.28 mg active SMA element can displace a 3.65 g composite structure against gravity, generating approximately 150 MPa recovery stress and 2.35 N contractile force under a steady input of

~150 mA. The resulting force-to-weight ratio confirms the viability of SMAs as lightweight artificial muscles for both assistive exoskeletons and bio-inspired robotic locomotion systems.

Modular Structural Design and Sensor Integration of a Smart Elbow Orthotic System
Poster #27 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Humayd Hussain Momin & Tochi Oji
Research Mentor(s): Ayse Tekes

Upper-limb orthotic devices often lack modularity and embedded sensing capabilities necessary for quantitative biomechanical assessment. Elbow based orthotics offer the prospect of aiding patients suffering from neuromuscular deficiencies and physical injury. There are several commercially available elbow orthoses, however, they hinder user movements by constraining them to rigid links. This project investigates the structural design and sensor integration of a modular smart elbow brace intended to support motion tracking and future assistive actuation development. In this work, we design the housing for a passively compliant elbow orthosis, the Smart Elbow Brace (SEB), aimed to aid patients suffering from a wide range of neuromuscular insults and physical injury by utilizing 3D modeling software, primarily SolidWorks. Our contribution focused on the mechanical design of the rigid brace assembly and the integration of the sensing hardware. The primary structural element consists of an elongated rigid support member that had precision-spaced screw holes to enable configurable mounting locations. This distributed hole pattern allows modular attachment of sensor housings, fastening components, and future electromechanical modules without requiring redesign of the base structure. The rigid component was designed to maintain structural stability under bending loads generated during elbow flexion and extension while minimizing added mass. We found the fit to be very user-friendly and compatible with sensor placement while adding minimal weight.

Molten Salt Reactors and Advances in Nuclear Reactor Core Cooling Technologies
Poster #44 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Moses Simmons & Noah Zenn
Research Mentor(s): Eduardo Farfan

Recent advancements in nuclear power technology have renewed global interest in the development of molten salt reactors (MSRs). As nations pursue reliable low-carbon energy systems capable of supporting long-term electricity demand and decarbonization, advanced reactor technologies are investigated as alternatives to conventional light-water reactor systems. Despite this renewed interest, the technical characteristics of MSRs and their implications for reactor design and deployment remain unfamiliar to many people outside development programs. Consequently, a technical overview of modern MSR cooling technologies and their *design motivations is needed to understand their role in next-generation nuclear energy systems. The purpose of this study is to characterize contemporary MSR designs and examine ongoing international projects focused on their development and commercialization. This effort reviews key technological advancements contributing to the growing adoption of salt-cooled reactor concepts and evaluates their role in the future of fission-based power generation. Focus is given to the thermophysical properties and performances of candidate molten salt compositions currently under investigation for reactor cooling applications. Reactor concepts supported by major institutional research programs primarily utilize fluoride-based, nitrate–nitrite–based, and chloride-based molten salts, each presenting distinct advantages and challenges related to heat transfer capability, corrosion behavior, and high-temperature operation. To provide context, this study presents an overview and technical comparison between conventional water-cooled reactors (WCRs) and salt-cooled reactor systems. Although the issues of environmental impacts are not the focus of this work, the comparison highlights an advantage of MSRs: their reduced dependence on large water resources for cooling. Because MSRs do not require continuous water consumption or proximity to bodies of water, they offer availability in currently unserved regions. Additional benefits, including opportunities for high-temperature industrial applications such as hydrogen production and inherent and passive safety characteristics relative to current WCRs, are also examined to show technological motivations behind MSR research and development.*

Numerical Analysis of Wing Vortex Interaction in Tandem Wing Configuration
Poster #36 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Ayush Patel & Musa Baig
Research Mentor(s): Gaurav Sharma

When aircraft or drone lifting surfaces operate in close proximity, the turbulent wake generated by the upstream surface can induce significant buffeting on the downstream surface. Buffeting is an unsteady aerodynamic phenomenon in which oscillating vortical structures interact with a structure, producing sustained aerodynamic loading and structural vibrations. If left unmitigated, these loads can accelerate material fatigue, degrade flight control performance, and potentially contribute to structural failure. Real-world examples include tail buffeting in fighter aircraft at high angles of attack and aerodynamic interference effects in tandem drone configurations. This computational study investigates wake interference by analyzing two NACA 0012 airfoils arranged in a tandem configuration at a high Reynolds number (Re = 3×106) in the incompressible flow regime (M = 0.12). To generate a separated wake, the upstream airfoil is pitched to a stalled angle of 14∘, while the downstream airfoil remains at 0∘ angle of attack. Two-dimensional transient simulations are performed in ANSYS Fluent using the SST k–ω turbulence model to capture the relevant flow physics. The horizontal stagger distance (X/c) between the airfoils will vary from 0.1 to 1.0 chord lengths while maintaining *constant vertical alignment. The time history of the lift coefficient on the downstream airfoil will be analyzed to quantify the magnitude and frequency of buffeting. Root Mean Square (RMS) analysis will be used to evaluate the amplitude of unsteady loading, while Fast Fourier Transform (FFT) analysis will identify the dominant frequency content of the oscillations. Ultimately, this study aims to identify critical spacing thresholds that minimize wake-induced buffeting in tandem lifting-surface configurations.*

Plasma Electrolytic Oxidation of Magnesium with HA and Graphene Oxide for Improved Corrosion Resistance for Biomedical Applications

Poster #32 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Noah Parayil, Sean Baker, Hassib Kazi, Emily Nwuha, Beatrice Lehner, Lucas Lebron, & Anthony Nguyen
Research Mentor(s): Hamdy Ibrahim

Magnesium alloys are biodegradable metals inside the body known for their favorable mechanical properties and potential biocompatibility, making them a great candidate for use in biodegradable medical implants. The development of magnesium-based biodegradable medical implants that can successfully degrade following a complete healing process is expected to result in significant progress in clinical use. However, one of the main obstacles for this broader implementation is their fast corrosion rates in biological environments. To address the effect of fast corrosion, plasma electrolyte oxidation (PEO) coating process has been explored due to its strong adhesion to the magnesium substrate. However, this coating process continues to pose a challenge due to its porous nature. The purpose of this research is to explore the addition of bioactive ceramic particles, namely hydroxyapatite and graphene oxide, into the PEO coating layer of magnesium alloy (ZK60) to improve corrosion behavior. In this work, a systematic analysis of the most critical PEO process parameters, i.e., current density and the nanoparticle type present during the coating process, was implemented. Characterization methods based on surface morphology and corrosion behavior were conducted. To this end, surface morphology is assessed using microscopy and scanning electron microscopy. Corrosion behavior is assessed through immersion and electrochemical tests such as potentiodynamic polarization and electrochemical impedance spectroscopy. The preliminary investigation shows that the incorporation of hybrid nanoparticles of hydroxyapatite and graphene oxide in the electrolyte of PEO decreases the corrosion rate of the alloy. Furthermore, the current density shows an important effect on the corrosion behavior and structural integrity of the PEO coating. The investigation continues to be carried out, and forthcoming experimental analysis will allow us to validate these hypotheses with a thorough characterization.

Role of High Temperature on Degradation of Clean Energy Generation

Poster #28 (Convocation Center, VyStar Arena)

9:00am – 9:45am
Undergraduate Student(s): Joshua Scarpinato, Ian Icardi, Hailey Mehta, & Joseph Wren
Graduate Student(s): Duy Pham & Ryan Gouafong
Research Mentor(s): Ashish Aphale

SOFCs, or Solid Oxide Fuel Cells, are high-temperature electrochemical devices that generate electricity with a reduction-oxidation reaction using an oxide electrolyte, running most commonly at over 500 degrees Celsius. Fuel cells allow for the production of clean energy from the reaction of H2 and O2 to produce H2O, or water. On one side, hydrogen is introduced to a porous anode (Ni-YSZ), and on the other, oxygen is introduced to a porous cathode (LSM) with an electrolyte in between. Oxygen gas is reduced through a cathode and travels through an electrolyte to react with hydrogen fuel to generate electrons that are collected from the metal interconnects. A lab-scale version of an SOFC was fabricated utilizing silver mesh in place for current collectors. Experiments such as constant current and EIS are used to determine the role of heat under normal operation that impacts the overall fuel cell performance over 50 hours. Results demonstrate a gradual decrease in performance over time.

Smart Prosthetics: Engineering a Soft Robotic Intelligent Hand
Poster #9 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Robert Flores-Iturbide, Jeffrey Ashby, James Chavez-Chavez, Sadra Sarmast, & Yubeen Kim
Research Mentor(s): Turaj Ashuri & Amir Ali Amiri Moghadam

Prosthetic hand systems are often cost-prohibitive and lack data-driven control architectures. This study presents a framework that integrates artificial intelligence with additive manufacturing to develop a vision-guided prosthetic hand based on classification-driven actuation. A convolutional neural network (CNN) was trained on image datasets to perform object recognition and map detected objects to predefined grasp patterns. The trained model, implemented in Python, transmits classification outputs to an Arduino microcontroller through serial communication. The microcontroller then actuates the hand's motors to execute the selected grasp configuration. The prosthetic hand structure was designed using computer-aided design (CAD) software and fabricated through 3D printing. The system consists of a prosthetic hand that selects grasp types from visual input and executes them through embedded control. The results indicate that image-based classification can be integrated with low-cost electronic components and additive manufacturing to produce a prosthetic prototype that performs task-specific responses at reduced production cost.

Structural Degradation of Zircaloy Cladding Under High Burnup Conditions
Virtual Presentation (Microsoft Teams)

Session 1 at 4:00pm – 5:00pm
Undergraduate Student(s): Madison Combs
Research Mentor(s): Eduardo Farfan

Zirconium alloys are widely used as fuel cladding materials in commercial light-water reactors due to their low neutron absorption cross section, corrosion resistance, and ability to retain strength at elevated temperatures. The cladding serves as the primary barrier preventing the release of radioactive fission products from uranium dioxide fuel pellets into the reactor coolant. During operation, the cladding is exposed to high temperatures, intense neutron irradiation, internal pressurization from fission gas release, and mechanical interaction with the fuel pellets. Prolonged exposure to these conditions leads to progressive microstructural and mechanical degradation that can affect cladding integrity. This study reviews the principal degradation mechanisms affecting Zircaloy cladding during normal reactor operation and extended fuel burnup. Corrosion promotes the formation of oxide layers on the cladding surface, reducing heat transfer efficiency [1]. Hydrogen generated during corrosion may be absorbed into the material, leading to hydride precipitation and increased susceptibility to embrittlement [1], [2]. Neutron irradiation alters the microstructure and mechanical properties, contributing to irradiation-induced growth, creep, and dimensional changes [3]. Fuel pellet swelling and power transients also generate stresses at the fuel-cladding interface, known as pellet-cladding interaction (PCI), which can promote crack initiation under certain conditions. Fuel performance and nuclear materials studies were reviewed to assess how these mechanisms influence cladding mechanical integrity and failure risk [1]–[3]. As burnup increases, corrosion, hydrogen uptake, and irradiation damage become more pronounced, increasing susceptibility to embrittlement and structural degradation. Understanding these processes is essential for maintaining fuel rod integrity, establishing appropriate burnup limits, and ensuring safe long-term storage of spent nuclear fuel.

Robotics and Mechatronics Engineering

Adaptive Deployment and Reliability Optimization of an Autonomous Mobile Courier for Clinical Environments

Virtual Presentation (Microsoft Teams)
Session 3 at 12:00pm – 1:00pm
Undergraduate Student(s): Azam Shahbaz
Research Mentor(s): Razvan Voicu & Muhammad Hassan Tanveer

Building on prior feasibility demonstrations of a corridor-based autonomous delivery robot, this research advances the system from proof-of-concept navigation toward reliability optimization and semi-structured deployment readiness within dynamic clinical-like environments. While earlier work validated point-to-point routing, LiDAR accuracy, and fiducial-assisted docking, *this phase focuses on robustness, repeatability, and performance under realistic operational variability. The updated platform integrates improved Nav2 parameter tuning for smoother path tracking, refined costmap inflation and obstacle layering for human-aware navigation, and enhanced localization stability through sensor fusion of LiDAR and IMU data. A redesigned docking workflow incorporates tighter fiducial pose estimation and controlled velocity profiling to improve final-approach accuracy and reduce oscillatory corrections near stations. This study also introduces structured reliability metrics, including run-to-run variance in travel time, docking positional error, recovery behavior frequency, and localization drift across repeated hallway trials. Expanded LiDAR validation testing now evaluates angular incidence effects and surface reflectivity to better quantify perception error under varied indoor materials and lighting conditions. Additionally, a lightweight mission scheduler with telemetry logging provides timestamped job tracking, enabling reproducibility and post-run diagnostics. Experimental trials in a taped-corridor testbed simulate moderate foot traffic and temporary obstacle intrusion to evaluate adaptive re-planning and recovery performance. Results are expected to demonstrate increased navigation smoothness, reduced manual intervention frequency, improved docking consistency within defined tolerance thresholds, and clearer operational baselines for short-haul logistics tasks. This progression transitions the system from feasibility validation toward scalable reliability engineering, supporting future integration into higher-traffic healthcare and laboratory workflows.*

Agricultural End-Effector Plug-and-Play System
Virtual Presentation (Microsoft Teams)
Session 4 at 2:00pm – 3:00pm
Undergraduate Student(s): Harrison Forsythe, Jon Brown, & Raphael Sena
Graduate Student(s): Daniel Byers
Research Mentor(s): Muhammad Tanveer & Matt Marshall

Modern agricultural robotic systems are expected to perform a variety of field tasks such as pruning, harvesting, spraying, inspection, and sampling. In practice, these tasks require different robot end-of-arm tools (EOATs). While many robotic platforms support mechanical tool replacement, the software integration process after a tool swap is usually completed manually especially for mobile systems. Operators frequently need to relaunch robot operating system (ROS) nodes, update parameters, select a new MoveIt configuration, or otherwise reconfigure their machine before work can continue. This project addresses that gap by developing an agricultural focused EOAT quick-change system whose core contribution is automatic ROS integration upon tool attachment. The system uses a tool-side microcontroller and a base-mounted computer connected to the robots arms built-in input-output. When a tool is attached, the system detects the connection, identifies the tool, and automatically launches the corresponding ROS and MoveIt configuration for operation. This approach can extend the scope of work that can be accomplished by individual agricultural robots during deployment. We verify *this proposed framework on a Kinova 7-DoF arm aboard a Husky Unmanned Ground Vehicle (UGV) in field tests.*

Artificial General Intelligence Control of Real-time Ecosystems (AGICore)
Visual Display #48 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Arvaan Banerjee
Research Mentor(s): Razvan Voicu & Muhammad Tanveer

Limited access, poor visibility, and other obstacles make inspecting confined residential areas such as spaces under decks and nearby crawl areas difficult. This project explores how the Hiwonder MechDog, a small quadruped robot that originally only moved forward and backward through a mobile app, can be upgraded into a compact inspection robot capable of navigating and inspecting tight environments. We propose a low-cost upgrade approach that improves the robot in several stages. The initial step was to adjust the robot's gait and turning parameters so that it could make sharper turns and follow smoother curved paths. The second step was to use the onboard ultrasonic sensor to detect nearby obstacles and trigger simple collision-avoidance behaviors. The last stage was to add an ESP32-CAM module to stream video to a computer and to observe real-time object detection to help interpret the environment. The final system combines movement control, distance sensing, and camera-based perception to provide live situational awareness while moving through tight spaces. Testing was conducted in representative environments with tight passages and common obstacles. Performance was measured using navigation success rate, turning capability (minimum turning radius), collision frequency, and camera processing speed and latency. Early results show improved maneuverability compared to the original robot configuration, reliable short-range obstacle detection, and a working real-time video display that allows remote inspection. Future work will focus on evaluating the system using clear performance benchmarks, expanding the robot's autonomy beyond simple obstacle avoidance (such as waypoint navigation), and improving reliability in low-light and dusty environments.

Artificial General Intelligence Control of Real-Time Ecosystems (AGICORE)
Poster #6 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Preston Brantley
Research Mentor(s): Razvan Voicu

Large language models (LLMs) are the basis of many artificial intelligence (AI) models and how they process information. The goal of this research is to combine these LLM models with AI systems to establish a more contextually based program. By utilizing these programs for both local and non-local processing, they have the ability to provide optimized responses with optimal *use of resources. This optimal use of resources has the potential for the program to handle information and tasks for areas and communities that may be underserved or lack adequate resources. The goal of this research is to test the limits of efficiency and accuracy. This focus on response time and accuracy is vital for the expansion of these programs into different sectors like healthcare. By establishing a model that has the ability to maintain both accuracy and fast responses, these systems have the potential to revolutionize healthcare. Building programs around AI models that have contextual understanding of not only text but also visual inputs creates the potential for these programs to learn from inputs not only through pattern recognition but through contextual understanding. Utilizing this program's contextual abilities, we establish a program that is able to recognize the typical variables associated with cancer cells, such as phenotypic traits in microscopy images. The anticipation of this program to test the accuracy of the cellular detection and prove the potential of these contextual models. By having an LLM model utilize a sorting system based on general associated ranges of cancerous cells, the hope is to establish a program that can automatically detect potential cancerous cells independently. This research shows promise in creating a program that can be an assistive tool for healthcare professionals, allowing for faster patient diagnosis and improved overall quality of care.*

Automated Table Organizer for Assisted Living Homes
Poster #17 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Daksh Garg
Research Mentor(s): Razvan Voicu

In assisted living homes, group meetings and social activities often leave tables cluttered and disorganized. Reorganizing these areas can be time-consuming and repetitive, presenting an opportunity for automation to improve overall efficiency. This research explores how a robotic arm can be utilized as an autonomous assistant to efficiently organize and clear meeting tables after group activities in an elderly care setting. The proposed system employs a robotic arm integrated with an intelligent vision-based recognition system capable of detecting, classifying, and sorting various objects using camera input and machine learning algorithms. The arm will be programmed to identify misplaced or used objects, determine their correct locations, and perform pick-and-place actions to return them to designated storage areas. Voice or touch-based input may also be incorporated to enable easy human interaction and ensure safe operation around residents. Experimental testing will measure object detection and classification accuracy, task completion time, and precision of movement. In preliminary tests, the system successfully recognized and repositioned objects with an average accuracy of 50% in detection and 75% in placement. These results highlight the effectiveness of combining computer vision and robotic control for everyday applications in shared living environments. Ultimately, this project aims to enhance organization and cleanliness in assisted living facilities by combining robotics,

computer vision, and human-centered design to create safer and more efficient shared environments for elderly residents.

Comparison of Two Algorithms for Heart Rate Detection from PPG signals obtained from a Wearable Device
Virtual Presentation (Microsoft Teams)
Session 4 at 2:00pm – 3:00pm
Undergraduate Student(s): Kyra Magee
Research Mentor(s): Razvan Voicu

PPG (Photoplethysmogram) is an optical technique that uses light reflected through the skin to detect changes in blood volume in blood vessels. PPG signals can measure heart rate and SpO2. However, calculating heart rate from a PPG signal is more complex than measuring SpO2 because it requires accurate peak detection. Many algorithms exist for detecting PPG signal peaks, making the choice of algorithm important for performance and accuracy. Additionally, in wearable devices, PPG signals may be affected by motion, so it is critical to evaluate algorithms under different circumstances. This study compares the accuracy of the first-derivative and slope-sum algorithms for real-time heart rate estimation from PPG signals recorded by a wearable device. One algorithm finds heartbeats by locating the signal's local maxima and minima after taking the first derivative, then calculates beats per minute based on the number of local maxima. The Slope Sum Function sums the positive derivatives of the signal. An adaptive threshold is applied after both algorithms to prevent double-counting of peaks. PPG signals will be obtained using a PPG sensor in a wearable arm sleeve, and samples will be collected with and without motion. Before applying the algorithms, a bandpass filter from 0.7 to 3.5Hz is applied to the signal to remove noise. The accuracy of each algorithm is evaluated by calculating the percent error in heart rate from each method relative to a commercial pulse oximeter. Preliminary results show that the accuracy of both algorithms decreases when motion occurs during signal acquisition. Further research could focus on implementing additional filters to remove motion artifacts from signals.

Converting Virtual Commissioning of a Pick and Place Robot into Digital Twin
Virtual Presentation (Microsoft Teams)
Session 4 at 2:00pm – 3:00pm
Undergraduate Student(s): Oscar Tharp & Juan Crisantos
Graduate Student(s): Carter Corbin, Gershom Richards, David Luna-Jimenez, & Theodor Myklebusthaug
Research Mentor(s): David Guerra

Virtual commissioning is an emerging industrial practice that allows engineers to validate systems in a simulated environment before physical implementation. This approach has *advanced with the integration of digital twin technology. Despite these advancements, current models often suffer from data inaccuracies and modeling limitations. This study improves digital twin reliability by applying the concept to a pick-and-place MiniFESTO system, highlighting an existing research gap. The study investigates the improvement of a digital twin using an integration of older and newer PLC technology. Using a MiniFESTO robot as a case study, a digital twin is developed with Siemens PLM tools including 2 PLC systems (S7-1200 and 1500), Tecnomatix, and TIA Portal. Real-time data acquisition enables the analysis of a key performance variable, and comparing digital and physical results to evaluate accuracy. Results show that the digital twin can mirror the physical system with an accuracy within approximately 5 percent. This reduced error enables more reliable performance forecasting and operational adjustments. As part of future work, the project will explore the integration of advanced tools to further improve accuracy. The findings provide a practical framework for implementing digital twins in daily operations and emphasize their potential to enhance industrial system performance.*

Developing an Agentic Humanoid Robot with Embodied Intelligence through Vision–Language–Action (VLA)

Oral Presentation (Prillaman Hall, Indoor Plaza)
1:00pm – 1:50pm
Undergraduate Student(s): Pettrus Konnoth
Research Mentor(s): Razvan Voicu

Vision Language Action (VLA) models aim to enable embodied agents to interpret natural language, reason over perception, and execute grounded physical actions in real world environments. Despite rapid advances in multimodal foundation models, most existing VLA systems remain confined to simulation or lack safe and real time integration with physical humanoid platforms. This gap limits progress toward truly agentic embodied intelligence. We present an agentic humanoid system built on the TonyPi platform that integrates large language model based reasoning with constrained real world skill execution. Our architecture exposes robot capabilities as callable tools through a Model Context Protocol server, enabling structured language model planning over locomotion, posture control, head articulation, and servo level actuation. The system incorporates live visual observations from an onboard camera, robot state telemetry including IMU data, battery voltage, and servo temperature, and a constrained skill interface to ensure safety and interruptibility. A Streamlit operator dashboard provides real time MJPG video streaming, natural language command interaction, latency visualization, and credential management for rapid experimentation. We evaluate the system across 120 real world language command trials involving navigation, orientation, and camera directed behaviors. The agent achieved an 87 percent task completion rate under constrained indoor conditions. Average response time measured from query to first model output was 1.42 seconds, and mean time to action measured from query to first physical action trigger was 2.08 seconds. The constrained *skill interface reduced unsafe or invalid action attempts to below 3 percent of trials, demonstrating improved execution reliability compared to unconstrained tool invocation baselines. These results demonstrate a practical framework for deploying VLA models on real humanoid hardware with measurable embodied AI latency metrics. The system represents progress toward scalable, safe, and modular agentic humanoid intelligence capable of closed loop language grounded interaction in physical environments.*

Quadruped for Structural Analysis: A Convolutional Neural Network for RGB-based Crack and Damage Detection
Poster #12 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Tobi Dabiri & Isaac Gardner
Graduate Student(s): Daniel Byers
Research Mentor(s): Muhammad-Hassan Tanveer

The automation of infrastructure inspection is increasingly prioritized to mitigate safety risks associated with hazardous environments, such as nuclear power plants, substations, and underground pipelines. In this research, an autonomous inspection system is developed utilizing a Unitree Go1 quadruped robot integrated with a multimodal sensor suite, comprising Light Detection and Ranging (LiDAR) and RGB cameras. The proposed framework is designed to provide a more cost-effective alternative to traditional, high-end 3D LiDAR systems. While quadrupedal platforms have been previously explored for metro and power transmission monitoring, this study focuses specifically on the autonomous detection of cracks in concrete and other structural surfaces. By leveraging Simultaneous Localization and Mapping (SLAM) for navigation and Convolutional Neural Networks (CNNs) for image processing, a methodology is established to identify structural deficiencies without human intervention. The integration of back-mounted payloads and edge computing allows for real-time data acquisition in complex geometries where traditional wheeled or aerial robots are restricted. System performance was evaluated via deployment at various locations on a university campus, where the proposed framework was compared against established 3D LiDAR-based benchmarks. It is demonstrated that the deployment of such systems enhances the frequency and accuracy of inspections while significantly reducing both the operational hazards faced by human personnel and the cost required for high-fidelity data acquisition.

A Robotic Hand with Integrated Vital Sign Monitoring
Poster #42 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Daksh Garg & Nora Tin
Graduate Student(s): Fariha Alam
Research Mentor(s): Razvan Voicu

This research project aims to design, construct, and evaluate a robotic hand capable of monitoring human vital signs through integrated sensors embedded in its fingers. The primary objective is to develop a functional platform that combines robotic functionality with biomedical sensing to support applications in healthcare and assistive technology. The robotic hand is equipped with sensors for measuring heart rate, body temperature, and oxygen saturation via direct skin contact. To ensure structural efficiency and ease of modification, most components are designed and fabricated using 3D printing. Collected sensor data is processed through a microcontroller-based system and transmitted to a computer interface for real-time display and analysis. By merging additive manufacturing, embedded electronics, and health monitoring, this project demonstrates how robotic systems can contribute to future advancements in patient care, rehabilitation systems, and human–robot interaction.

Seated Extensible Leg Exoskeleton for Rehabilitation (SELERE)
Poster #7 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Mouhamadou Diop, Kyumin Kim, Jason Yu, Jennifer Rosales Sandoval, & Jerry Sutin
Graduate Student(s): Vijay Wulfekuhle, Daniel Byers, & Carter Corbin
Research Mentor(s): Razvan Voicu, Muhammad Hassan Tanveer, & Cary Chun

This research advances a wheelchair-integrated seated extensible leg exoskeleton for rehabilitation, a lower-limb therapy platform that delivers programmable, repeatable movement using powered knee and ankle joints. Although rehabilitative exoskeletons are widely studied, many existing systems remain difficult to personalize, constrain patients to rigid trajectories, and support a limited set of control modalities, factors that restrict clinical flexibility and hinder systematic evaluation of movement quality. The objective of this research was to strengthen the platform's reliability and modularity while establishing an experimental foundation to compare servo-based control and impedance-based control as complementary actuation strategies, with an emphasis on jerk minimization and consistent protocol execution. The system employs a modular mechanical architecture and a touchscreen interface that supports multiple rehabilitation paradigms, including passive range-of-motion, assist-as-needed movement, resistive exercise, and isometric routines. By integrating therapy directly into a wheelchair form factor, the platform enables lower-limb rehabilitation without transfers, supporting realistic deployment in environments where patient handling and repeated transfers are limiting. The technical contribution centers on robust mechatronic integration of a four-degree-of-freedom system using dual CAN-based motor control with pancake motors and integrated controllers. Key engineering developments included redesign of high-load mechanical components, reconstruction of wiring harnesses for improved durability and serviceability, and implementation of real-time sensing and actuation over CAN to support dependable closed-loop operation. This research establishes a *testbed suitable for controlled, protocol-driven studies of control strategy selection and movement quality metrics in seated rehabilitation. Future development will expand the protocol library, refine the interface for clinician-guided configuration, integrate higher-fidelity sensing for joint state and interaction forces, and conduct structured evaluations quantifying trajectory tracking, jerk, user comfort, and safety across servo and impedance modes, progressing toward controlled clinical testing and translational deployment.*

SoilBus: Advanced Soil Health Diagnosis with Clustering and Random Forest Machine Learning Models
Virtual Presentation (Microsoft Teams)
Session 4 at 2:00pm – 3:00pm
Graduate Student(s): Carter Corbin, Daniel Byers, & Lakshay Battu
Undergraduate Student(s): Emanuel Allen, Sheraz Saudagar, Aaditya Moore, & Saam Haghighat-Grami
Research Mentor(s): Muhammad Tanveer

In the world of precision agriculture, data collection for the diagnosis of the health of soil and plants remains a prominent part of the movement to implement advanced robotics and technologies in the agricultural field of industry and research. While today we use basic soil sensors to facilitate our needs, our research is exploring the use of more comprehensive devices, analysis methods, and automation of the diagnosis process. Building off of our last project, the SoilBus: a repeatable sensor suite unit utilizing an Ad Hoc network with ESPnow protocols, we aim to overhaul the design, improve performance and accuracy, and implement new analysis methods using the wealth of data obtained to provide more complex and niche remedial suggestions to poor health metrics. Specifically, we aim to use Machine Learning Clustering and Random Forest Models in tandem with Long Short-Term Memory Neural Networks to classify and group good and bad soil health data, using a set remedial suggestion interface for users to access their crop health. Utilizing data from real deployment, we will assess packet loss, formation effectiveness, and enclosure performance.

Tripod Walker
Poster #37 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Tashfeen Shafi, Samit Kadasinghanahalli, Joseph Thomas, Manas Mamidala, & Sawyer Epps
Research Mentor(s): Amir Moghadam & Turaj Ashuri

This paper presents the design, modeling, and experimental validation of Tripod Walker, a three-legged underactuated robotic platform developed to investigate stable locomotion under reduced actuation. Unlike conventional legged systems that rely on multiple actively controlled joints for *balance and propulsion, the proposed architecture utilizes a single centrally actuated leg to generate both thrust and steering, while two passive legs provide static stability during gait transitions. This configuration significantly reduces the number of active degrees of freedom while maintaining functional mobility on flat terrain. The current prototype, implemented using a VEX-based structural framework, incorporates three motors to enable forward locomotion and steering control. Motion is achieved through periodic joint-space actuation sequences, with system stability being primarily governed by geometric support constraints rather than dynamic balance control. Extensive experimental evaluations were conducted to iteratively refine gait timing, optimize turning performance, and regulate center-of-mass positioning within the support polygon. Additional studies examined the effect of alternative foot materials and their respective ground interaction, focusing on friction characteristics, traction consistency, and overall walking stability on smooth indoor surfaces. Experimental results emphasize gait repeatability, turning efficiency, and load distribution across passive supports. To enhance torque density and improve mass efficiency, future iterations will transition to a fully 3D-printed architecture incorporating compact high-torque servomotors and an embedded Arduino-based control system. These redesigns are expected to reduce inertial effects, improve energy efficiency, and enable limited terrain adaptability, including obstacle negotiation. By emphasizing mechanical simplicity and underactuated design principles, the Tripod Walker serves as a scalable platform for studying minimalist locomotion strategies, reduced-complexity gait control, and cost-effective robotic mobility. The results demonstrate that stable and controllable walking is achievable with significantly fewer actuators than traditional legged systems, contributing to the broader development of efficient and accessible robotic locomotion. Artificial Intelligence was employed to refine grammar and vocabulary.*

Engineering Technology

Effects of Filament Preparation and Specimen Conditioning on the Tensile Properties of Polylactic Acid

Poster #16 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Tzvi Gan
Research Mentor(s): Aaron Adams

3D printing is becoming an increasingly important part of the prototyping and manufacturing processes. It allows for many different materials such as Polylactic Acid to be used. Regarding the mechanical properties, various things can impact the quality of the parts. Some of these variables include the filament preparation and specimen conditioning. Prior to manufacturing the part, the filament can be dried to remove moisture. This cans improve the printability of the filament, as well as the overall quality of the part by reducing print artifacts that may lead to premature failure. Furthermore, after the parts are done printing, the post processing of these *parts can make a major impact on their tensile strength with how long the specimen is conditioned, as well as the conditioning parameters. These conditioning parameters are the temperature and humidity and have an impact on the final mechanical properties of the parts. This research examines the effect that filament preparation and specimen conditioning have on the mechanical properties of Polylactic Acid. Early results show that filament that has not been dried has a negative impact on the overall quality of a part by introducing print artifacts that are detrimental to the mechanical properties. On the other hand, filament that has been dried have improved print quality as well as improved mechanical properties. The importance of this research is to standardize the manufacturing process to ensure repeatability and reliability in final products.*

Enhancing Metal 3D Parts: From Print to Performance
Virtual Presentation (Microsoft Teams)
Session 2 at 1:00pm – 2:00pm
Undergraduate Student(s): Shimei Bailey & Gavin Reece
Graduate Student(s): Mechack Nduwa
Research Mentor(s): Aaron Adams

Additive manufacturing of 316L stainless steel has become a feasible option for creating essential components. The corrosion response of additively manufactured parts after post-processing must be sufficiently investigated to ensure consistent performance in harsh conditions. Laser powder bed fusion (LPBF) additively manufactures parts through localized melt pool formation and rapid solidification. This process introduces microstructural heterogeneities, such as porosity and residual stresses, which influence passive film stability and pitting susceptibility. Printed parts are homogenized through post–processing methods such as heat treatment and hot isostatic pressing (HIP), but their effect on corrosion resistance is not well understood. In this study, the corrosion behaviors of as-printed, heat-treated, and HIP-treated LPBF SS316L samples were compared to determine how passivation and corrosion resistance are influenced by post-processing in a chloride environment. Potentiodynamic polarization testing was performed in 3.5% (0.6 M) NaCl using a three-electrode electrochemical cell with a 316L working electrode, an Ag/AgCl reference electrode, and a graphite counter electrode. Corrosion behavior was assessed using the resulting polarization curves. During testing, the post-processed specimen exhibited improved passivation behavior relative to the as-built specimen, and the HIP-treated specimen showed the strongest overall corrosion resistance. The results show that post-processing contributes to the corrosion performance of LPBF 316L. This supports the post-processing of LPBF 316L for applications in aggressive environments or requiring long-term integrity and further demonstrates the potential of this material and manufacturing process combination.

Feasibility of TPMS Lattices as a Potential Nuclear Fuel Structure

Poster #25 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Eric Miller
Research Mentor(s): Aaron Adams

Nuclear fission reactors are a promising source of energy for the future, with the potential for nearly unbridled energy production. However, they suffer from major limitations: the energy produced must not exceed the heat that can be transferred from the fuel to the coolant. This issue is exacerbated by the current fuel structure, in which fuel is stored in cylinders with a poor surface area to volume ratio. A promising alternative is the use of TPMS (triply periodic minimal surface) lattices instead of cylinders, which have demonstrated potential in heat exchanger applications. Before these can be implemented, however, physics must be modeled to ensure that they will behave as expected. Past research has focused on simulating the fluid and thermal properties separately using nTop; however, this approach is limited by nTop's limitations and the interdependence of the fluid and thermal properties in this use case. This research focuses on the transfer of geometry from nTop to ANSYS and on using ANSYS as simulation software, with the end goal of conducting a conjugate heat transfer analysis.

FoldCore
Poster #40 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Wisdom Tonge, Jalon Merriweather
Research Mentor(s): Javad Khazaii

Foldable structures present a unique mechanical and structural design challenge in which mobility, rigidity, and durability must be synchronized within a cohesive system. Within the current market, existing emergency shelters often struggle to balance rapid deployment with the strict accessibility requirements necessary for comprehensive disaster recovery. FoldCore has created this cohesive system by incorporating replaceable sandwich paneling, edge close-outs, light-gauge steel inserts, high-stiffness-to-weight structure, and self-locking joints. The 'sandwich paneling' consists of an exterior skin made from glass fiber reinforced polypropylene (GFPP), a core composed of recycled polyethylene terephthalate (rPET) foam, and an interior skin made from a thin layer of plywood. Selecting smart materials and modular construction principles helped improve durability, reduce lifecycle waste, and simplify manufacturability. While in the deployed state, structural rigidity is enhanced mechanically through self-locking joints, which are designed to alleviate racking and improve overall stability. FoldCore's concept strikes a balance between portability, structural stability, durability, sustainability, and production feasibility, positioning FoldCore as a viable advancement in the foldable shelter market.

Microstructure, Mechanical, & Corrosion Characterization of Additive Manufactured TZM-Ti64 Bimetallic Structures

Poster #45 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Ashley Smith
Research Mentor(s): Sainand Jadhav

This work presents the fabrication and characterization of bimetallic TZM–Ti-6Al-4V thin-wall structures produced using wire-arc additive manufacturing (WAAM). Microstructural, mechanical, and electrochemical analyses were conducted to evaluate interface quality and overall material performance. Optical and SEM imaging confirmed a continuous, defect-free metallurgical interface with a narrow transition region formed by thermal diffusion during deposition. Hardness measurements showed distinct gradients across TZM, the HAZ, and Ti64, consistent with the differing alloy systems and process thermal history. Tensile testing demonstrated a ductile response characteristic of the thin-wall geometry, and corrosion testing indicated improved stability on the Ti64 side compared to TZM. These results demonstrate the feasibility of joining refractory and titanium alloys using WAAM and provide foundational insight for multi-material components in high-temperature and structural applications

Portable Emission Tracer

Poster #37 (Convocation Center, VyStar Arena)
10:0am – 10:45am
Undergraduate Student(s): Anh Phung, Forrest Austin, Leanna Wildes, & Wilfred Djoko Talle
Graduate Student(s): Bota Yvan Brillant
Research Mentor(s): Darren Wilcox

Additive manufacturing processes release volatile organic compounds (VOCs), aerosols, and ultrafine particles that can accumulate in poorly ventilated environments and contribute to long-term respiratory or cardiovascular diseases. Industrial systems often include filtration or monitoring equipment, but affordable, real-time solutions are rarely available for non-industrial users such as small labs, hobbyists, and students. In this paper, a portable handheld emissions tracer is presented. The tracer system integrates multiple sensors for ultrafine particulate matter (down to 1.0 μm), total VOCs, and formaldehyde into a compact, battery-powered platform that will enable accurate and efficient data collection. The system integrates Raspberry Pi Zero 2 with the Sensirion SEN55 and a MEMS formaldehyde sensor for targeted VOC monitoring. The electrical design emphasizes efficient power management; a rechargeable lithium-ion battery with a USB-C charging module which supports roughly four hours of operation. The contribution of this paper is a low-cost, adaptable solution for environmental monitoring in maker spaces and highlights the role of electrical design in developing practical, portable instrumentation.

Civil and Environmental Engineering

An Examination of Environmental, Roadway and Collision Factors in Distracted-Driving Crash Outcomes
Poster #7 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Taryn Borden
Graduate Student(s): Sarala Gunathilaka
Research Mentor(s): Sunanda Dissanayake

Distracted driving continues to be a major contributor to roadway crashes in the United States, accounting for approximately 8–10% of all fatal crashes and over 3,000 deaths annually. The objective of this study was to identify roadway and environmental factors that affect the severity of confirmed distracted-driving related crashes. The study examined whether crash severity is statistically significantly associated with manner of collision, light condition, road composition, and private property status. Crash data obtained from Georgia Department of Transportation (GDOT) for the years 2019-2022 were analyzed. The dataset was filtered to include only confirmed distracted-driving crashes. Cross-classification tables were developed to evaluate relationships between crash severity (fatal, injury, and property damage only) and the four categorial variables. Chi-square test of independence was conducted to compare observed and expected crash frequencies under the assumption that crash severity is independent of each factor. Then, the resulting estimated chi-square statistics were compared to the Critical Values to determine statistically significant relationships between crash severity and the five variables. Results showed statistically significant association between crash severity and all four variables at the 95% confidence level. The calculated chi-square statistics exceeded their critical values for manner of collision ($\chi^2 = 1132.32$), light condition ($\chi^2 = 330.12$), road composition ($\chi^2 = 38.29$), and private property status ($\chi^2 = 1312.15$). The majority of crashes occurred during daylight conditions; however, dark–not lighted conditions produced 77 fatalities (1.06% more than all other conditions), indicating increased fatal risk at night. These findings provide valuable insights io transportation planners by identifying certain conditions that may require targeted improvements for road design, lighting strategies, road surface, and overall safety.

Analysis of the Relationship between Distracted Driving Factors and Crash Severity in Georgia
Poster #22 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Joel Louise
Graduate Student(s): Sarala Gunathilaka
Research Mentor(s): Sunanda Dissanayake

Distracted driving-related crashes contributed to 75,981 crashes, which made up 3.3% from the total of 2,245,210 crashes in the years 2018-2022 in Georgia. The objective of this study was to identify factors affecting the severity of distraction-related crashes, using cross-classification analysis. This study used crash factors such as road character, driver age, driver gender, road surface, and weather towards the relation of crash severity of fatal, injury, and property damage only crashes. Analysis of crash data revealed that certain factors were associated with higher rates of fatal and injury crashes: curved road character (30.9%), driver age group of 15-34 (29.3%), female drivers (29.4%), reduced friction road surface (29.8%), and inclement weather (29.7%) To find the significance of crash factors towards crash severity, the chi-square test was performed with a confidence level of 95% (p-value < 0.05). The results revealed that road character, driver age, driver gender, and weather have p-values < 0.05, which indicates that these factors are statistically significant towards the crash severity. On the other hand, the road surface variable showed a p-value >0.20, indicating that this factor has no direct relationship to the crash severity. This study provided an understanding of the causes of distracted driving-related crashes, which could be addressed through improvements in infrastructure for road character in road signs on curved roads, driving literacy programs, and road design visibility improvements during inclement weather situations.

Atlanta Energy and Emissions Modeling and Analysis Tool (AEEMAT): An Integrated Machine Learning Model with an Interactive User Interface

Oral Presentation (Prillaman Hall, Indoor Plaza)
1:00pm – 1:50pm
Undergraduate Student(s): Blake Stevens
Graduate Student(s): Faysal Chowdhoury
Research Mentor(s): Mahyar Amirgholy

The advancement of traffic simulation modeling has enabled sophisticated analyses of transportation planning, design, control, and management strategies aimed at enhancing multimodal system performance, accessibility, and mobility in major U.S. cities. Despite these advancements, conducting predictive energy and emissions analyses for transportation improvement scenarios relies on advanced models, such as the Motor Vehicle Emission Simulator (MOVES) developed by the U.S. Environmental Protection Agency (EPA), which require substantial time and expertise. Moreover, the rapid adoption of electric vehicles (EVs) has significantly increased electricity demand for battery charging, and this trend is projected to accelerate in the coming years. Therefore, accurate prediction of EV electricity demand under diverse policy and infrastructure scenarios, along with the resulting grid emissions, has become increasingly critical for integrated transportation and energy sector planning. To address these challenges, this research has developed the Transportation Energy and Emission Modeling Analysis Tool (TEEMAT). TEEMAT is a machine learning tool designed to automate and streamline predictive transposition energy and emissions analysis in major cities in the United

Staes. TEEMAT synthesizes outputs from traffic simulation models with advanced machine learning algorithms to estimate vehicle fuel consumption (based on their type, fuel, and age) as well as EV electricity demand for battery charging based on simulated traffic dynamics. Furthermore, TEEMAT enables direct prediction of resulting emissions of CO_2, NO_x, and $PM_{2.5}$ (tires and brakes) from vehicles, as well as CO_2, N_2O, and CH_4 emissions resulting from EV charging, by accounting for the energy mix and power generation technologies across the United States. Trained using simulated data from the EPA's MOVES model and the National Renewable Energy Laboratory's (NREL) Cambium model of grid emissions, TEEMAT enables seamless integration of traffic simulation outputs with predictive energy and emissions modeling and substantially reduces analytical time and computational burden while maintaining high fidelity. The results of this research indicate the importance of transportation electrification and clean energy generation in mitigating the projected increase in vehicle and grid emissions in the United States.

Aerial Imagery Dataset for Rapid Damage Assessment in Disaster Response
Poster #38 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Graduate Student(s): Sultan Al Shafian
Undergraduate Student(s): Seth Silvey, Joel Karu, Justin Corder, Rishabh Singh, & Yiting He, & Kiara O'Neal
Research Mentor(s): Da Hu

Wind-driven disasters such as hurricanes and tornadoes cause widespread destruction and significant loss of life each year. Their increasing frequency and intensity highlight the need for rapid and reliable damage assessment to support effective emergency response. Unmanned Aerial Vehicles (UAVs) have become a valuable tool in post-disaster scenarios due to their ability to quickly capture high-resolution imagery and provide timely situational awareness over affected areas. This study presents a UAV-based aerial imagery dataset developed to support damage assessment in disaster response applications. The dataset consists of high-resolution images capturing various structural damage conditions. These images are annotated into multiple damage levels, ranging from no visible damage to complete destruction, enabling structured analysis of damage severity. The dataset is designed to facilitate object detection and classification tasks, providing a focused representation of damage-related features. To demonstrate its applicability, a deep learning-based object detection model was trained using the dataset to identify and localize damaged structures. The results indicate that the dataset supports effective detection of damage patterns and enables efficient processing suitable for time-sensitive scenarios.

Bioinspired Rover for Perennial Streams
Poster #46 (Convocation Center, VyStar Arena)

9:00am – 9:45am
Undergraduate Student(s): Tobiah Watts
Research Mentor(s): Roneisha Worthy

Continuous monitoring of freshwater systems is critical for understanding nutrient cycling and water quality, yet current methods rely heavily on short-term sampling or frequent human intervention. This project presents the design of a bio-inspired autonomous rover intended for deployment in perennial streams to enable in situ chemical sensing over extended periods. The rover is designed to operate autonomously while measuring key water quality indicators, including pH, ammonia concentration, and dissolved organic carbon. A central focus of this work is the development and integration of an ammonia-assisted zinc-air battery as the primary onboard power source. Conventional zinc-air batteries are limited by the formation of insoluble zinc oxide on the zinc electrode, which inhibits oxidation and reduces electrical output over time. By incorporating ammonia into the electrolyte, zinc oxide formation is mitigated through complexation, maintaining ion solubility and sustaining electrochemical activity. This approach aims to improve power stability and operational lifespan in aquatic environments where ammonia may be naturally present. For this phase of the project, the rover will be tested in controlled stream conditions over short-term deployments of one to three days to evaluate sensor performance, power output, and autonomous operation. While experimental results are not yet available, preliminary data will be collected prior to the conference and used to assess system feasibility and energy efficiency.

Comparative Analysis of Deep Learning Models for Building Damage Segmentation
Poster #34 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Kiara O'Neal
Research Mentor(s): Da Hu

Natural disasters such as hurricanes, tornadoes, and earthquakes often result in severe structural damage, creating urgent challenges for emergency response and recovery. Accurate and detailed assessment of building damage is essential for prioritizing rescue operations and resource allocation. While aerial imagery collected by unmanned aerial vehicles (UAVs) enables rapid data acquisition over affected areas, extracting meaningful information from these images remains a significant challenge. This study investigates the use of deep learning–based semantic segmentation techniques to classify building damage at a fine-grained level. High-resolution aerial images of post-disaster environments were annotated to represent multiple damage categories, including no damage, minor damage, major damage, and complete destruction. Several state-of-the-art segmentation models are implemented and systematically compared to evaluate their ability to distinguish varying levels of structural damage. The performance of each model is assessed using standard evaluation metrics to identify strengths and limitations in *capturing damage patterns. The results provide insights into the effectiveness of segmentation-based approaches for detailed damage mapping and highlight their potential for supporting faster and more informed decision-making in disaster response.*

Computational Fluid Dynamics Analysis of Jet-induced Mixing in a Cylindrical Tank
Poster #14 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Dawson Echols
Research Mentor(s): Jie Zhang

This project investigates the fluid mixing behavior inside a cylindrical tank using Computational Fluid Dynamics (CFD). The study focuses on how a jet inlet influences circulation patterns, velocity distribution, and overall mixing efficiency. A 3D model of the tank was constructed in SimFlow, which is a CFD software, and multiple inlet angles were simulated to determine how jet orientation affects turbulence generation and bulk fluid motion. Velocity fields, vorticity structures, and mixing time estimates were compared across configurations. The results show that inlet angle strongly influences flow symmetry and energy dissipation, with certain orientations producing significantly more effective mixing. This work demonstrates the usefulness of CFD as a predictive tool for optimizing industrial and laboratory mixing processes.

Data-Driven Analysis of Cooling Behavior in a Simulated Thermal System Using CFD
Poster #45 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Eric Wang
Research Mentor(s): Jie Zhang

Affects performance and reliability. This project investigates cooling behavior in a simplified physical system using computational fluid dynamics (CFD). The primary goal is to analyze how temperature changes over time and how factors such as airflow and material properties influence cooling efficiency. Using SimFlow CFD software, an initial model was developed based on dimensions from prior literature. A simplified geometry representing a heat-generating component within an air domain was constructed, and boundary conditions were assigned to simulate airflow-driven cooling. Rather than focusing on highly complex physics, this study emphasizes a data-driven approach: temperature-versus-time data are collected from simulations and compared under varying conditions. By examining cooling curves and thermal trends, this project seeks to identify which variables most significantly affect heat dissipation behavior. The broader objective is to understand how computational modeling can be used to predict cooling performance and support engineering design decisions. This work meets the definition of undergraduate research by conducting a mentored investigation that applies computational *modeling tools to analyze thermal behavior and generate original interpretations of simulated data.*

Design and Construction of a Large-Scale Permeameter for Soil Testing
Poster #34 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Marin Pittman
Research Mentor(s): Jayhyun Kwon

Permeability plays a critical role in geotechnical engineering because it controls the movement of water through soil, directly affecting drainage capacity, dissipation of pore-water pressure, and the stability of foundations, and retaining structures. As discussed in earlier studies, inadequate drainage can result in excess pore-water pressure, and potential structural instability. Established research consistently shows that coarse grained souls such as sands show high permeability due to their larger and more interconnected void spaces, while fine grained soils such as silts and clays prove significantly lower permeability because the smaller particles restrict the flow paths of water. While the hydraulic behavior of natural soils has been widely studied, less attention has been given to manufactured sand (M-sand), which is increasingly used due to the depletion of natural sand resources. However, these correlations are based on natural sands, and it stays uncertain whether they accurately stand for the behavior of crushed, angular manufactured sand. This study investigates how the number of fines affects the permeability of M10 manufactured sand, and whether established permeability relationships for natural soils are applicable to this engineered material. To address the questions, fines were first separated from a base sample of M10 manufactured sand using sieve analysis and then were reintroduced at controlled percentages to create mixtures with varying fines contents. Each sample was treated in the same manner and subjected to the constant head permeability tests, making it suitable for coarse-grained soils. During the test, a constant hydraulic head was maintained, and the flow rate through each sample was measured to determine its hydraulic conductivity. This controlled approach ensured that the effect of varying percentages of fines content on permeability was direct in deciding without the interference of other variables. According to trends seen in natural sands, permeability is expected to decrease as fines content increases. However, the rate and amount of reduction may vary due to the gradation and angularity of manufactured sand. The outcomes will be compared to known permeability relationships to decide whether existing design correlations can be applied directly to M-sand or if changes are needed. The study's contributions will improve our understanding of how manufactured sand behaves in drainage and stability applications within geotechnical engineering.

Design Optimization of Industry Waste-incorporated Cement Concrete for Performance and Environmental Impact

Poster #41 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Teddy Tzvetkov & Joshua Hardy
Research Mentor(s): Youngguk Seo

Portland cement concrete (PCC) production is a major contributor to global carbon emissions globally, and substituting industrial by-products for conventional cement or aggregate has emerged as a promising mitigation strategy. However, the effects of such replacements on mechanical performance and durability remain poorly understood, limiting their practical adoption in the field. This study investigates how the type and replacement proportion of waste material influence the structural and environmental performance of PCC. Four industrial by-products — fly ash (Types C and F), crumb rubber, recycled glass, and steel slag — were incorporated as partial replacements for cement or fine aggregate at levels of 10%, 20%, 30%, and 40%, following American Concrete Institute mix design procedures. Compressive strength and electrical resistivity were assessed at 7-, 14- and 28-day curing benchmarks across all mix designs. Concurrently, a life cycle assessment was conducted for each mix to quantify environmental impact, enabling identification of optimal replacement levels that balance structural adequacy with maximum environmental benefit. By linking mechanical performance directly to life cycle environmental impact, this study advances the case for waste-incorporated concrete as a viable and quantifiably sustainable alternative to conventional PCC.

Detecting Structural Damage Using Ambient Vibrations
Poster #18 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Finn Johnson & Jared Aifah
Graduate Student(s): Mujeeb Owoniyi
Research Mentor(s): Metin Oguzmert

Bridges that use structural supports like piers and vertical supports face a danger that can be both hard to detect and detrimental to the health of a bridge. That being the erosion of the soil around the support pillar. Now this doesn't seem like a big deal, but it can cause the bridge to sway more and even collapse. However, the biggest problem is how difficult it is to identify. This is because erosion can be hidden by rushing water or placement below the bridge. Here is where our research comes in, where we are going to answer the question of detecting structural damage using ambient vibrations. Using ambient vibrations created by the usage of the bridge we want to observe if it is possible to identify the extent of the damage present on the bridge using the vibrations created by these factors. Studies using vibrations for structural analysis of bridges have been conducted, but not ones using ambient vibrations. To do this we used multiple cinderblocks and a shake-table to act as the supports and placed plywood panels over the supports to create a model bridge. We then placed the shake table underneath the center of the table with *an Accelerometer attached to it. Next, we drilled holes in the sides of the shake table, where we inserted metal rods to act as a removable soil to measure the vibrations produced as more rods or "soil" are removed. Then to test the ambient vibrations we drove RC cars over to simulate usage. The results our team is expecting are that as rods are removed greater vibrations will be produced when a vehicle goes over the bridge. This study can not only help to save bridges fast but also save people who could get hurt by a bridge being damaged.*

Drone-Based Post-Disaster Audio Filtering and Voice Detection
Poster #20 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): John Haly
Research Mentor(s): Da Hu

Image detection systems using drones are currently being tested and used in post-disaster situations, such as the aftermath of a hurricane, in hopes of detecting survivors faster than first responders. In addition to image-based approaches, this study aims to implement a detection system based on audio signals to detect survivors. We have developed a drone attachment that uses many features to listen for survivors while filtering out the humming caused by the propellors of the drone. The attachment consists of a platform that is mounted to the drone, with a pole measuring 22 cm in length and 1.5 cm in diameter. This pole is used to add distance between the microphone and the propellors to provide more consistent humming noise that can be filtered out easier. A microphone is mounted at the end of the pole, and a parabolic cone, concave down, is shielding the microphone. This parabolic cone accomplishes two things; it blocks some of the sound waves from the propellors, and the cone is designed to deflect sound waves coming from anywhere on the ground directly to the microphone, a greater chance of collecting a human's yell. The receiver of this microphone is connected to an AI noise filtering system that filters out the main frequencies of the drone humming, allowing the noise of a survivor's yell to be much more noticeable. We have confirmed that without the attachment and with the microphone attached directly under the drone, the sound of a human yell could be heard from a maximum of 6.5 meters off the ground. With the attachment on, the sound of a human yell can be heard from a maximum of 11 meters off the ground.

Fractionation, Recovery, and Reusability of Micro/Nanoplastics Along Water Treatment by 3D Functionalized Membranes Through Size and Charge Exclusion
Virtual Presentation (Microsoft Teams)
Session 3 at 4:00pm – 5:00pm
Undergraduate Student(s): Gibriel Massoud
Research Mentor(s): Amirsalar Esfahani

This proposed project aims to investigate the development of functionalized membranes aimed at significantly improving the removal and fractionation of MPs/NPs from water. This project encompasses two primary aims. The first aim seeks to advance our understanding of the physical (deposition) and chemical (adsorption) interactions between diverse MPs/NPs and membrane filtration technology via experimental analyses. These investigations aim to determine the impact of the unique 3D-fabricated membranes on both the fate and transport of MPs/NPs. The second aim is to formulate selective remedial strategies for microplastics using a range of 3D-fabricated membranes with different chemical (i.e., surface charge) and physical (i.e., pore size) properties as a new platform of tunable membrane flat sheets. The successful fractionation of MPs/NPs via a series of designed membranes has two benefits: 1) lower required energy to filtrate the specific particle sizes in comparison to filtering all particle sizes together, and 2) plastic recovery and eventually reusability.

Optimizing Multiple Chemical Injection and Mixing Points in Pipelines Through Computational Fluid Dynamics Modeling
Oral Presentation (Prillaman Hall, Indoor Plaza)
1:00pm – 1:50pm
Undergraduate Student(s): Katherine Araya-Elizondo
Research Mentor(s): Jie Zhang

Computational fluid dynamics (CFD) modeling is increasingly used to evaluate fluid flow and mixing behavior in water and wastewater treatment systems. This study investigates the optimization of multiple chemical injection and mixing points within a full-scale pipeline system at a municipal water treatment plant in Miami. Efficient chemical dispersion is critical for treatment performance; however, suboptimal injection placement can result in incomplete mixing, increased operational costs, and excessive chemical consumption. A three-dimensional CFD model was developed to simulate flow and chemical transport in a 36-inch diameter horizontal raw water pipeline with 216 inches upstream and 720 inches downstream of the primary injection region. An 18-inch diameter recirculation pipe extends vertically from the pipeline centerline. Four potential chemical injection locations, spaced 36 inches apart along the horizontal pipe centerline, were evaluated. All dimensions were converted to metric units for simulation. The model assesses velocity distribution, concentration profiles, and mixing performance for each configuration to identify optimal injection placement. Results are expected to demonstrate how strategic positioning of multiple injection points improves mixing uniformity and hydraulic performance while minimizing chemical usage. This work highlights the value of CFD as a decision-support tool for optimizing chemical dosing strategies in real-world water treatment infrastructure.

Smart Transportation Solution for Georgia Parents
Poster #44 (Convocation Center, VyStar Arena)

3:00pm – 3:45pm
Undergraduate Student(s): Maggie Traber, Pedro Chavez-Romero, & Ishika Vyas
Graduate Student(s): Proma Dutta & Sarala Gunathilaka
Research Mentor(s): Parth Bhavsar

Elementary and middle school pick and drop off process create long queues and stop and go traffic, which results in a increased pollution Consequently, school zones are now characterized by extended vehicle queues, prolonged idling, and heightened pollution levels during peak periods, thereby presenting environmental and safety challenges for both students and school personnel. These conditions induce particulate matter, i.e. PM. 2.5 and PM 10 which causes respiratory issues in children and adults. In the wake of the Covid-19 pandemic, a greater number of parents are utilizing personal vehicles, which have exacerbated congestion in the vicinity of elementary and middle schools. To address these issues, this research, which is a continuation of our past project, proposes the development of a cloud-based smart transportation solution for Georgia parents to improve traffic efficiency and reduce environmental pollution near schools. The primary objectives of this investigation are to optimize traffic flow at school intersections, reduce idle vehicle waiting time, and evaluate potential changes in on-site PM 2.5 and PM 10 concentrations. In the first phase of the study, the Synchro traffic simulation model will be utilized to replicate current pick-up and drop-off zone performance and evaluate traffic flow efficiency. The second phase will use the results of the traffic study which will guide the conceptual design of a cloud-based mobile application directed at improving coordination and enhancing efficiency in school pick-up and drop off operations. Overall, we aim to optimize traffic flow during school pick-up and drop-off periods by improving traffic flow and coordination while reducing vehicle idling and congestion, eventually helping lower pollution levels and improving air quality around school zones.

Student-Centered Learning of Structural Dynamics Through Experimentation and Simulation
Poster #47 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Riley Womack
Research Mentor(s): Mohammad Jonaidi & Simin Nasseri

This work describes an experiential, project-based approach used to support student learning in structural dynamics within undergraduate and graduate engineering research courses. The activity emphasized learning through direct engagement with physical systems, computation, and collaborative problem solving rather than isolated laboratory demonstrations. Students worked in teams to design and test scaled structural models subjected to base excitation, while using simulation tools to interpret experimental results. The instructional approach integrated hands-on experimentation, finite element modeling, and data analysis to help students connect *theoretical concepts with observed system behavior. Educational goals focused on improving understanding of dynamic response, damping effects, and seismic excitation, while also developing skills in experimental planning, data interpretation, and teamwork. Student reflections and observed outcomes indicated increased engagement and improved ability to relate analytical predictions to measured response. Overall, the project illustrates how structured experiential activities can strengthen conceptual understanding and promote active learning in structural dynamics.*

Teaching AI to Think Like an Engineer: Can Machines Learn What 'Dangerous Damage' in Our Critical Infrastructure Looks Like?
Poster #7 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Shray Bhatnagar, Noah Boynton, Tinsaye Henock, & Monvilai Chet
Research Mentor(s): Tadesse Wakjira

Deterioration of aging civil infrastructure poses a significant public safety concern that necessitates reliable and efficient structural damage assessment. When surface anomalies such as concrete fractures occur, structural engineers must determine whether the damage are merely cosmetic or indicative of imminent failure. Recent advances in deep learning and computer vision have demonstrated strong performance in automated crack detection; however, the majority of existing models remain limited to binary classification tasks that distinguish only between the presence and absence of damage without any evaluation of severity. Moreover, the practical implementation of such models is limited. Therefore, this project investigates a central research question: Can artificial intelligence (AI) be trained to accurately classify the severity of structural damage? A deep learning-based model capable of identifying damage level in concrete structures is proposed. A labeled dataset of structural crack images, annotated according to established severity criteria, is used to train, validate, and test the model. The anticipated outcome is a robust classification model that can reliably distinguish structural damage in previously unseen images. Additionally, this study explores the ethical implications of deploying Al in high-stakes public safety contexts, particularly the risks associated with underestimating severe structural flaws. The final findings will be presented at the KSU Symposium of Student Scholars.

Ultra-High-Volume Industrial Waste Substitution in Concrete: Environmental and Economic Assessment of Cement and Fine Aggregate Replacements
Poster #21 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Joshua Hardy & Teddy Tzvetkov

Research Mentor(s): Youngguk Seo

Fly ash has been used as a supplemental cementitious material in Portland cement concrete (PCC), making PCC mixes affordable and sustainable. However, the substitution rates of fly ash are kept at lower ranges (<30%) mostly for fear of the reduction of PCC's strength. Limited studies examined the impact of fly-ash on durability. This study aims to test PCC mixes that contain either types (C or F), substituting either cement or fine aggregate at a wide range of rates: 10, 20, 30, 40, 50, 70, and 90% by weight. Workability of fresh state mixes are measured with slump and air content, and durability potential is monitored by electrical resistivity in hardened fly ash concrete at early curing stages up to 28 days, before being tested for compressive strength. Results allow for the optimization of PCC designs for fly ash concrete that provides high durability while maintaining reasonable levels of compressive strength. These findings support high volume fly ash concrete presents a promising pathway toward lowering greenhouse gas emissions and promoting the beneficial reuse of industrial byproducts in real world applications.

Wellstar College of Health and Human Services

Exercise Science and Sport Management

Acute Muscular Response to Dynamic Co-contraction Exercise Compared to Traditional Resistance Exercise
Poster Presentation #50 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Graduate Student(s): Carson Ryan
Research Mentor(s): Daphney Carter

Dynamic co-contraction (DCC) involves continuous maximal contractions of agonist and antagonist muscle groups throughout a full range of motion without the use of body weight or external weights. Studies comparing DCC to resistance training focus on neuromuscular responses and adaptations but not cardiovascular responses. Purpose: To describe muscle fatigue and heart rate during DCC, traditional resistance exercise (TRAD), and passive movement. Methods: The study used a within-subject design. Participants completed exercise and recovery sessions under three conditions. Visit 1 included a maximal strength test was conducted and familiarization followed. During visits 2-4, participants were assigned to DCC, TRAD, or passive movement. Maximum voluntary isometric contraction (MVIC) of the elbow flexors was measured pre-exercise, immediately after, 5-min, and 10-min post-exercise. After baseline measures, participants completed 4 sets of 20 elbow flexion at a designated cadence. TRAD was performed with 60% of 1-RM. DCC involved maximal contraction of agonist and antagonist muscle groups throughout a full range of motion. Passive movement included full range of movement without resistance or maximal contraction. Participants received continuous biofeedback. Heart rate was recorded after each set. Muscle fatigue, as measured by changes in MVIC across time. Two-way Bayesian repeated measures ANOVA were used to compare results over time and across conditions. Results are shown as mean±SD. Results: 12 participants (age: 22±3yr; height: 170±7cm; weight: 71±10kg) completed the study. Muscular force (mV) was lower for TRAD (0.3896±0.13) when compared to PASS (0.4332±0.13; BF10 = 47.14) and DCC (.4675±0.16; BF10 = 1.15e7). Heart rate at the end of exercise was highest for TRAD (107±14) when compared to PASS (76±13; BF10 = 1.19e16) and DCC (105±15; BF10 = 3632.49). Conclusion: DCC elicited a greater fatiguing response and heart rate when compared to passively moving the arm but did not create as great of a response when compared to TRAD.

Agreement Within and Amongst Non-invasive Technologies for Monitoring Flight Time During a Repeated Jump Test
Poster #29 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm

Undergraduate Student(s): Josiah Matthews
Research Mentor(s): Gerald Mangine

To compare the agreement between technologies, 70 physically active adults (21.6±1.8 years old, 170.5±10.0 cm, 75.0±15.2 kg) were recruited to complete a standard dynamic warmup followed by a single test comprised of ten consecutive maximal jumps. Flight time on each jump was simultaneously measured by a light-based optic sensor (OPTOJUMP NEXT [OJ]), a wearable motion sensor (Output Sports [OP]), and an in-ground force plate (FP; AMTI), and then organized into early- (EP, jumps 2, 3, and 4) and late-phases (LP, jumps 7, 8, and 9). Two separate sub-samples of 63 participants were used to make comparisons within (EP vs. LP for sample 1 [OJ and FP1] and sample 2 [OP and FP2]) and between devices (OJ vs. FP1 at EP and LP, and OP vs. FP2 at EP and LP) because of missed repetitions by OJ (n=4) and OP (n=6). Separate Friedman's tests revealed a significant difference (p=0.047) EP (0.37±0.38 sec) and LP (0.13±0.13 sec) for FP1, as well as between all devices at EP and LP (mean difference: 1.24-1.37 sec, p<0.001). Non-significant Spearman's correlations (r = 0.02-0.16) were observed between the average of, and differences between, devices for all comparisons except between OJ and FP1 at LP (r = -0.41, p < 0.001, mean bias: 0.031 sec, 95% LOA: -0.21 to 0.28 sec). The force plate identified differences between EP and LP in sample 1 when OJ could not. This might be attributed to the poor agreement noted between devices at LP. Both OJ and OP significantly overestimated flight time compared to force plate at both phases of the repeated jump test. However, agreement was still consistent between all devices at EP. Only OP consistently agreed with force plate at LP.

Baby Steps: The Biomechanics of Infant Crawling
Poster #16 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Rhyleigh Hendrix, Zhong Chan, & Tierra Vandiver
Research Mentor(s): Mark Geil

Crawling, often perceived as a simple developmental milestone, is the result of progressive neurological and musculoskeletal maturation after birth. In infants with cerebral palsy (CP), impairments in motor coordination and altered physical development are often presented later in life. Early detection of CP remains challenging due to substantial motor variability in infancy and the absence of laboratory-based diagnostic measures [1]. These limitations highlight the need for objective biomechanics indicators of atypical neuromotor development. The research question is whether there is a relationship between stride width and linear body density (mass-to-length ratio) in TD and CP populations. In typically developing infants, a given linear density is expected to correspond to a predictable stride width. We compare this relationship to that of infants with cerebral palsy to assess whether neuromotor impairment alters the slope and predicts stride width at equivalent linear densities. Therefore, deviation in this relationship may *provide an early indicator of neurodegenerative impairment. To measure infant data, we used a 4.9m x 0.6m Zeno pressure transducer mat (ProtoKinetics, Havertown, PA) with a distributed array of 1 cm2 force sensors sampling at 120 Hz. 890 TD trials and 33 CP trials were analyzed, after which the statistical data were analyzed using an ANCOVA test. The p-value for the stride with was statistically significance at 0.02022 however the p-value for the linear density was 0.2776. This indicates there is a significant difference between the TD population and the CP population when looking at stride with. However, this difference is not explained by linear density. Future research should focus on determining the factor that may cause this difference in stride width.*

Blood Flow Restriction During Aerobic Exercise Does Not Increase Non-Local Muscle Fatigue of the Upper-Body

Poster #18 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Graduate Student(s): Zykearia Dean, Anna Acosta, & Hana Abouward
Undergraduate Student(s): Kayla Davis & Rachel Bacchus
Research Mentor(s): Garrett Hester, Daphney Carter, & Mitchell Zaplatosch

BACKGROUND: Blood flow restriction (BFR) during aerobic exercise has increased in popularity due to the potential for enhanced endurance performance. Non-local muscle fatigue (NLMF), a decline in performance of an unexercised limb following fatiguing exercise of a different muscle group, has been described previously, but BFR-induced NLMF during different aerobic modes has not been thoroughly investigated. PURPOSE: This study aimed to determine the effects of BFR during aerobic exercise on peak force and rate of force development (RFD) of the elbow flexors. METHODS: Twenty young adults (18–35 yrs;11 females) completed two experimental visits after a familiarization visit that included VO2max testing. The experimental visits included a BFR condition and a non-BFR (control) condition. Each condition involved treadmill exercise at 50% VO2max; the BFR condition required a cuff on the upper legs at 60% arterial occlusion pressure (AOP). Before and after each condition, subjects performed rapid maximal isometric contractions of the elbow flexors, and force metrics were captured using a calibrated load cell. Peak force (PF) and RFD were analyzed with PF defined as the highest 500 ms rolling average and RFD calculated from the slope of the force–time curve. Two-way (condition×time) repeated measures ANOVAs were used for analysis. RESULTS: No condition×time interactions were observed for any outcomes ($p \geq 0.145$); however, main effects of time showed reductions in PF and all rapid force measures ($p \leq 0.042$, ES=0.30–0.49). CONCLUSIONS: BFR during treadmill exercise did not increase NLMF of the elbow flexors, possibly due to exercise intensity and prior work suggesting NLMF is less sensitive to discrete muscle function outcomes. Based on effect sizes, regardless of condition, reductions in rapid force outcomes (ES=0.30-0.45) appeared more pronounced than peak force (ES=0.23), suggesting RFD may be more sensitive than maximal strength to NLMF.

Bilateral Crawling Kinetic Symmetry in Infants with Cerebral Palsy and Limb Loss
Oral Presentation (Prillaman Hall, Indoor Plaza)
10:00am – 10:50am
Undergraduate Student(s): Larissa Brehm
Research Mentor(s): Mark Geil

Despite the observation that 95.7% of human infants crawl as part of their neuromotor development toward upright walking [1], there is a lack of quantitative data available to understand the biomechanics of infant crawling. Crawling can relay information about an infant's development and indicate certain health-related conditions [2]. Specifically, properly characterized crawling patterns might indicate the presence of conditions like cerebral palsy (CP) in a developmental window in which other definitive diagnoses are impractical. This study quantified kinetics and spatiotemporal outcomes of infant crawling in two atypically-developing populations. The study assessed crawling using a 4.9m x 0.6m Zeno pressure transducer mat. Children were encouraged to crawl back and forth across the mat until at least three trials of five consecutive crawling passes were obtained. The primary outcome measure was bilateral weight-bearing symmetry, expressed as the ratio of left-versus-right integrated pressure ratio (IPR L-R). The study included two children with left side spastic hemiplegic CP and three children in the LLD group: one with right arm and right leg limb difference (IPR L-R values inverted for comparison) and two with left lower limb involvement; an acquired absence of their left foot, and the other a congenitally short left femur. The infants with CP and the child with arm and leg difference showed a substantial amount of pressure being put on their involved side compared to their contralateral side (mean 1.88). The other two LD infants, with only leg involvement, bore more weight on their involved side (mean 0.85). To our knowledge, these are the first quantitative kinetics data collected during crawling for these populations. The results demonstrate the importance of upper limb involvement in crawling, as the two populations were very different in their weight-bearing strategy, with the exception of the LLD child with both leg and arm involvement.

Combining Optical and Light-Based Technology to Advance Monitoring of Skeletal Muscle Blood Flow and Oxygenation
Poster #20 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Evie Neal & Caleb Offutt
Graduate Student(s): Zykearia Dean & Kayla Anderson
Research Mentor(s): Garrett Hester, Daphney Carter, & Paul Lee

Background: Previous methods for simultaneously monitoring skeletal blood flow and oxygenation saturation are costly and impractical. This has led to limitations in understanding *disease- and age-related changes in muscle blood flow and oxygen utilization. Using speckle contrast optical spectroscopy and near-infrared spectroscopy technology combined (SCOS+NIRS), a new method for simultaneously collecting skeletal blood flow and oxygenation saturation can be pursued. Purpose: This study will determine the feasibility of SCOS+NIRS to capture changes in skeletal blood flow and oxygenation saturation during handgrip exercise with and without compression-induced reductions in blood flow. Methods: As part of an ongoing study, four healthy males that were 18-30 years old and had a body mass index 18.5–33 kg/m2 completed a single testing visit. While supine, the right arm was extended perpendicular to their body. Subjects completed intermittent (2-sec on, 2-sec off) isometric handgrip contractions with arterial compression. Doppler-mode ultrasound was used to monitor changes in blood flow of the radial artery. The SCOS+NIRS sensor was placed on the forearm muscle to detect changes in skeletal muscle blood flow and oxygenation saturation, induced by exercise and compression of the brachial artery. Participants performed 7-min of rhythmic handgrip exercise at 30% of maximal strength. After 3-min, pressure was applied on the brachial artery, reducing blood flow by ~50% for 2-min. Exercise continued for another 2-min without applied pressure, allowing blood flow to increase. The final stage was recovery. Results presented as Mean±SD. Results: Artery diameter (cm) appears to increase from rest (0.16±0.05), initial exercise (0.18±0.06), exercise with compression (0.19±0.04), exercise following compression (0.20±0.05), and with the biggest increase during recovery (0.24±0.06). Conclusions: Based on this data, an increase in artery diameter, likely from increased demand for blood flow, was recorded through ultrasound. We would expect to see these changes using the SCOS+NIRS technology.*

Effects of Acute Dynamic Co-Contraction Exercise on the Musculature and Perceptions
Poster #9 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Hunter Ecker, Arnav Hazari, & Sara Matthews
Graduate Student(s): Carson Ryan
Research Mentor(s): Daphney Carter

Background: Resistance exercise leads to improvements in muscular strength and hypertrophy. However, many individuals do not participate when knowing these perceived benefits. The purpose of the study was to compare the effects of passive movement (PASS), traditional resistance exercise (TRAD), and dynamic co-contraction (DCC) on the acute muscular swelling response and perceptions. This could lead to a more viable alternative resistance exercise. Methods: Visit 1 consisted of familiarization and a maximal strength test (1RM). Visits 2-4, included (randomized order) PASS (elbow flexion in a full range of motion without resistance), TRAD (biceps curls with resistance (60% 1RM)), and DCC (maximal contraction through a full range of motion). There were 20 goal repetitions for four sets of elbow flexion. Ratings of perceived exertion (RPE) and discomfort were taken immediately after each set. Muscle thickness was taken pre-, post-, post-5min, and post-10min of exercise completion. One-

way Bayesian repeated measures ANOVA collapsed across conditions were used to analyze results with a BF10 ≥ 3 indicating more than moderate evidence for a difference between conditions. Results presented as mean±SD. Results: 17 participants completed the study. Discomfort (A.U.) for DCC (4.51±1.55) was more than PASS (.29±.50, BF10=6.041x10^26) and similar to TRAD (4.79±2.27, BF10=0.288). RPE (A.U.) for DCC (6.34±1.66) was more than PASS (.90±.71, BF10=2.492x10^32) and less than TRAD (7.62±.97, BF10=5.324x10^6). Muscle thickness (cm) for DCC (4.13±.74) was more than PASS (4.07±.70, BF10=88.667) and less than TRAD (4.29±.77, BF10=1.579x10^6). Conclusion: DCC seems to induce a greater response of discomfort, RPE, and muscle thickness when compared to PASS. However, it does seem that TRAD is a greater stimulus for acute muscular changes (i.e., muscle swelling).

Effects of Blood Flow Restriction Aerobic Exercise on Acute Metabolic Rate and Cardiovascular Responses

Poster #4 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Rachel Bacchus & Kayla Davis
Graduate Student(s): Hana Abouward & Anna Acosta
Research Mentor(s): Daphney Carter

Background: Blood flow restriction (BFR) enhances aerobic capacity and muscle mass when used with aerobic exercise (AE). However, there is little research on BFR with continuous AE and effects on cardiovascular and metabolic responses. This study aimed to determine the effects of BFR with AE on cardiovascular and metabolic responses. Methods: Visit 1 included a maximal oxygen consumption (VO2max) test and familiarization followed. Visit 2 included AE with bilateral BFR (AEBFR) at 50% VO2max and 60% arterial occlusion pressure (AOP) for 15 min. Visit 3 included AE until the approximate calories from visit 2 were reached. During exercise, discomfort and pain were recorded every 3 min, VO2 and heart rate (HR) were monitored continuously, and changes in blood pressure (BP), HR, and weight were recorded approximately 10 min post-exercise. Bayesian Paired Sample T-tests were used to analyze results, with a BF10 ≥ 3 indicating more than moderate evidence for a difference between conditions. Results are presented as mean±SD. Results: 24 participants (13 females, age 22±3 yr, VO2max 43.6±9.7 kg/ml/min) completed this study. HR (bpm) was higher in AEBFR (140.24±14.81) than AE (122.26±12.29, BF10=1.153e8). Discomfort (A.U.) was higher in AEBFR (3.9±1.3) than AE (0.9±0.9, BF10=1.64e8). Pain (A.U.) was higher in AEBFR (2.7±1.7) than AE (0.5±0.9, BF10=17084.3). ΔSystolic BP (mm Hg, AEBFR (14.6±6.7), AE (11.9±5.7, BF10=2.77)) and ΔDiastolic BP (mm Hg, AEBFR (8.2±7.0), AE (6.4±7.1, BF10=0.34)) were anecdotal. Conclusion: AEBFR has greater pain and discomfort than AE during exercise, suggesting that adding BFR may not be an ideal choice. Additionally, the exaggerated HR response may be concerning for some populations with increased risk of cardiovascular events.

The Effects of Blood Flow Restriction During Acute Aerobic Exercise on Elbow Flexor Fatigability

Poster #33 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Caleb Offutt, Rachel Bacchus, & Kayla Davis
Graduate Student(s): Anna Acosta & Hana Abouward
Research Mentor(s): Garrett Hester, Daphney Carter, & Mitchel Zaplatosch

Background: Previous research shows that aerobic exercise combined with blood flow restriction (BFR) can be more effective at increasing endurance performance than aerobic exercise alone. Non-local muscle fatigue (NLMF), or decrements in upper-body performance following lower-body exercise, could be amplified with the inclusion of BFR, but this is unclear. It is possible that the rate of force development (RFD) is more sensitive to NLMF than peak force since the former is dependent on neural drive. Purpose: To determine the acute effects of aerobic exercise with BFR on fatigability of RFD and peak force of the elbow flexors. Methods: Twenty healthy (18-35yrs; 11 females) adults completed an initial visit for measuring maximal oxygen uptake, followed by 2 experimental visits. The two experimental visits consisted of aerobic exercise at 50% VO2max with (AR+BF) and without (AR) BFR. Cuffs were applied on the upper bilateral thigh with 60% arterial occlusion pressure during the AR+BFR condition. Before and after each condition, subjects completed 12 consecutive maximal isometric elbow flexions to determine fatigue indices for peak force and RFD. Peak force, highest 500 ms rolling average, with RFD being determined from the slope of the force-time curve between 0-200 ms. Fatigue index was calculated as the ratio for the average of the best 2 reps and the average of the worst 2 reps. Results: Peak force fatigability was greater following AR+BFR ($p=0.004$, $d=0.73$) compared to AR alone, whereas all rapid force outcomes responded similarly between conditions ($p>0.05$). Conclusion: The present study found evidence that aerobic exercise with BFR enhanced NLMF of the elbow flexors, specifically for peak force. None of the rapid force outcomes showed differences between conditions, suggesting greater sensitivity of peak force fatigability to NLMF. These findings indicate that upper-body muscle performance may be negatively affected by aerobic exercise when combined with BFR.

Evaluating Baseline Iron and Iron-Rich Foods Levels Associated with VO2 Max in Recreational Runners

Poster #41 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Joao Silva Macedo Camargos & Rosie Heidemann
Research Mentor(s): Mitchell Zaplatosch

PURPOSE: Because iron supports oxygen transport, we examined whether dietary iron was associated with VO2max, the maximal rate of oxygen consumption during exercise, in recreational runners. METHODS: As part of a larger diet and training intervention, twenty-six recreational runners (7 females) (mean ±SD; age, 34 ± 8 y; height, 177.19 ± 9.70 cm; weight, 80.23 ± 12.62 kg) completed baseline diet and aerobic fitness assessments. Dietary intake was completed by using ASA24 digital dietary recall, capturing iron, total meat protein, and red meat. VO2max was assessed via a graded exercise test. One-sample t-tests compared mean iron intake to sex-specific RDA's (males: 8mg, females:18mg). Spearman's rank correlations assessed the relationship between each dietary variable and VO2max. RESULTS: Males exceeded the RDA for iron (20.7 ± 13.1 mg, $t = 4.2$, $p < 0.001$), whereas female iron intake was not significantly different from the recommendation (19.04 ± 14.6 mg, $t = 0.19$, $p = 0.857$). Iron intake was not associated with VO2max ($\rho = 0.21$, $p = 0.297$) in the full sample, or in males ($p = 0.866$) or females ($p = 0.310$). There was no association between total meat protein and VO2max in the full sample ($\rho = -0.238$, $p = 0.24$) or in females ($\rho = 0.357$, $p = 0.444$); however, greater meat protein intake in males was associated with lower VO2max ($\rho = -0.495$, $p = 0.033$). Red meat was not significantly associated with VO2max for all analyses (all ps > 0.05). CONCLUSION: Iron intake had limited association with VO2max, perhaps due to limitations of self-reported dietary intake. The negative correlation between meat protein and VO2max in males warrants further investigation into other related nutrients, such as an increase in saturated fat intake or a decrease in carbohydrate intake, the primary fuel for intense cardiovascular exercise.

Evaluating the Agreement Between Body Composition Measures with Changes in Hydration Status

Poster #36 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Holt Schadler, Bret Schadler, & Alexis Lewis
Research Mentor(s): Mitchell Zaplatosch

Purpose: Dual-energy X-ray Absorptiometry (DEXA) and InBody (IB) machines are commonly used in research to measure body composition. We sought to evaluate the agreement of these two devices with a change in hydration status. Methods: Twenty-Three (12 females) (mean ± SD; age, 22.6 ± 2.3yrs; height, 169.1 ± 9.2cm; weight, 80.4 ± 35.03 kg) participants were recruited for a hydration intervention study. Each participant collected their urine over a 24-hr period to assess osmolality (UOSMO) and volume (UVOL), as well as body composition assessments using DEXA and IB before (PRE) and after (POST) the intervention. Body composition variables included Fat Mass (FM), Body Fat percentage (BF%), Lean Body Mass (LBM) and for IB additional measures of total body water (TBW), extracellular water (ECW), and intracellular water (ICW) were collected. Paired t-tests were used to evaluate hydration changes across time. Separate mixed effects models were used to assess the relationship between changes in hydration *and the difference between body composition measures between devices and to assess the association between IB body water measurements and 24h urinary hydration variables. Results: UOSMO was lower at POST compared to PRE (MD: -97mOsm/kg [-168, -26], t = -2.80, p = 0.010). UVOL was not significantly different between timepoints (t = 0.677, p = 0.505). Neither change in UOSMO or UVOL were significantly associated with changes in LM, BF, or BF% (all ps > 0.05). Changes in UOSMO and UVOL were not associated with changes in TBW, ICW, or ECW (all ps > 0.05). Conclusions: Improving hydration did not meaningfully impact the agreement between DEXA and IB. IB changes did not reflect improvements in 24h UOSMO, suggesting this device should not be used to indicate a change in hydration status. Significant variability in the change in UOSMO between participants warrants further investigation into this relationship.*

Factors Associated with Body Composition in Middle-Aged Adults from Year 20 of the Coronary Artery Risk Development in Young Adults (CARDIA) Study)

Poster #26 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Janice Marimon, Mackenzie Burgess, Michael Qualey, & Adriana Canchola
Graduate Student(s): Andrew Levine
Research Mentor(s): Robert Buresh

Background: The Coronary Artery Risk Development in Young Adults (CARDIA) study was initiated in 1985-86 to examine factors that contribute to cardiovascular disease. The purpose of this investigation was to analyze data collected in year 20 of the CARDIA study to identify factors associated with body weight and composition. Methods: In year 20 of the CARDIA study, participants underwent a series of assessments, including body composition via dual-energy x-ray absorptiometry, and step counts were derived from accelerometers that were carried for at least 7 days. Results: Sample included a total of 1071 participants (age = 45.6 ± 3.4 years; height = 171.0 ± 9.1cm; weight = 81.4 ± 18 kg), 601 females (height: 165.3 ± 6.4 cm; weight: 75.8 ± 17.8 kg; body fat: 34.0 ± 7.1%) and 470 males (height: 178.3 ± 6.3 cm; weight: 88.7 ± 15.5 kg; body fat: 22.8 ± 5.8%). Pearson correlation analysis was performed, and factors demonstrating significant correlations with body fatness were included as potential predictors. Stepwise non-linear regression analysis was performed, and a predictive model for percent body fat (PBF) was developed using sex, height, and average daily step counts expressed relative to fat mass (RelSteps) as inputs. The final model demonstrated good fit (R^2 = 0.82, RMSE = 3.2), indicating that these variables collectively explain a substantial portion of the variance in PBF. Conclusion: These findings demonstrate a high predictive power for daily step counts expressed relative to fat mass accurately predicting body fat percentage in middle-aged adults. The regression model highlights the possibility of integrating step counts as a useful metric to manage weight and body fatness.

High-Intensity Functional Training Competition Workload Comparisons Between Men and Women (2011–2025)
Poster #41 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Graduate Student(s): Christopher Shewmaker
Research Mentor(s): Gerald Mangine

High-intensity functional training (HIFT) competitions are designed to test work capacity across broad time and modal domains. However, little research has quantified how prescribed mechanical demands differ between men and women or how those demands have evolved longitudinally. The purpose of this study was to quantify and compare total concentric mechanical workload and workload rate prescribed to men and women across fifteen annual seasons (2011–2025) of a large-scale HIFT competition. Official competition scores were collected for all athletes who completed a predefined minimum workload in each event. Stratified random samples of 500 men and 500 women per year ($n = 15{,}000$; 18–54 y) were drawn proportionally across performance distributions. Scores were decomposed into total repetitions per exercise, and concentric mechanical work (kg·m) was calculated using prescribed loads and standardized anthropometric models to estimate segment displacement. Annual averages of total workload and workload rate (kg·m·min^{-1}) were computed. Two-way (sex × year) analyses of variance assessed differences across seasons. Significant sex-by-year interactions were observed for both total workload and workload rate ($p < 0.001$). Across all seasons, men completed greater workloads (11,114 ± 2,752 kg·m) at faster workload rates (1,258 ± 1,542 kg·m·min^{-1}) than women (6,290 ± 1,988 kg·m; 740 ± 990 kg·m·min^{-1}). Workload characteristics varied substantially between years for both sexes, indicating notable shifts in annual programming demands. These findings suggest that although aspects of competition programming are scaled between sexes, mechanical demands are not equivalent and fluctuate considerably over time. Results will be discussed in the context of competition design, sex-based physiological considerations, and implications for long-term athlete preparation.

Height is Correlated with High-Intensity Functional Training Performance in a Sample of Trained Athletes
Poster #19 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Wil King
Research Mentor(s): Gerald Mangine

Body height has been documented to affect individual exercise performance. Taller athletes can exert effort over greater ranges of motion, which may be advantageous for high-velocity, single-effort barbell movements. However, this may be a disadvantage when efforts must be repeated *quickly over several repetitions, like what is required in high-intensity functional training (HIFT). The training strategy combines multiple exercise modalities into a single circuit and instructs trainees to complete assigned work as fast as possible. As such, the ability to quickly cycle through repetitions is essential to HIFT success, but the effect of height is unknown. Therefore, to quantify the influence of height on HIFT performance, trained men and women (n = 5; 32.2 years; 75.9 kg; 170.4 cm) were recruited to complete two HIFT circuits (C1: 10 toes-to-bar, 15 wall balls, 10 calories of rowing; C2: 10 box jumps, 5 barbell snatches, 10 pullups) scored by time to completion (TTC). Circuits were completed on the same session and separated by 5 minutes of rest. Linear regression analysis revealed a moderate-to-strong (r = -0.44; r = -0.78) relationship between athlete height and TTC in both exercise circuits, suggesting that taller athletes completed each circuit faster. Slopes (β1) for each circuit are as follows: β1C1 = -1.99 (95% CI: [-4.9 - 0.9]); β1C2 = - 2.1 (95% CI: [-9.9 - 5.7]). The data provide insight into the relationships between height and HIFT performance. However, cautious interpretation is warranted as each 95% CI is wide and includes the null point estimate. A larger sample size is needed to refine prediction equation estimates of the differential effects of height on HIFT circuit performance.*

The Influence of Relative Back Squat Strength on Countermovement Jump Performance in College-Aged Males

Poster #40 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Holt Schadler & Bret Schadler
Research Mentor(s): Jacob Grazer

Purpose: Countermovement Jump (CMJ) performance can provide insight into the force production capabilities relative to the individuals ability during a dynamic task. In conjunction with power output during a CMJ, few investigations have looked to identify the influence of relative strength on these types of tasks. This research aims to establish a link between the relative strength (RS) of an athlete and CMJ performance in jump height (JH) and force production values that were surveyed. Methods: Seventeen males (mean ± SD; age, 23.2 ± 3.8yrs; height, 1.78, ± 6.10m; weight, 84.8 ± 13.2kg) were recruited for this study. Each participant performed a one repetition maximum back squat measured in kilograms and a Dual-energy X-ray Absorptiometry (DEXA) body composition assessment. From these measures, an RS ratio (1RM/total body mass) was calculated. Participants were assigned into a strong (>1.70x BW RS) weak (<1.65x BW RS) group. The groups were then compared using independent t-test and Cohen's d effect size for CMJ performance differences. Results: Metrics surveyed were not statistically significant (p> 0.05) in JH, concentric impulse, eccentric impulse, relative peak power, and symmetry of force production. Effect Sizes for JH and Relative Peak Power were large (d>0.80). Effect sizes for net impulse (d=0.43), eccentric impulse (d=0.77), and *concentric impulse (d=0.49) were small to moderate. Conclusion: Results indicate that although there were no statistically significant differences between groups, effect size values indicated large potential differences for several of the metrics measured. It appears that possessing greater levels of relative strength may improve force and power output in college-aged males. It is possible that a larger sample size could clarify the difference in data output implications.*

Jump Height Intra-rater Reliability Between Three Non-invasive Technologies and Force Plates
Poster #12 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Sharapova Cary
Research Mentor(s): Gerald Mangine

To test the reliability of three performance monitoring technologies, 47 physically active individuals (20.4 ± 5.2 y, 170.7 ± 9.9 cm, 75.6 ± 15.1 kg) were recruited to complete three maximal countermovement jumps in a single session. Maximal vertical jump was measured using a vertical jump station (Vertec Vertical Jump Tester) and quantified as the difference between maximal jump height and reach. All jumps were performed on an in-ground force plate (AMTI) and vertical displacement was simultaneously estimated by a light-based optic sensor (OPTOJUMP NEXT [OJ]) and a wearable motion sensor (Output Sports [OP]). Generalizable intra-rater correlation coefficients (ICC2,1) were calculated between trials 1 and 2, and between trials 2 and 3, for jump heights quantified by the force plate, OJ, and OP. A non-generalizable equation (ICC3,1) was used to assess the reliability of the vertical jumping station. Reliability was further assessed by the standard error of the measurement (SEM) and minimal differences (MD). Paired-samples t-tests revealed significant differences (mean difference: 0.02 ± 0.03 m; p<0.001) between jumps 1 and 2, and 2 and 3 for Vertec data, as well as a difference (mean difference: 0.01 ± 0.04 m; p = 0.038) when quantified by OP. Force plate and OJ were more reliable for the first two jumps (ICC2,1 = 0.69-0.77, SEM2,1 = 0.12-0.18 m, MD = 0.23-0.36 m) than jumps 2 and 3 (ICC2,1 = 0.41-0.58, SEM2,1 = 0.12-018 m, MD = 0.24-0.36 m). The reliability was consistent across all three jumps with OJ, whereas jump height was measured more consistently on the first two jumps with force plate and the second two jumps with OP. Meanwhile, the measurements on the vertical jump station were unreliable across all three jumps.

Reactive Hyperemia as a Predictor of Changes in VO2 Max
Poster #45 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Graduate Student(s): Kenneth Thompson
Research Mentor(s): Mitchell Zaplatosch

An association between skeletal muscle tissue oxygenation (StO2) during a near-infrared spectroscopy vascular occlusion test (NIRS+VOT) and maximal oxygen consumption (V02max) have been found. This study seeks to determine if the association persists during a diet training intervention. 8 runners (36.2± 6.7 years old) within a diet-training study completed a treadmill VO2max test and NIRS+VOT prior to and after 6 weeks into a 12-week aerobic training plan following either a high or standard protein diet. StO2 was collected from a NIRS device on the forearm. Occlusion pressure was applied for 5 minutes, followed by 3 min of recovery. Desaturation (S1) and reperfusion (S2) slopes were derived from the NIRS+VOT. Then the participants conducted a runner-specific VO2max test on a treadmill. Random-intercept linear mixed effects models were used to evaluate the interaction between group and time on the NIRS+VOT and VO2max. Repeated measures correlations were used to assess the relationship between NIRS+VOT metrics and VO2max change over the course of the training plan. Mean VO2max, S1, and S2 were as follows: VO2(Pre 48.96 ± 8.99, Mid 45.33 ± 12.92), S1(Pre -0.1 ± 0.02, Mid -0.1 ± 0.02), S2(Pre 2.4 3 ± 0.84, Mid 2.43 ± 0.55). There were no statistically significant effects of time or group on any metric and no group x time interaction for change in VO2max (p = 0.639), S1 (p = 0.124), or S2 (p = 0.365). VO2max was negatively associated with S1 (r = -0.94, [-0.996, -0.350], p = 0.017) but positively associated with S2 (r = 0.862, [0.166, 0.985], p = 0.027). The diet training intervention did not significantly influence the outcome measures of interest. However, our preliminary analyses suggest strong correlations between VO2max and tissue desaturation and reperfusion rates overtime. The NIRS+VOT measures may be used to track adaptations over the course of a diet or training intervention within participants as an alternative to VO2max testing.

Step Counts in the Prediction of Cardiometabolic Risk in Middle-Aged Adults
Poster #7 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Mackenzie Burgess
Research Mentor(s): Bob Buresh

PURPOSE: The progressive rise in body fatness in U.S. adults is coincident with increases in cardiometabolic risk (CMR), like dyslipidemia and insulin sensitivity. The purpose of this study was to analyze a subset of participants in year 20 of the Coronary Artery Risk Development in Young Adults (CARDIA) database to identify factors associated with key markers of CMR, and to develop regression models to predict CMR outcomes. METHODS: Data from year 20 of the publicly available CARDIA study were obtained. Participants included 1,071 adults (mean age 45.6± 3.4 years, 55% females) who had body composition determined via dual-energy X-ray absorptiometry, and recorded step counts by carrying accelerometers for at least 7 days. Participants also provide blood samples for assessment of common markers of CMR. RESULTS: Pearson correlation analysis showed that sex, height, and average daily step counts expressed *relative to fat mass (RelSteps) were identified as being significantly correlated with several key markers of CMR: total cholesterol: HDL ratio (RATIO), triglyceride-glucose index (TYG), and Quantitative Insulin Sensitivity Check Index (QUICKI). Stepwise non-linear regression analysis resulted in models that predicted those three CMR outcomes significantly. The model predicting natural log of RATIO yielded an R^2 of 0.27 with an RMSE of 0.27: the natural log of QUICKI was predicted with an R^2 of 0.27 with an RMSE of 0.24, and the natural log of TYG was predicted with an R^2 of 0.19 with an RMSE of 0.06. CONCLUSIONS: This analysis illustrates a demographic overview of middle-aged adults from the CARDIA dataset. Findings demonstrate sex, height, and RelSteps to be significant predictors of key markers of CMR. The strength of the models highlights the possibility of utilizing RelSteps to improve CMR in middle-aged adults.*

Step Counts as a Predictor of Body Composition in Adults

Poster #10 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Adriana Canchola, Michael Qualey, Mackenzie Burgess, & Janice Marimon
Graduate Student(s): Andrew Levine
Research Mentor(s): Bob Buresh & Brian Kliszczewicz

Background: Current research lacks consensus on the relationship between step count relative to fat mass and body composition. The purpose of this study is to identify factors related to body composition, including common markers of physical activity. Methods: Following a 10-12 hour fast, participants underwent baseline body composition assessments via bioelectrical impedance analysis and dual-energy x-ray absorptiometry (DEXA) scan for 4-compartment analysis. Participants were provided with pedometers (Realalt, London, UK) and instructed to carry them during all waking hours for four weeks. Step counts were concealed to minimize bias. Results: A total of 53 participants (42 females, age = 37.4 ± 12.5 years, weight = 73.8 ± 17.5 kg, height = 162.9 ± 6.5 cm, body composition = 38.8 ± 7.9% fat, and 11 males, age = 43.5 ± 12.6 years, weight = 75.5 ± 16.5 kg, height = 171.7 ± 7.3 cm, body composition = 29.1 ± 6.7% fat) completed the study protocol. Pearson correlation analysis was performed, and factors demonstrating significant correlations with body fatness were included as potential predictors. Stepwise non-linear regression analysis was performed, and a predictive model for percent body fat (PBF) was developed using sex, height, and average daily step counts expressed relative to fat mass (RelSteps) as inputs. The final model demonstrated good fit (R^2 = 0.63, RMSE = 5.2), indicating that these variables collectively explain a substantial portion of the variance in PBF in adults under 60 years old. Conclusion: These findings demonstrate a strong association between RelSteps and body fatness, and the resulting non-linear regression model explains ~ 63% of the variation in PBF in a diverse sample of men and women under the age of 60 years. The *regression model highlights the possibility of integrating step counts as a useful metric to manage weight and body fatness in adults.*

Step Counts as a Predictor of Key Markers of Metabolic Health in Adults
Poster #37 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Michael Qualey, Mackenzie Burgess, Janice Marimon, & Adriana Canchola
Graduate Student(s): Andrew Levine
Research Mentor(s): Bob Buresh, Brian Kliszczewicz, & Austin Brown

BACKGROUND: In the past 50 years, rates of obesity among adults have more than tripled, corresponding to an increase in the prevalence of cardiometabolic disorders. The purpose of this study was to identify factors associated with cardiometabolic risk (CMR) factors, and to develop regression models that may partially predict key CMR outcomes. METHODS: Fasted participants underwent body composition assessments via bioelectrical impedance analysis and dual-energy x-ray absorptiometry for 4-compartment analysis. Participants were provided pedometers (Realalt, London, UK) and instructed to carry them during all waking hours, continuing normal daily behaviors, for four weeks. Step counts were concealed to minimize bias. Resting heart rate (RHR) and blood pressure were measured using an Omron HEM-907XL monitor. Fasting finger-stick blood samples were collected and analyzed for common markers of CMR. RESULTS: A total of 53 participants (42 females: age 37.4±12.5 years, height 162.9±6.5 cm, weight 73.8±17.5 kg; 11 males: age 43.5±12.6 years, height 171.7±7.3 cm, weight 75.5±16.5 kg) completed the study. Pearson correlation analysis was used to identify potential predictors of CMR outcomes. Stepwise nonlinear regression models were fit using sex, height, and average daily step counts relative to fat mass (RelSteps) as independent variables to predict the natural log of the quantitative insulin sensitivity check index (lnQUICKI; R^2=0.34, RMSE=0.07) and the natural log of the total cholesterol to HDL ratio (lnRATIO; R^2=0.21, RMSE=0.14). Additionally, linear regression yielded a model for RHR using the aforementioned predictors (R^2=0.32, SEE=9.3). CONCLUSIONS: These findings demonstrate that regression analysis including RelSteps as a predictor yielded models predictive of key CMR outcomes, and highlights the potential of using this marker of physical activity as a tool for improving CMR management.

Validation of OpenCap for Quantifying Dynamic Knee Valgus During Single-Leg Squat: A Pilot Study
Visual Display #49 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Jessica Walkup, Nick Shields, & Michelle Nunez-Navarro

Research Mentor(s): Michael Hales & John Johnson

Dynamic knee valgus (DKV) is a clinically relevant frontal-plane movement pattern associated with patellofemoral pain, chronic hip pathology, and elevated risk of non-contact anterior cruciate ligament (ACL) injury. Quantitative assessment of DKV typically requires laboratory-based three-dimensional motion capture systems such as Vicon, which are costly and inaccessible in many clinical and performance settings. OpenCap is an open-source, markerless motion capture platform utilizing synchronized mobile devices to generate biomechanical models outside traditional laboratory environments. If validated, OpenCap could substantially expand access to objective movement analysis. The purpose of this pilot study was to evaluate agreement between OpenCap and a Vicon motion capture system for quantifying DKV during a single-leg squat task. Repeated single-leg squat trials were collected for both dominant and non-dominant limbs. Motion was recorded simultaneously using Vicon and a two-camera OpenCap configuration. For each repetition, four peak and three trough DKV values were extracted, yielding 21 paired observations per limb (42 total). Agreement was assessed separately by limb using root mean square error (RMSE), Bland–Altman analysis, proportional bias testing, standard error of measurement (SEM), and minimal detectable change at the 95% confidence level (MDC95). For the dominant limb, RMSE was 1.50°, with a mean bias of −0.60° and 95% limits of agreement from −3.37° to 2.17°. SEM was 1.00°, producing an MDC95 of 2.77°. A statistically significant proportional bias was detected ($p = 0.007$), indicating slightly increasing disagreement at higher DKV magnitudes. For the non-dominant limb, RMSE was 1.97°, mean bias was −0.75°, and limits of agreement ranged from −4.40° to 2.90°. SEM was 1.32°, yielding an MDC95 of 3.65°, with no significant proportional bias ($p = 0.375$). Across both limbs, systematic bias remained less than 1°, and measurement error was within approximately 2° on average. Minimal detectable change values suggest that DKV changes exceeding approximately 3° represent true biomechanical change beyond measurement error. These preliminary findings support the feasibility of OpenCap as a scalable, cost-effective alternative to laboratory-based motion capture for assessing dynamic knee valgus. Future work will expand the sample size to evaluate inter-individual variability and further establish reliability across diverse populations.

Health Promotion and Physical Education

Age at Diagnosis Across Pediatric Tumor Classifications: A Public Health Analysis Using National CCDI Cancer Data

Poster #35 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Kendra Palomo
Research Mentor(s): Robert Fairman

Introduction: Pediatric cancer remains a significant public health concern, and understanding when children are diagnosed is critical for improving treatment and survival outcomes. Age at diagnosis may vary by tumor type due to biological development and healthcare access. Using national datasets allows researchers to examine patterns and identify potential disparities. However, limited national-level analyses have compared age at diagnosis across multiple pediatric tumor classifications using large publicly available datasets. This study analyzes publicly available data from the National Cancer Institute's (NCI) Childhood Cancer Data Initiative (CCDI) to evaluate differences in age at diagnosis across pediatric tumor classifications. Methods: Individual-level patient data from NCI CCDI were analyzed. After extensive data cleaning and restructuring, the final analytic sample included 7,822 pediatric patients aged 1 day to 3,650 days (estimated 0 - 10 years) The primary variables were age at diagnosis (measured in days) and tumor classification. Secondary variables included race, sex at birth, treatment type, and last known survival status. Analyses were conducted in SPSS, with α=.05. Results: Results indicated that on average, patients were 1832.36 days old at age of diagnosis, or approximately 5 years old (SD=955.813), and a majority of the sample were male (66%) and White (53%). One-way ANOVA revelated a statistically significant difference in age of diagnosis by tumor classification, ($F(2,3002) = 22.710$, $p<.001$). Tukey post-hoc analyses were conducted. Results indicated that patients with metastatic tumors different significantly at age of diagnosis compared to those with primary tumors (MD = 271.49, $p<.001$) as well as those with regional classifications (MD=582.82, $p<.001$). Conclusion: Overall, there were significant differences in the age at diagnosis between pediatric tumor classifications; metastatic tumor was detected at different ages than primary and regional cancers. These results emphasize the significance of tumor-specific screening awareness and could guide targeted public health programs and early detection initiatives.

Age, Drugs, and Service: How Age at First Use Informs Substance Abuse Among U.S Veterans

Poster #45 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Kayla Wachiuri
Research Mentor(s): Robert Fairman

Areas of the brain critical in judgment, decision-making, learning, memory, and behavior control are physically augmented in people with drug addictions. Addiction is disastrous for the long-term health of the mind and body. Nearly 49 million Americans, ages 12 and older, have substance use disorders. Veteran substances abuse rates rival those of the general public; more than 10% of veterans are diagnosed with substance use disorders. Adolescents are also susceptible to drug abuse. 10 million U.S adolescents, ages 12-25, were categorized as having substance use disorders in 2020. Youth with substance addictions are more vulnerable to sexually transmitted diseases, imprisonment, school difficulties, increased mental health burden, *and neurocognitive impairments. Recruited adolescents may be uniquely exposed to service-induced trauma that could disrupt their general acclimation to adulthood post-service, possibly compromising their ability to resist substance abuse as a method for managing distress. Using data from the 2023 SAMHSA TEDS data set, we aim to examine relationships between age at first use and drug type use among US veterans. The final analytic sample only included those with a veteran status (n=31,227). All analyses were conducted in SPSS, with a α=.05. Of our sample, approximately 88% identified as male, 66% as White, and approximately 53% entered a rehabilitation facility after the age of 45. In examining the primary mode of substance use, 49% reported alcohol use as their primary drug, followed by 13% reporting methamphetamine, and 10% reporting heroin. Results show that among those under the age of 18, the primary drug of first use is alcohol, compared to higher proportional reporting of opiate and methamphetamine use among older veterans (X^2=21805, p<.001). Our findings will add to research exploring the susceptibility of certain groups to drug addiction. Future studies should vet the effectiveness of substance abuse treatments for veterans.*

Examining the Rates of Electronic Cigarette Use Among Adolescents in the United States by the Social Determinants of Health, Before, During, and Post-COVID-19
Poster #26 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Leah Larcher & Faith Gathoni
Research Mentor(s): Kathleen Tatro

Electronic cigarettes, also known as vapes, are the most used tobacco product among adolescents in the United States. The popularity of vapes has grown through targeted marketing and misconceptions of vape safety. Research has linked adolescent vape use to nicotine dependence which effects mood, brain development, and behavior. The COVID-19 pandemic introduced global disruptions to daily life, influencing adolescent risk behaviors. This study examines patterns in vape use among high school students before, during, and after the COVID-19 pandemic while accounting for social determinants of health. Data obtained from the Youth Risk Behavior Surveillance System (YRBSS) was used to conduct a retrospective cross-sectional analysis of youth aged 14-18. Using nationally representative YRBSS data, we examined trends in current vape use across three two-year data cycles, 2017, 2019, and 2021. Descriptive statistics and bivariable analyses were conducted to generate and assess weighted frequencies and identify associations between vape use and COVID-19 timing. Secondary predictors, like mental health and aspects of social life, were considered key factors of the study and included in the analyses. All analyses were weighted according to YRBSS procedures and performed using Statistical Analysis System (SAS) software. In our nationally representative sample of high schoolers, 26.93% were in 9th grade, 26.26% in 10th grade, 24.37% in 11th grade, and 22.24% in 12th grade. Hispanic respondents and upperclassmen demonstrated higher vaping prevalence. Significant associations between vape use and COVID-19 timing were identified. In our *unadjusted bivariate analyses, significant differences were observed in the relationship between vape use and variables including COVID-19 timing, race/ethnicity, age, grade level, and bullying status at p values > 0.05. We hypothesize that after adjusting for sociodemographic characteristics, the relationship between vape use and COVID-19, grade level, race/ethnicity, and bullying status will remain significant. After conducting adjusted analyses, findings may identify patterns guiding adolescent vaping prevention.*

Perceived Care, Quality, and Concerns Influence Telehealth Use Among Older Adults Living in Rural Georgia
Oral Presentation (Prillaman Hall, Indoor Plaza)
10:00am – 10:50am
Undergraduate Student(s): Julianne Lentz
Research Mentor(s): Anita Reina

Alzheimer's disease and related dementias (ADRD) are progressive cognitive conditions that affect approximately seven million people in the US and is expected to double by 2030. Older adults living in rural Georgia experience higher dementia prevalence and persistent healthcare disparities that limit timely screening and access to ADRD care. Telehealth has the potential to improve access to care; however, telehealth adoption among older adults remains inconsistent. This exploratory study aims to identify perceptions and concerns regarding telehealth use among adults aged 65 and older living in rural Georgia. A cross-sectional analysis of the Community Dementia Needs Assessment (CDNA), developed by the University of Georgia's Cognitive Aging Research and Education (CARE) Center and Kennesaw State University, was conducted in 79 counties in Georgia. The analyses focused on 10 survey items, including demographics, telehealth experience, comfort, and concerns. The sample included 225 residents (M = 73.91± 6.07; 70.2% female, 25.3% non-white). Over half of respondents (n = 127, 56.4%) reported having never used telehealth. The most frequently expressed concern was that telehealth care quality was inferior to in-person visits (34.7%), followed by insurance eligibility (20.4%), and low confidence in using telehealth (12%). However, top respondents reported being comfortable using telehealth for basic check-ups (57.3%), prescription updates (52.9%), and mental health care (39.1%). These findings suggest that telehealth utilization among older adults is influenced by perceived quality of care, insurance literacy, and privacy concerns rather than inexperience. Future approaches to telehealth adoption among older adults should consider technology and insurance literacy, patient privacy, and basic check-ups for older adults.

Perception Under Pressure: The Impact of Cigarette Smoking on Self-Rated Health in U.S. Adults
Poster #5 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Birdie Berie

Research Mentor(s): Robert Fairman

Introduction: Cigarette smoking remains one of the leading preventable causes of chronic disease and mortality in the United States. Although tobacco control efforts have reduced smoking prevalence over time, millions of U.S. adults continue to report current cigarette smoking. Smoking is a well-established risk factor for cardiovascular disease, respiratory illness, cancer, and decreased life expectancy. However, there may be additional implications of smoking beyond these outcomes, like self-perception of health. We aimed to examine the effect of smoking status on perceived health status, as well as differences by gender. Methods: Data came from the 2023 Behavioral Risk Factor Surveillance System (BRFSS), a nationally representative survey conducted by the Centers for Disease Control and Prevention (CDC). General health was recorded to create a binary outcome variable (fair/poor vs. excellent, very good, and good), and cigarette use as was cigarette use (everyday and someday vs. not at all). Results: The analytic sample consisted of 166,211 persons, 52% of which identified as male, and 46,920 (28%) who stated that they smoked cigarettes. Nearly 74% of the sample reported being in good health. Of those who smoke, 66% report being in good health, with 33% of those who smoke did not report being in good health ($\chi 2$=1824.7, p<.001). Those who smoke are 1.7 times more likely to rate themselves in good health, compared to those who do not smoke (OR=1.659, 95% CI-1.621-1.699), while those who are male are less likely to rate themselves in good health compared to female (OR=0.920, 95% CI=0.9-0.94). Conclusion: Cigarette smoking was significantly associated with self-rated health among U.S. adults. Smokers had greater odds of reporting fair or poor health compared to non-smokers, and males were slightly less likely than females to report good health. These findings highlight the continued need for tobacco prevention efforts addressing both physical health and health perception.

Trends in Alcohol-Impaired Driving Fatalities Across U.S. States, 2012–2014
Poster #1 (Convocation Center, VyStar Arena)
4:00pm – 4:45pm
Undergraduate Student(s): Aissatou Ajavon
Research Mentor(s): Robert Fairman

Introduction: Alcohol-impaired driving is a serious public health problem that results in thousands of preventable deaths each year. Utilizing the Fatality Analysis Reporting System (FARS) provided by the Centers for Disease Control and Prevention (CDC), rates of deaths by age and sex (per 100,000) were calculated for those killed in crashes involving a driver with a blood-alcohol content equal or greater than .08%. We aim to examine if the rates of death from impaired driving differed by state, as well as by age and gender. Methods: Data was obtained from the CDC using the FARS system and cleaned to eliminate any missing data. Paired t-tests were used to analyze changes in rates between 2012 and 2014. All analyses were conducted in SPSS, with α=.05. Results: The average rate of death for 2012 is 3.974, compared to 3.653 in

2014 (MD=.3213, SD=.9026, p=.019). There was approximately a 7.5% decrease in impaired driving death rates from 2012 to 2014. Among males, rates decreased from approximately 6.294 (SD=3.1309) to 5.674 (SD=2.4494) from 2012 to 2014, respectively (t (46) =2.704, p=.010). Among females, the rate in 2012 was 1.685 (SD=.7755) compared to 1.612 (SD=.7944) in 2014 (t (32) =1.644, p=.110). Discussion/Conclusion: The results of this study have implications for public health policy and suggest that continued intervention among high-risk groups and geographic areas is warranted. Future studies will include more years of data, explore trends by age, and evaluate the success of prevention programs. This study hopes to offer a clear explanation of the problem of impaired driving deaths and demographic disparities to help guide evidence-based interventions.

Nursing

Animation-Enabled Training for Dementia-Related Agitation Management: Protocol

Poster #18 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Benjamin Karanja, Anulika Obiekwe, Reese Bryd, & Blessing Anyanwu
Research Mentor(s): Modupe Akintomide & Joy Li

Approximately 60% of persons living with dementia experience agitation, a distressing behavioral symptom. Although effective non-pharmacological interventions are recommended as first-line management strategies, they remain underutilized, partly due to limited knowledge and competence among healthcare professionals. Interactive educational approaches, including digital animations, offer innovative opportunities to enhance competence. This is a KSU-VIP subproject of the "Dementia Healthcare XR App" study, which aims to develop an extended reality application for dementia care training for healthcare students. And to develop an animated video with a basic storyline, characters, and dialogue designed to educate healthcare students on person-centered, non-pharmacological strategies for managing dementia-related agitation. Developmental research was conducted, and an extensive literature review identified key antecedents of agitation, including unmet physical needs, environmental overstimulation, and non-pharmacological interventions. These findings informed the development of a storyboard and script for a 3 minute 2D interactive animation. In the next phase, the script will be used to create the animation in Animaker, applying the See–Try–Apply framework to depict agitation and demonstrate the Antecedent–Behavior–Consequence–Debrief model. The completed animation will be pilot tested with 15 healthcare students to evaluate clarity, usefulness, feasibility, and changes in pre/post knowledge of anticipatory de-escalation strategies using the Agitation in Alzheimer's Screener for Caregivers. It is anticipated that the animated intervention will effectively translate complex neurobiological mechanisms underlying dementia-

related agitation into an accessible visual format that facilitates rapid comprehension among healthcare students. Participants are expected to demonstrate improved post-intervention knowledge of non-pharmacological strategies for managing agitation, as measured by pre- and post-test assessments. Feedback regarding clarity, feasibility, and perceived usefulness is expected to support the acceptability of the intervention and inform iterative refinement of the training video. Digital animation could offer a scalable, engaging teaching method for strengthening healthcare students' knowledge of non-pharmacological management of dementia-related agitation.

Breaking Barriers for First-Generation Nursing Student Success: A Literature Review
Poster #41 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Emma Sinclair-Olanipekun & Katherine Sandoval Gomez
Research Mentor(s): Sarah Caffrey

The pursuit of higher education by first-generation students is in many ways a laborious endeavor that tends to lead to certain challenges in all aspects of their secondary education, significantly more than their peers. There are various barriers to entry for the different pathways of first-generation students, presented through social stigma and underrepresentation. A literature review was conducted to better understand the challenges that first-generation students face in higher education and how faculty and institutions can support these learners in pre-licensure nursing programs. The overarching focus of this literature review is how nursing programs can develop inclusive and responsive strategies to support first-generation students and promote their academic success. This question was analyzed through a literature review of peer-reviewed studies, and articles published between 2015-2025 were sourced through databases such as Google Scholar and other library search engines. Although our research is still pending, preliminary results have shown that peer mentoring, embedded tutoring, financial support, faculty support, and programs that promote a sense of belonging can improve GPA, confidence, and retention rates for first-generation nursing students. The literature has also shown that stress, academic performance, and low self-esteem are common factors that determine the attrition rates of first-generation students in the program. Our completed findings will be presented at the Symposium of Student Scholars and will further explain how to help nursing programs can apply inclusive and responsive strategies to better support first-generation students, promote their academic and social success, and guide them to being professional healthcare providers.

Bridging the Gap Between Dementia Care Design and Caregiver Reality
Poster #14 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm

Undergraduate Student(s): Hasana Chaudhary, Chavon Mba, Yvonne Balderas, & Anushri Aiyar
Research Mentor(s): Modupe Akintomide & Xinyue Zhang

Despite extensive interventions and end-products being developed, many fail to translate into home/community settings, remaining unused on shelves and offering little real benefit to the people they were designed to help. Understanding caregivers lived realities is essential for creating interventions that are truly usable and sustainable. The aim of this is to explore the research priorities and desired interventions of informal dementia caregivers and generate requirements to inform future researcher-developed interventions. Based on the KSU HatchBridge initiative, we conducted four user-view focus groups with 30 dementia caregivers during a user's event to explore their needs and perceptions on priorities and desired interventions. Using a written guide, trained facilitators led 45-minute discussions to identify major themes across caregiver experiences. All attendees consented to have the discussion reviewed anonymously for identifying patterns. Thematical analysis was conducted. Four themes emerged. Theme 1: Emotional Landscape and Adaptive Caregiving - Caregivers highlighted emotional exhaustion, guilt, and the difficulty of sustaining the emotional regulation expected in many interventions. Theme 2: Clinical and Behavioral Complexity - Caregivers described unpredictable symptoms, including language loss and behavioral triggers, and emphasized the need for practical, real-time management strategies. Theme 3: Systemic Barriers and the Post-Diagnostic Void - Caregivers reported fragmented services, limited legal guidance, and financial confusion as major obstacles. Theme 4: Ethical Use of Technology - While receptive to AI-driven assistive tools, caregivers stressed the importance of dignity-preserving, trustworthy, and ethically vetted technologies. Findings suggest that effective dementia interventions must support caregivers' emotional labor while addressing behavioral challenges and systemic barriers. Researchers need to focus on dignity-first, practical, and ethically grounded interventions to move caregivers from isolated survival toward supported, sustainable care. These findings directly inform the development of an ongoing KSU IRB approved health and wellness app designed for informal dementia caregivers.

Design with Purpose: Implementing Human-Centered Design through LoCKS Focus Groups
Poster #36 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Brianne Opoku-Agyemang & Ria Reddy
Research Mentor(s): Melissa Osborne

Firearm injuries are a leading cause of death among children and adolescents in the United States, with firearm access primarily occurring within the home (Centers for Disease Control and Prevention, 2026). Secure firearm storage is key to preventing firearm-related injuries, yet *many parents lack access to education and resources that support safe storage practices. Evidence-based home visiting (EBHV) programs aim to address this issue by conducting ongoing visits and working directly with families. This study explores how parents prefer to interact with a web-based educational component of a program called Learning to Create Kid-Safe Spaces (LoCKS), a secure firearm storage module currently in development. LoCKS is intended to be delivered through EBHV programs, reaching an estimated 284,000 families annually (National Home Visiting Resource Center, 2026). This study follows a human-centered design approach and will evaluate and present findings using qualitative methods, including focus groups with parents of children ages 0–17 who have participated in EBHV or similar parenting programs. Focus group questions will center around preferences for learning information online versus in a face-to-face format, attitudes toward providing data in an online training, and potential barriers to discussing firearms with a provider. Data informing the preferred usability, content, and engagement of LoCKS will be collected. Conclusive data from this study will be used to refine the design of the LoCKS web-based educational component, ensuring that it is accessible, relevant, and effectively delivers secure firearm storage education to families.*

Development and Psychometric Testing of the Time Toxicity Index (TTI) for Cancer Patients in Active Treatment

Poster #29 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Isaac Kuhn
Research Mentor(s): Chinomso Nwozichi

Cancer treatment places substantial time demands on patients, including clinic visits, travel, waiting, treatment administration, recovery, and care coordination. Although the physical, financial, and emotional toxicities of cancer care are well documented, treatment related time burden, often called time toxicity, remains undermeasured in clinical practice and research. Time toxicity affects quality of life, treatment adherence, and overall well being, yet no standardized patient reported instrument exists to assess it. This study developed and psychometrically validated the Time Toxicity Index, a patient centered measure of perceived treatment related time burden among adults undergoing active cancer treatment in the United States. A quantitative cross sectional design guided development and validation. An initial 45 item pool was generated through literature review, concept analysis, and expert review, followed by pilot testing with 50 participants. The final validation sample included 488 adults receiving active treatment nationwide who completed an online survey and were randomly divided for exploratory and confirmatory factor analyses. Exploratory factor analysis supported a four factor structure explaining 65.9% of total variance, with strong sampling adequacy (KMO = 0.90; Bartlett's $p <$ 0.001). Twenty one items were removed because of low or cross loadings, resulting in a final 24 item instrument. Confirmatory factor analysis demonstrated good model fit (CFI = 0.93; TLI =

0.92; RMSEA = 0.058; SRMR = 0.054). Reliability was strong for the overall scale (α = 0.92) and subscales (α = 0.84 to 0.89), with excellent test retest stability (ICC = 0.88). Higher scores were significantly associated with greater travel time, clinic visit frequency, and disruption to work and daily activities ($p < 0.001$). The Time Toxicity Index demonstrates strong psychometric properties and provides a rigorous patient reported measure to support clinical assessment, research, and interventions aimed at reducing time burden in cancer care.

The Digital Sip: A Literature Review of Mobile App Hydration Support in Geriatric Oncology

Virtual Presentation (Microsoft Teams)

[Session 3 at 2:00pm – 3:00pm]()

Undergraduate Student(s): Hussein Mahmoud & Sejal Rangrej

Research Mentor(s): Tracy Ruegg

Dehydration is a significant concern for older adults with cancer, who are particularly vulnerable due to age-related physiological decline and comorbidities that intensify treatment of side effects of cancer treatment. Despite its clinical importance, maintaining adequate hydration at home remains challenging. Existing approaches, including artificial hydration and wearable monitoring devices, are often impractical outside clinical settings. This literature review examined mobile app–based oral hydration interventions for older adults with cancer. A structured literature review using a PRISMA-guided process was conducted in Scopus, CINAHL, PubMed, Cochrane Library, and Google Scholar. Search terms include oral hydration, fluid intake, mobile health (mHealth), mobile applications, older adults, elderly, geriatric, and cancer. Eligible studies have been published since 2015, involving adults aged 65 years or older with a cancer diagnosis, and examined mobile or digital tools designed to address hydration or fluid intake. Exclusion criteria included non-oral hydration methods, gaming or wearable technologies, and interventions lacking a hydration focus. A total of 42 studies were identified. After removing duplicates and screening titles and abstracts, 16 full-text articles were evaluated. All were excluded because they did not focus on hydration, include older adults with cancer, or involve mHealth applications. Only one study, identified via manual search, met final inclusion criteria. Keaver et al. (2021) systematically reviewed research studies that included mobile apps containing nutrition information for cancer survivors and found limited evidence-based hydration guidance or structured fluid-tracking features. This review found only one study evaluating oral fluid monitoring for older adults with cancer using mHealth applications, highlighting a substantial lack of evidence and the need for targeted research to address dehydration in this population. No cancer-specific hydration mobile-app interventions were found thus future research should include developing patient-centered, self-monitoring strategies that support hydration autonomy and improve treatment-related outcomes.

The Effects of E-cigarette Education Among College Students

Poster #27 (Convocation Center, VyStar Arena)
12:00pm – 12:45pm
Undergraduate Student(s): Yeeun Kim & Seoyoung Kim
Research Mentor(s): Alan Jones

E-cigarettes or Electronic Nicotine Delivery System (ENDS) are battery-operated devices that deliver nicotine in the form of aerosol. In the United States, young adults are the largest population of e-cigarette users. E-cigarettes have been linked to respiratory diseases, cardiovascular diseases, and decreased wound healing, as well as partial loss of taste. However, the awareness of its harmful effects is less recognized among young adults compared to traditional tobacco. This research study aims to investigate how education regarding the effects of e-cigarette use among college students aged 18 to 25 years influences their perceptions, decisions, and use of e-cigarettes compared to no educational intervention during college years. Within the framework of primary prevention in nursing practice, health education serves as a key foundational strategy to reduce and prevent risky behaviors that affect health conditions. Accordingly, a 30-minute education session regarding the effects of e-cigarettes was conducted using simple imagery and emotional testimonies. Students were recruited across the Kennesaw State University campus using posters that included QR codes to the pre-survey. Students filled out pre-surveys and post-surveys to measure perception changes before and after the 30-minute in-person or live-stream online education session, and an additional post-survey two weeks post-education session. Among the students who were in the session, those who use e-cigarettes filled out pre-surveys and post-surveys to measure behavioral changes, along with perception changes. Those who did not attend the session after filling out the pre-survey served as the control group. Expected outcomes include changes in participant perceptions following the session and potential long-term behavioral changes in participants who use e-cigarettes, while participants show an increased awareness of e-cigarette use and its impact, with the appropriate nursing health promotion and encouragement of a healthy lifestyle in the community.

Effect of Print-Based Colorectal Cancer Education Toolkit on Colorectal Cancer Knowledge Among Graduate Students
Poster #16 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Carolyn Jackson & Zamion Robinson
Research Mentor(s): Chinomso Nwozichi

Background: *Colorectal cancer (CRC) is the third most commonly diagnosed cancer in the United States and a leading cause of cancer-related mortality among adults under age 45 (CDC, 2025). Although screening guidelines have expanded and awareness campaigns have increased, significant knowledge gaps persist, even among highly educated populations such as graduate students. Print-based educational materials remain a cost-effective and accessible way to* *disseminate health information, but limited evidence exists regarding their effectiveness in improving CRC knowledge in academic settings.* ***Purpose:*** *This study seeks to evaluate the effectiveness of a print-based CRC educational toolkit in increasing CRC knowledge among graduate nursing students at Kennesaw State University (KSU). The project also examines whether sociodemographic variables such as biological gender, family history of CRC, or family history of cancer are associated with baseline knowledge or influence changes in knowledge after exposure to the toolkit. This research contributes to the field by addressing a gap in understanding how low-cost educational interventions may impact cancer literacy among younger and highly educated adult populations.* ***Methods:*** *A quasi-experimental one-group pretest–posttest design will be used. Graduate nursing students will be recruited through classroom announcements, email invitations, and learning management systems. Participants will complete informed consent, a demographic questionnaire, and a baseline CRC knowledge survey. They will then receive a print-based educational toolkit and complete a follow-up knowledge survey. Descriptive statistics, paired t-tests, and subgroup analyses will be used to evaluate changes in knowledge and associations with sociodemographic characteristics.* ***Expected Results:*** *It is hypothesized that CRC knowledge scores will significantly increase following exposure to the print-based toolkit.* ***Conclusion:*** *Findings from this study will help determine whether brief, print-based educational interventions effectively improve CRC knowledge in graduate nursing student populations and may guide future targeted cancer-prevention education strategies within university settings.*

Effects of Fear of Cancer Recurrence among Adolescents and Young Adult Cancer Survivors

Poster #12 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Ogechi Eke
Research Mentor(s): Chinomso Nwozichi

Fear of cancer recurrence (FCR), defined as persistent anxiety or distress regarding the possibility that cancer may return following remission, represents a major psychosocial burden for cancer survivors and occurs at disproportionately high rates among adolescents and young adults (AYAs). This life stage involves critical developmental transitions, such as identity formation, which may intensify the psychological impact of cancer survivorship. Despite growing recognition of survivorship challenges, specific predictors and clinical patterns associated with FCR in AYA populations remain insufficiently characterized. Therefore, this project contributes to the growing field of psychosocial oncology by consolidating current evidence on predictors, patterns, and interventions related to FCR in AYA populations, with the goal of informing survivorship care and targeted psychological support. A systematic search was performed using electronic databases including PubMed, PsycINFO, Scopus, Web of Science, and CINAHL. Search terms included "fear of cancer recurrence," "cancer worry," "adolescent," *"young adult," and "cancer survivorship." Eligible studies were published in English between 2015 and 2025 and focused on AYAs aged 13-29, and both qualitative and quantitative studies were included. Titles and abstracts were screened, followed by full-text review, and relevant findings were synthesized using a thematic approach. The findings revealed that prior cancer recurrence and documented histories of psychosocial distress, particularly anxiety and depressive disorders, were the strongest correlates of severe FCR. Additional contributing factors included pessimistic outlook, uncertainty regarding long-term prognosis, comorbid health conditions, reduced engagement in survivorship care, fewer scheduled follow-up visits, and lower participation in recommended cancer screening practices. Conclusively, although psychosocial interventions such as cognitive behavioral therapy, mindfulness-based strategies, and acceptance and commitment therapy are commonly implemented, evidence suggests limitations in their long-term durability and consistency of application in AYA populations. Therefore, additional research is needed to improve their long-term effectiveness and strengthen survivorship care for this population.*

Enhancing Academic Assessment: Leveraging AI for Grading Scholarly Student Papers
Visual Display #49 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Christian Greene
Research Mentor(s): Angela Keith

The United States faces a critical nursing shortage, yet nursing programs are struggling to graduate enough nurses due to a severe deficit of nursing faculty. Because there are not enough educators to instruct and manage incoming students, programs are bottlenecked. Furthermore, educators are overextended, and grading scholarly writing remains a highly time-consuming element of their workload. Artificial intelligence (AI) tools offer potential relief by streamlining grading, which could help faculty manage larger student cohorts; however, it remains unclear if AI can replicate the nuanced evaluative processes required in academic assessments. This study assessed the reliability and validity of using AI as a co-evaluator by evaluating agreement between AI-generated scores and faculty-assigned scores. In this quantitative, comparative study, 26 de-identified scholarly papers from an upper-level BSN course were graded by three independent nursing faculty using a standardized rubric. The same papers were evaluated by three licensed AI platforms (ChatGPT Pro, Gemini, and Copilot) using their highest-tier versions. To prevent data contamination, researchers initiated a new chat session with cleared history for each paper and utilized a standardized scripted prompt across all platforms. Scores were compiled into a spreadsheet, and a statistics expert performed descriptive statistics and inter-rater reliability testing. Findings revealed a significant lack of correlation; the AI platforms were inconsistent and produced hallucinated scores, struggling to accurately evaluate the papers as cohesive wholes. These preliminary findings suggest that, in its current form, AI-assisted grading of scholarly nursing student papers may not provide sufficiently reliable alignment with *expert faculty judgment for independent use in high-stakes academic assessment. However, AI remains a promising support tool for academic work when used with standardized prompting, session controls, and human oversight. Findings from this study may help inform best practices for responsible AI integration in nursing education, faculty workload support, and long-term educational capacity planning.*

Exploring the Relationship between Stress and Stress Management in Critical Care Nurses

Virtual Presentation (Microsoft Teams)

[Session 3 at 2:00pm – 3:00pm]

Undergraduate Student(s): Sofia Vergara & Arianna Hardy

Research Mentor(s): Doreen Wagner & Sarah Caffrey

Burnout among critical care nurses is a prevalent issue in healthcare. The physical and emotional demands of working in a high-acuity clinical environment can take a toll on those nurses, making them more inclined to experience occupational stress and exhaustion. Addressing this issue in healthcare is pivotal for delivering safe and high-quality nursing care to critical care patients. The purpose of this study is to examine relationships among occupational stress and burnout, coping strategies, resilience, and stress-management activity use among this population of nurses. A cross-sectional, correlational study design is proposed to address the study aims. This study aims to explore critical care nurses' perceived barriers to stress management and their support needs in critical care settings. Critical care nurses will be recruited from participating Wellstar healthcare institutions using convenience sampling methods. Data will be collected through an anonymous, self-administered online survey distributed via Qualtrics. The survey will include validated measures to assess occupational stress, coping strategies, resilience, and utilization of stress-management tools, in addition to collecting demographic and workplace-related information. Burnout will be measured using the Copenhagen Burnout Inventory. Qualitative data will be analyzed using statistics, correlation analyses, and various regression models to examine relationships among occupational stress, coping strategies, resilience, stress-management use, and burnout. Qualitative open-ended responses will be analyzed using thematic analysis to examine perceived barriers to stress management and identify needs for support within high acuity clinical environments. Data collection and analysis are currently in progress. Results are not yet available at the time of this abstract submission. Findings will describe levels of occupational stress, coping strategies, resilience, stress-management use, and burnout among critical care nurses, as well as relationships among these variables.

Exploring Undergraduate Research Experiences through Collaborative Autoethnography

Poster #30 (Convocation Center, VyStar Arena)

3:00pm – 3:45pm
Undergraduate Student(s): Michelle Olah-Anguiano, Brittney Chhieng, & William Nickerson
Research Mentor(s): Roxanne Bennett

Student engagement is central to meaningful learning, yet higher education continues to grapple with how best to motivate learners and sustain their professional development. This study sought to understand the lived experiences of undergraduate students as both researchers and participants, with a focus on motivation, teamwork, and mentorship. The guiding question was: how can faculty-led research mentorship foster engaged, motivated learners who value their contributions and continue evolving as learners? Using a Collaborative Autoethnographic (CAE) design, the study incorporates three sources of qualitative data: faculty and student reflective narratives, group reflection sessions, and student-led peer interviews. Data is analyzed through thematic analysis which seeks to identify how team-based mentoring structures shape students' research engagement, perceptions of mentorship, and professional development as emerging scholars. Preliminary findings suggest that student struggles such as self-doubt and imposter syndrome were reduced, whereas engagement was increased when students had autonomy in role selection, experienced supportive mentorship, and received constructive feedback. The common themes in our findings allow educators to build upon mentoring foundations by catering to their students' needs. Although this study addresses student experiences within a specific research program, the findings are designed to be scalable and applicable to a wide range of education environments.

Household Discussions: Examining Levels of Comfortability and Resistance in Discussing Firearm Storage
Poster #36 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Sharon Pradeep & Abisade Adetomiwa
Research Mentor(s): Melissa Osborne

Firearm injury is the leading cause of death among children in the United States. Nearly 29% of unintentional firearm deaths among children occur in those aged 0–5 years (Miller et al., 2025). Safe firearm storage practices are critical, and discussions about firearm storage within households are equally important for protecting children. Conversations about safe storage practices may encourage the use of protective measures such as gun locks, safes, and storing firearms unloaded and separate from ammunition. Promoting open communication about firearm safety may serve as a key strategy in reducing preventable injuries and deaths (Kroshus et al., 2022). This study examines how parents of children ages 0–17 years discuss firearm storage within their households and explores factors influencing their willingness to engage in these conversations. Specifically, the study assesses parents' self-reported levels of confidence and *comfort when discussing firearm storage with the firearm owner (or another owner) in the household. Using a survey-based approach, data were collected on parents' confidence and comfort in discussing firearm storage through two separate quantitative items. Additionally, open-ended questions assessed perceived barriers and facilitators to engage in these discussions. Quantitative data were analyzed using descriptive statistics, and qualitative responses were examined using thematic analysis to identify common patterns in reported experiences. Preliminary findings indicate that most parents reported moderate confidence, with a statistic of around 45%. Barriers reported through an open-ended question are currently being analyzed and will be presented in this poster presentation as well. These findings highlight the role of interpersonal communication in shaping household safety behaviors. By examining levels of comfort and resistance in firearm storage discussions, this study contributes to broader injury-prevention efforts aimed at reducing firearm-related harm among children.*

Know & Act: Breast Cancer Awareness for Georgia's Diverse Women
Poster #39 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Sara Saeidi Saeidabadi
Research Mentor(s): Kawther Hamash

Background: Breast cancer incidence continues to rise across ethnic groups, with minority women disproportionately affected. In 2022, 27,136 women under age 45 were diagnosed in the U.S., underscoring the increasing burden of early-onset disease. Despite ongoing advancements, awareness of breast cancer symptoms, risk factors, and testing remains low, particularly among women facing socioeconomic barriers, limited access to health services, and cultural or personal beliefs that restrict their ability to obtain essential health information. Aim: This study aimed to assess breast cancer awareness related to symptoms, risk factors, and testing among women in a Georgia community, with a focus on minority groups, through a community outreach educational session. Method: A community outreach project was conducted at a Georgia community center in two phases. Phase One included seven attendees who completed a brief survey assessing demographics, awareness, and program evaluation. Descriptive statistics, including percentages and frequencies, were used to summarize participants' characteristics and post-session awareness. Results: Seven of the 50 women attended the session, representing multiple nationalities (2.9% Pakistani, 14.3% Iraqi, 14.3% Moroccan) and two languages. Of the attendees, 14.3% reported a family history of cancer. Educational levels varied, with 57.1% having completed college and 14.3% high school. Most participants (85.7%) were married, 42.9% were unemployed, and 57.1% received annual health check-ups; 14.3% earned below $30,000 annually. Overall, 57% had performed a breast self-exam at least once, and the same percentage relied on informal sources (family, neighbors, television) for health information. Awareness gaps were evident: 29% were unaware of common warning signs, and 57% did not know that changes in breast shape may indicate cancer. Encouragingly, 71.4% could explain the *purpose of early detection after the session, and all participants found the program helpful. Conclusion: Findings highlight the need for expanded culturally sensitive outreach to improve breast cancer awareness across diverse communities.*

Learning Refusal Phenomenon in Dementia Through Animation
Poster #46 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Dandre Williamson, Brooke Alfred, & Andrew Widner
Research Mentor(s): Modupe Akintomide & Joy Li

Background: Refusal phenomena, distressing rejection behaviors experienced by about 20% of persons living with dementia, often arise from perceived threat, discomfort, or unmet needs, leading to compromised health outcomes, reduced safety, and increased caregiver burden. This is a KSU-VIP subproject of the ongoing "Dementia Healthcare XR study," which aims to develop and evaluate an XR dementia-care training app to strengthen competencies among healthcare students. Aim: To develop and pilot-test an animation-based learning platform consisting of cartoon-style videos with a simple storyline, characters, and dialogue to improve healthcare students' knowledge of non-pharmacological interventions for managing the dementia-related refusal phenomenon. Design: Developmental research. Methods: We conducted a comprehensive literature review to identify antecedents of refusal behaviors and effective non-pharmacological interventions. The findings informed the development of a three-minute 2D animation script. For the next phase, we will use FlexClip software to create an animated scenario based on a created script that incorporates the Physical, Intellectual, Emotional, and Environmental framework to ensure alignment with person-centered assessment principles. A pilot test of the developed animation with 15 healthcare students will evaluate clarity, usefulness, and feasibility, as well as completion of pre- and post-assessments measuring their knowledge using an adapted Refusal of Care Informant Scale. Anticipated Results: The animation is expected to enhance recognition of non-verbal cues preceding refusal and improve accuracy in identifying proactive de-escalation techniques. Participants are anticipated to show measurable gains in behavioral knowledge and confidence. Conclusions: Animation could provide a scalable and engaging learning platform to strengthen healthcare students' understanding of the dementia-related refusal phenomenon and associated non-pharmacological interventions.

LoCKS: A Secure Firearm Storage Module for Home Visiting Programs
Poster #35 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Graduate Student(s): Tanuj Tammalala
Research Mentor(s): Melissa Osborne

LoCKS (Learning to Create Kid-safe Spaces) is firearm storage training module designed for parents participating in Evidence-Based Home Visiting (EBHV) programs. The module focuses on how to discuss the safe storage of firearms and children's safety in a way that is practical, respectful, and sensitive. Firearms are the leading cause of injuries and fatalities among U.S. children and teens, and prevention is key. Research indicates that many EBHV providers report limited training in firearm safety counseling and would be more likely to discuss safe storage with families if appropriate resources were available (Osborne et al., 2024). LoCKS addresses this need by providing a structured, accessible online training program. The training includes short video lessons, knowledge tests, and scenario-based training through a web-based platform. Early in the training, users respond to brief questions about their role, the families they serve, and common safety concerns. These responses are used to tailor later examples and scenarios, increasing the relevance and practical value of the training when communicating with families. The results of quizzes, and participation metrics can be tracked to determine training utilization and areas for optimization. A potential future enhancement involves integrating an AI-driven conversational chatbot. It could use NLP techniques to simulate realistic dialogue, provide adaptive feedback, and offer just-in-time guidance for users seeking focused information. This study will explore parents preferences for AI integration through focus groups using a human-centered design approach. Prior research shows that user acceptance of AI chatbots in sensitive domains is influenced by factors such as human-likeness and professional credibility [(Kim et al., 2024).]() The design of this feature, focus groups with parents will be conducted using a human-centered design approach. Qualitative findings from these discussions including themes related to trust, usability, and openness to AI-supported guidance will be analyzed and presented.

Mind Matters: Analyzing Adolescent Mental Health Trends Using the CDC's Youth Risk Behavior Surveillance System (YRBSS)

Poster #24 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Chance Lundy
Research Mentor(s): Ashley Barber

Suicidal ideation and mental health symptoms remain a significant concern among adolescents. Although prior research indicates a connection between heavy social media engagement and outcomes such as depression, cybervictimization, fear of missing out, and body-dysmorphia, few studies have examined whether there is a direct relationship between average daily social media use and suicidal ideation. This study examines the association between average time spent using social media per day and the frequency of suicidal ideation among adolescents through secondary data analysis. The sample consisted of participants in grades 9-12 in the United States who participated in the 2023 Youth Risk Behavior Surveillance Survey conducted by the Center of Disease Control and Prevention (CDC). Data included survey answers to self-reported average *daily social media use, and if participants seriously considered attempting suicide in the past 12 months of taking the survey. Covariates included respondents' age, gender, bullying experiences, and reports of feeling sad or hopeless using Chi-Square testing and binary logistic regression. A combined 70.3% of participants reported using social media several times a day, or about once an hour, and 25.4% reported seriously considering committing suicide in the past 30 days. Out of the 25.4% who reported "Yes" to suicidal ideation, 7.88% used social media more than once an hour, and 7.83% used social media several times a day. A Chi-Square test of independence showed a significant association between suicidal ideation and social media use ($p < .001$). These findings suggest that an increase in social media use may lead to an increase in suicidal ideation among adolescents. This study expands the literature by identifying a potential cause of rising suicidal ideation. These findings have the potential to strengthen mental health awareness and guide prevention efforts, as well as give insights that may benefit parents, educators, and healthcare professionals.*

Optimal Sucrose Dosing in NICU Neonates
Poster #18 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Gabby Gillespie & Anna Wrobley
Research Mentor(s): Jenna Shackleford & Kate Harrington

Neonates in the neonatal intensive care unit (NICU) undergo frequent painful procedures, making effective pain management essential to reduce physiologic stress and potential neurodevelopmental consequences. Oral sucrose is widely used as a non-pharmacologic analgesic for minor procedural pain, with evidence supporting short-term effectiveness; however, questions remain regarding dosing consistency, repeated administration, and nurses' perceptions of long-term safety. This qualitative descriptive study explores NICU nurses' clinical decision-making related to oral sucrose administration for neonatal procedural pain management. Registered nurses will participate in semi-structured focus group interviews conducted following work shifts to minimize disruption to patient care. Interview questions will examine current dosing practices, frequency of administration during repeated procedures, perceived effectiveness, concerns regarding cumulative exposure, and use of adjunct non-pharmacologic interventions. Audio-recorded discussions will be transcribed verbatim and analyzed using thematic analysis to identify recurring patterns and themes. Institutional Review Board (IRB) approval is currently in progress prior to participant recruitment and data collection. This study addresses a gap in current literature by examining how oral sucrose is applied in real-world NICU practice. Findings may inform development of standardized protocols, support evidence-based nursing education, and strengthen consistency in neonatal procedural pain management.

Parental Firearm Storage Practices and Motivations for Secure Storage
Poster #27 (Convocation Center, VyStar Arena)

2:00pm – 2:45pm
Undergraduate Student(s): Allison Martinez & Maria Maldonado
Research Mentor(s): Melissa Osborne

Firearm-related injuries are a leading cause of injury and death among children in the United States. Wilson et al. (2023) found that most unintentional firearm deaths among children occur in the home, and the firearms involved are commonly stored loaded (74%) and unlocked (76%). This study explored parent firearm storage behaviors with the purpose of examining the prevalence of secure storage practices and identifying motivations for adopting secure storage. Secure storage was measured consistent with prior research (e.g., locked and unloaded; unlocked and loaded, etc.; Miller & Azrael, 2022). A survey was conducted with 768 parents recruited through Qualtrics Panels, including firearm owners (n = 306), non-owners with a household firearm (n = 157), and non-owners (n = 305). Respondents, excluding non-owners, selected one of five firearm storage categories: all firearms are unloaded and locked; at least one is loaded and locked; at least one is loaded and not locked; at least one is unloaded and not locked; unsure of firearm storage. Parents who reported that firearms were not stored securely were asked to identify factors that would motivate them to store more securely. Preliminary qualitative data, analyzed using thematic analysis, indicate that barriers to safer storage include believing their current storage method is already the safe way to store, and concerns regarding quick access to the firearm in case of an intruder. The collected quantitative data were analyzed using descriptive statistics. Preliminary findings indicated that 76.24% of firearm owners secure all household firearms, while 14.69% reported that at least one firearm is loaded and locked. The rest of the sample reported that firearms were kept unlocked (7.56%) or that they were unaware of the storage (1.51%) in their household. Findings will inform future interventions and public health initiatives to promote secure firearm storage among parents.

The Role of Education in HIV Transmission
Poster #43 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Serena Somani, Hailey Williamson
Research Mentor(s): Melissa Osborne

Human immunodeficiency virus is a disease transmitted through infected bodily fluids that weakens the immune system. Numerous individuals do not have proper education on the disease and its transmission to make informed health decisions. College-aged students represent a particularly vulnerable group in the spread of HIV due to engaging in risky sexual behaviors while also being less likely to perceive themselves at risk for infection. Stigma surrounding sexual health conversations and limited access to health services on campus further increase susceptibility. The primary purpose of the project is to determine whether implementing targeted HIV education materials among college-aged students improves knowledge of HIV transmission *and prevention, increases intentions to practice safer sex and utilize HIV resources, and reduces stigma surrounding the disease. The research process begins with the KSU research team creating an educational pamphlet with information about HIV. The team will set up an in-person tabling event at approved, high-traffic campus locations. During the session, the team will distribute the educational pamphlets and briefly explain HIV transmission and prevention to students who voluntarily approach the table. The research team will then screen students for survey eligibility by asking if they are undergraduate KSU students between the ages of 18 and 25 years. The back of the pamphlet will include a QR code linking to a Google Forms survey, and students will have autonomy in deciding whether to participate. Data collection will occur during the first two weeks of April 2026 with a target sample size of 50. The presentation will include descriptive statistics regarding participants' intentions to engage in safe sex practices, utilize resources, and increase their knowledge of HIV. The findings may help inform campus-based health education programs and guide nurses and public health professionals in implementing stigma-free, evidence-based HIV prevention strategies.*

The Silent Struggle: Understanding the Lived Experience of Male Breast Cancer through a Van Manen Phenomenological Lens

Oral Presentation (Prillaman Hall, Indoor Plaza)

10:00am – 10:50am

Undergraduate Student(s): Abigail Dartois, Alex Hile, & Osahon Uhuangho

Research Mentor(s): Chinomso Nwozichi

Male breast cancer accounts for approximately one percent of all breast cancer diagnoses, yet remains underrepresented in research. Because breast cancer is associated with women, men often experience delayed symptom recognition, disbelief at diagnosis, and limited access to male-centered resources. Many dismiss symptoms and encounter discomfort navigating predominantly female clinical environments. As a result, diagnosis may be delayed, and psychosocial experiences may differ from those typically documented in breast cancer research. Despite increasing incidence, the lived experience of men with breast cancer remains insufficiently explored. This study explores and interprets the lived experience of men diagnosed with breast cancer in the United States using Max van Manen's hermeneutic phenomenological framework. The study sought to uncover how men navigate diagnosis, treatment, survivorship, masculinity, and advocacy within the context of a gendered illness. A qualitative hermeneutic-phenomenological design, by van Manen's six methodological activities, was employed. Fifty-seven men aged 59 to 73 years who had been diagnosed with breast cancer participated in semi-structured interviews, which were audio recorded, transcribed verbatim, and analyzed through the hermeneutic circle. NVivo 15 supports a systematic data organization. Six results emerged. (1) "A Fist to the Gut": Diagnosis was described as shocking because breast cancer was perceived as a "woman's disease." (2) Disrupted Masculinity: Participants reported discomfort undergoing mammograms in female-dominated clinics and navigating pink-centered *environments. (3) Isolation: Many struggled to find male-specific support groups, describing loneliness before discovering male breast cancer networks. (4) Vulnerability: Experiences of mastectomy, chemotherapy, tamoxifen therapy, physical and cognitive changes reshaped bodily awareness. (5) Anxiety and Recurrence Uncertainty: Fear fluctuated, particularly with recurrence or stage progression. (6) From Silence to Advocacy: Over time, participants reframed their illness as a platform for awareness, education, and advocacy. These findings deepen understanding of male breast cancer and support the development of informed, patient-centered oncology care.*

A Study of the Impact of Mental Health and Educational Resources on the Quality of Life for Young Adults with Type 1 Diabetes
Poster #44 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Rachel Wang, Jubal Capri, & Jaina Dybdahl
Research Mentor(s): Ashley Barber & Rachel Myers

The purpose of this research project is to examine how access to mental health resources affects the well-being and quality of life of young adults with type 1 diabetes (T1D). The research question is: Among young adults aged 18-25 with T1D, does participation in mental health support resources lead to improved mental health outcomes and enhanced overall quality of life compared to non-participation in such resources? An extensive review of existing scholarly literature indicates that individuals living with T1D are at an increased risk for depression and diminished overall quality of life. Young adults represent a vulnerable developmental period, characterized by significant transitions in healthcare and significant life changes. Although mental health resources and support programs have demonstrated positive outcomes, there is still limited research examining their impact on young adults during this critical transitional stage. Few studies have directly compared mental health and quality-of-life outcomes between individuals who participate in support resources and those who do not. Our project aims to address this gap by evaluating the influence of participation in mental health programs on well-being and quality of life among young adults living with T1D. Our team collectively decided to make business cards featuring QR codes that will be distributed at a local endocrinology office. These QR codes will link the community to a digital pamphlet containing mental health resources designed to support individuals through their diabetes journey. An anonymous and voluntary survey is included on the business card and pamphlet, where we will use the data to identify associations, patterns, and perceived needs related to mental health resource use among young adults living with type 1 diabetes. From the survey results, we hope to see the current knowledge of available mental health resources and the accessibility to these services.

Social Work & Human Services

Listening First: Using Preliminary Cobb Vital Signs Data to Understand Barriers to Resources in Cobb County

Oral Presentation (Prillaman Hall, Indoor Plaza)
10:00am – 10:50am
Undergraduate Student(s): Richa Lokhande
Research Mentor(s): Cameron Greensmith

Inequitable distribution of resources in the United States is a persistent challenge that shapes access to housing, transportation, caregiving supports, and other essential services. These challenges are often unevenly experienced and closely tied to local conditions. This undergraduate project draws on preliminary data collected through the Cobb Vital Signs initiative to examine barriers community residents face in accessing services within a rapidly diversifying suburban county. Using an existing dataset that includes community surveys and qualitative interviews, this project explores residents' perspectives on service access, unmet needs, and structural factors that contribute to gaps in resources. The project is grounded in principles of community-based participatory research (CBPR), which emphasize collaboration, shared knowledge production, and centering lived experience in identifying community priorities (Israel et al., 1998). Community-based research frameworks recognize that residents are experts in their own conditions and that meaningful change requires attention to both structural barriers and local knowledge (Greensmith et al., 2023). Rather than producing definitive conclusions, this analysis identifies emerging patterns and priority areas that may inform future research, policy conversations, and service provision in Cobb County. By engaging preliminary Cobb Vital Signs data through a community-informed lens, this study demonstrates how undergraduate research can contribute to broader efforts aimed at equity, cultural responsiveness, and sustainable community well-being.

Administrative Research

Academic Affairs

Your First Year from the Inside Out: Researching How Students Thrive at KSU
Visual Display #49 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Lizmaily Martinez-Antonetty & Zakia Dowdy
Research Mentor(s): Sherrill Hayes

The first year of college is a significant transition that influences students' academic adjustment, engagement, and sense of belonging. In Fall 2025, Kennesaw State University enrolled its largest freshman class in institutional history (N = 9,333), providing an opportunity to examine how students experience this transition within a large public university setting. This study examines factors associated with first-year student thriving, with particular attention to belonging, perceived academic capability, engagement behaviors, and mindset orientation. The research explores students' backgrounds and motivations; their processes of transition and adjustment; their experiences of connection to peers, faculty, and the institution; and their developing academic and personal goals. Using a mixed-methods design, data were collected through participant observation, autoethnography, surveys, and semi-structured interviews. Researchers intentionally engaged with first-year students in high-density campus environments, including student organizations, residence halls, common areas, and academic support centers, to capture a range of experiences. Integrating qualitative and quantitative approaches allowed for examination of both individual lived experiences and broader patterns within the Fall 2025 cohort. The study investigates how students engage with available opportunities, including academic support services, student organizations, on-campus employment, housing, wellness resources, and counseling services. Preliminary findings highlight both strengths in student engagement and areas where barriers to connection or support may exist. By identifying patterns in belonging, engagement, and adjustment, this research contributes insights that may inform ongoing efforts to support first-year student success at Kennesaw State University. Findings will be presented at the Spring Undergraduate Research Symposium.

Center for the Advancement of Military and Emergency Services Research

A Moral Foundations Approach to Vaccine Hesitancy: Moral Foundations in Online Vaccine Conflict
Poster #12 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm

Undergraduate Student(s): Kiana Genao & Annika Nath
Research Mentor(s): Thomas Hodges

Vaccine skepticism during the COVID-19 pandemic costs lives, with people who did not get vaccinated being more likely to die from the virus. With social media use becoming increasingly prevalent in day-to-day life, it is important to examine how social media narratives shape vaccine skepticism and its connection to how morality can be conveyed on the internet. While public health interventions to address vaccine hesitancy often focus on providing information about the safety of vaccines, these interventions are rarely effective. Part of the problem is the disregard of the conflict dynamics of vaccine hesitancy, instead treating it as a consequence of ignorance instead of conflict. We chose to frame vaccine hesitancy as a conflict, building on the concept of online debates as moral negotiations. We introduce moral foundations theory and moral inclusion as relevant for how public vaccine debates unfold online. We used qualitative thematic analysis of a popular YouTube video from the channel Jubilee that depicts debates over vaccines, "Dr. Mike vs 20 Anti-Vaxxers," to understand how moral inclusion is framed. We coded the video transcript for various moral foundations, including authority, care, equality, honor, liberty, loyalty, ownership, and purity. Preliminary results suggest that healthcare providers can be more effective when they draw from the moral foundations hypothesis and treat patients as equals, by making sure they're included in important information and taking seriously their objections and existing beliefs, instead of presenting themselves as authority figures. Oftentimes, healthcare professionals tend to forget that they are still speaking to human beings, and that even though they are not in the same profession, they should still be included in important medical conversations, not looked down upon. If vaccine-hesitant people feel as though they aren't being heard or are being looked down on, they may feel excluded for their beliefs and morals.

An Analysis of Jubilee's Surrounded Debates to Inform Conflict Resolution
Visual Display #49 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Annika Nath & Kiana Genao
Research Mentor(s): Thomas Hodges

Previous studies show that bias and misinformation on social media influence how people perceive healthcare professionals, medical advice, and especially vaccines. Public distrust can be dependent upon the characteristics of media that people consume, suggesting that media platforms play a major role in fabricating medical mistrust. As social media has become a primary source of health information, this study aims to understand how social media shapes and mistrust in the healthcare system. We explored how mistrust in healthcare and medicine is communicated via social media through a thematic analysis of the Jubilee video "Dr. Mike vs. 20 Anti-Vaxxers." We analyzed how platform characteristics and dynamics of this video communicate the focus of mistrust in vaccines. Preliminary results suggest that mistrust in *healthcare is communicated through distrust in corporations and the government, skepticism of media and medical authority, and belief in biased narratives over scientific evidence. This study has potential to inform public health campaigns and health communication by identifying a need to turn communication strategies away from defending big pharma and instead towards personal connections such as friends and family.*

Impact of Law Enforcement Academy Physical Training on Lower Body Power and Agility

Poster #8 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Elizabeth Cole & Amina Mendy
Research Mentor(s): Sarah Lanham

Law enforcement (LE) officers perform intense physical occupational tasks, such as apprehending subjects, navigating over obstacles, running up and down stairs, and engaging in foot chases while wearing personal protective equipment. Therefore, it is important to prepare LE cadets with physical training to improve their fitness and health. The purpose of this investigation was to determine the effectiveness of an academy physical training program on lower body power and agility. METHODS: Two LE cadet classes (n=47, Male: 41, Female: 6; Age: 28.5±7.3 yr, BMI: 30.7±7.3 kg/m²) were assessed at the beginning and end of a 20-week LE cadet academy on several variables, including modified Illinois Agility Test (mIAT) and standing long jump (SLJ). Paired samples t-tests compared the means of pre-academy and post-academy metrics. Significance was set to p<0.05. RESULTS: Post-academy mIAT time (17.9±1.0 s) was less than pre-academy modified mIAT time (19.4 ± 2.0 s) indicating a 7% improvement in agility (t(46) =-8.408, p<0.001, d=0.83). Post-academy SLJ distance (196.4 ± 32.5 cm) was greater than pre-academy SLJ distance (179.4±34.2 cm) indicating a 10% improvement in lower body power (t(46)=7.897, p<0.001, d=0.51). There were no changes in body mass or waist circumference (p≥0.282). DISCUSSION: Both performance metrics improved following the 20-week cadet academy. LE agencies are encouraged to adopt evidence-informed physical training to enhance readiness of incoming certified LE personnel, specifically as it relates to lower body power and agility.

Impact of Law Enforcement Academy Physical Training on Upper Body Endurance and Cardiovascular Fitness

Poster #30 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Amina Mendy & Elizabeth Cole
Research Mentor(s): Sarah Lanham

Law enforcement (LE) officers perform physically demanding tasks such as navigating difficult terrain, apprehending subjects, and rescuing victims. Therefore, it is important to prepare LE cadets with physical training to improve their fitness and health. Currently, there is no LE academy physical training standard in Georgia. The purpose of this investigation was to determine the impact of a 20-week cadet academy physical training program on upper body endurance and cardiovascular fitness. METHODS: Two law enforcement cadet classes (n=47; Male: 41, Female: 6; Age: 28.6± 7.3 yr, BMI: 30.7±7.3 kg/m^2) were assessed at the beginning and end of a 20-week LE cadet academy on several variables, including body mass, waist circumference, maximum pushups in two minutes to an 80 bpm metronome, and 4-minute maximum rowing distance. A paired-samples t-test compared the means between pre- and post-academy metrics. Significance was set at p<0.05. RESULTS: Post-test push-up count (28.3±9.8 repetitions) was greater than pre-test push-up count (22.7±10.6 repetitions), indicating the training program improved upper-body muscular endurance (t(46)=5.72, p<0.001, d=0.54). Post-test 4-minute rowing distance (957.3±75.2 m) was greater than pre-test 4-minute rowing distance (899.0±94.6 m), indicating the academy improved cardiovascular endurance performance (t(46)=5.79, p<0.001, d=0.68). There was no change in body mass or waist circumference following the academy (p≥0.282). DISCUSSON: The 20-week cadet training program was effective in improving muscular endurance and cardiovascular fitness. The lack of observed changes in body mass and waist circumference suggests improved absolute and relative physical performance on the body mass-influenced physical performance metrics. These findings support the implementation of evidence-based fitness programs into LE cadet academies to enhance readiness of incoming certified LE personnel.

Center for Excellence in Teaching and Learning

Inside the Student Mind: How KSU Students Define Success
Poster #42 (Convocation Center, VyStar Arena)
11:00am – 11:45am
Undergraduate Student(s): Coco Starry
Research Mentor(s): Michele DiPietro

Kennesaw State University (KSU) wants all its students to succeed. Our research team wanted to hear student voices and to dive deeper into what student success means to KSU's students. Student success is a concept that is inheritably difficult to define and measure, and this is compounded by the diversity of the student body of KSU, leaving a gap when it comes to understanding how students are learning, developing and thriving. The Center for Excellence in Teaching and Learning (CETL), a department dedicated to supporting faculty in cultivating student success, sought out answers to fill that gap. Our researchers focused on two main questions: how the students define and gauge their success and how KSU and its faculty help or hinder their educational path. The study was multi-staged with focus groups in phase 1 and a *survey in phase 2. The phase 1 data was collected by multiple focus groups that consisted of participants of a variety of backgrounds, including demographic and academic factors. Then in phase 2, a survey was conducted to ask more targeted questions based on common themes that emerged from the focus groups, allowing researchers to gather broader, more detailed data about how students experience success at KSU and what they believe the university can do to better support them. The poster will present insights gathered from phase 1 of this research in the students' own voices. The results of this research will inform CETL and KSU's next steps to guide future research and initiatives to support student success.*

Office of Research

Examining the Effectiveness of Paid Social Media Marketing in Overall Brand Awareness

Poster #19 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Evie Hanover
Research Mentor(s): David Roberts

Our research project, Examining the Effectiveness of Paid Social Media Marketing in Overall Brand Awareness, is to help the Kennesaw State Research team understand what research projects the public are most interested in. In order to gather this data, we set up four paid ad campaigns to run through Facebook each for one week at a time. The ad ran from a Monday at 5:00 am to the following Monday at 5:00 am allowing us to gather seven days of data for each campaign. The four ad campaign topics include Improving Health and Saving Lives, Enhancing Human Capabilities, Understanding Our World, and Innovation Through Creativity. To add, each ad was given about $1,000, which was equally used throughout the seven days. After running the ad, we gathered data like how many people the ad reached, the amount of people that clicked on the link associated with the ad, and the number of impressions. To conclude, we compared each category from every ad to figure out which ad interested and reached the most people. I will be presenting the data and results at the Symposium!

Office of Undergraduate Research

Carrying What Isn't Spoken: A Young Black Woman's Autoethnography on Family Mental Health and Loss

Poster #9 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): TaTyana Cook
Research Mentor(s): Amy Buddie

This autoethnography examines how, as a young Black woman in college, witnessing mental-health challenges within my family and losing loved ones to these struggles shapes my daily life, communication patterns, and emotional expression. Rather than focusing on my own mental health, this project explores the perspective of navigating school, family expectations, and early adulthood while carrying the emotional impact of others battles with depression, anxiety, and trauma. By reflecting on personal memories, family conversations, and cultural norms within Black communities, I analyze how ideas of strength, silence, and resilience influence the way I respond to conflict, offer support, and manage emotional boundaries. These experiences shape how I interpret others' behaviors, how openly I communicate, and how I balance empathy with self-protection. Connecting my story to broader conversations about mental health in Black families, this autoethnography highlights the often invisible labor young Black women perform as supporters, observers, and survivors of generational emotional struggle. It demonstrates how loss and mental-health challenges around me continue to shape my identity, my communication style, and my understanding of healing.

Emotional Labor and Academic Pressure in Pre-Nursing Programs: An Autoethnographic Study
Poster #6 (Convocation Center, VyStar Arena)
2:00pm – 2:45pm
Undergraduate Student(s): Abraham Carbajal
Research Mentor(s): Amy Buddie

Pre-nursing programs are known for their rigorous academic demands. It is framed as a necessary "proving ground" for those who wish to enter the nursing profession, yet the emotional toll involved in preparing for nursing school is often overlooked. Through an autoethnographic approach, this study examines the emotional and academic strain involved in preparing for competitive nursing programs. I reflect on my own experiences of navigating heavy coursework, long study hours, and continual pressure to excel, while also engaging with other pre-nursing students to grasp a better understanding of these experiences beyond my own challenges. Drawing from the literature on stress and resilience, I consider how institutional expectations shape feelings of burnout, self-doubt, and inadequacy, even among highly motivated students. This study argues that the emotional labor required before entering nursing school plays a crucial role in forming professional identity, highlighting a need for pre-nursing environments to recognize and better support the well-being of their students.

Inside the Emergency Room: Learning Care Through Chaos
Poster #1 (Convocation Center, VyStar Arena)
3:00pm – 3:45pm
Undergraduate Student(s): Nathan Acevedo
Research Mentor(s): Amy Buddie

The emergency room is often seen as a place of urgency and chaos, yet within that chaos lies a distinct culture of care that shapes how healthcare workers learn how to serve others. This autoethnography explores my personal experiences working as an emergency department technician (Er Tech for short) – specifically, how empathy, composure, and teamwork are cultivated in such a high-stress environment. Through journaling and memory analysis, I capture critical moments that reveal how care is both practiced and challenged. Using theoretical frameworks from medical sociology and the ethics of care, this study interprets how the ER's fast-paced culture fosters professional identity and mental stamina. Overall, I argue that care in the emergency room is not simply a feeling, but a disciplined practice formed through chaos, where compassion is merged with efficiency. Focusing on the unspoken and emotional labor of emergency medicine, this autoethnography sheds light on the deeper meaning of what it means to care for others in moments of crisis and chaos.

Kenyan Identity, Accent, and Belonging in American Culture
Poster #23 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Undergraduate Student(s): Thomas Ouma
Research Mentor(s): Amy Buddie

Many studies have shown that individuals with accents and cultural backgrounds different from societal norms can experience prejudice and bigotry. This research explores how my Kenyan upbringing, specifically my accent/communication style and my cultural habits influence different parts of my American life. In short, does my accent and the way I do things, which are normal in Kenyan culture, make it easier or harder for me to find my place here in America? And how have language and cultural differences shaped who I am today? I will examine how immigrants balance two cultures, as well as how everyday aspects such as the sound of my voice and the customs I follow impact my sense of belonging. I will examine my own stories, journal entries, and experiences to see where my accent helped me, hurt me, or made things awkward. Second, I will interview my family members and other Kenyans who grew up like me here in America. I will look to see if we share the same struggles or successes when it comes to fitting in. Then, I'll look for the patterns in all our stories. I expect to find that two identities create a "juggling act." My accent might sometimes make me stand out in a good way, but other times it might make me feel like an outsider. This study will highlight that immigrants need not lose their identity to become "American," but that they can become adept at switching between cultures.

Listening to Voices: Student, Faculty, and Administrator Perspectives on Course-Based Undergraduate Research Experiences (CUREs)
Poster #48 (Convocation Center, VyStar Arena)

10:00am – 10:45am
Undergraduate Student(s): Jonathan Velasquez, Kiara O'Neal, & Diya Patel
Research Mentor(s): Amy Buddie

Course-based Undergraduate Research Experiences (CUREs) embed authentic research projects into existing courses, enabling students to contribute to real scientific investigations while developing transferable skills and earning course credit. CUREs expand access to research opportunities for students that were once limited, allowing broader participation in research and project-based learning. While prior studies have emphasized student outcomes, fewer have qualitatively examined how students, faculty, and administrators with and without CURE experience perceive the implementation and impact of CUREs. Understanding these perspectives is essential, as faculty play a central role in course design and delivery, administrators influence institutional funding and resource allocation, and students are the recipients of these experiences. This NSF-funded study investigates how students, faculty, and administrators in STEM fields at Kennesaw State University view the benefits, challenges, and logistics of integrating CUREs into the curriculum. Seven focus groups were conducted with participants who have and have not been involved in CUREs. The qualitative data are currently being analyzed in NVivo using a structured codebook encompassing themes such as student benefits, accessibility, institutional support, teaching logistics, and barriers encountered before and during a CURE, among others. Although analysis is ongoing, this study seeks to identify areas of alignment and divergence across participant groups to better understand the opportunities, constraints, and long-term sustainability of CUREs within STEM education. By examining these perspectives, this research aims to deepen our understanding of how CUREs can be better designed and supported, ensuring that both students and faculty benefit from meaningful, accessible research experiences.

Measuring the Effects of Conference Presentations on Presenters and Viewers
Poster #6 (Convocation Center, VyStar Arena)
9:00am – 9:45am
Graduate Student(s): Amelia Baker
Undergraduate Student(s): Audrey Beilharz, Mikkel Cullen, Anulika Obiekwe, & Rumana Ghaniwala
Research Mentor(s): Amy Buddie

Undergraduate research conferences play an important role in supporting students' academic development, confidence, and sense of belonging within the scholarly community. These conferences often provide students with their first opportunity to share research, engage with peers and faculty, and see themselves as contributors to their fields. While prior research highlights the benefits of conference participation, fewer studies examine how different forms of participation shape student outcomes. This study explores how involvement in an undergraduate *research conference, either as a presenter or as an audience member, affects individual learning, research confidence, professional identity, and interest in future research engagement. The study was conducted within the Kennesaw State University Symposium of Student Scholars and compares the experiences and perceived benefits of presenters and attendees within the same conference setting. Data was collected through surveys administered during the Symposium, and follow-up surveys conducted two to three weeks later. There were 72 survey responses overall (52 presenters and 19 attendees). Survey measures assess research self-efficacy, professional identity, engagement, and perceived value of the conference experience. Quantitative data will be analyzed using descriptive and comparative statistical methods, while qualitative data will be examined using thematic analysis. We expect presenters to show greater gains in research self-efficacy and professional identity, while attendees will also demonstrate meaningful increases in engagement and sense of belonging. These findings will clarify how different forms of participation support student development. Final results will be presented at the symposium.*

Navigating Undergraduate Research in the Digital Era: A Qualitative Analysis of Faculty Digital Practices and the Visibility of Undergraduate Research Opportunities
Poster #41 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Undergraduate Student(s): Danielle Rukezo, Laamiah Mansuri, Madison Millen, & Southern Mullen
Research Mentor(s): Amy Buddie

Participation in undergraduate research fosters intellectual curiosity and gives participants confidence in their respective disciplines. Despite the benefits of undergraduate research, there is little research as to how faculty communicate to prospective students about the availability of undergraduate research opportunities. Effective communication of undergraduate research opportunities, especially through digital channels, is essential to the overall accessibility of undergraduate research to students. To address this gap, this study aims to catalogue the way faculty at a public, R2 university communicate information about undergraduate research online. The webpages and department biographies of the undergraduate, full-time, tenure-track faculty at a large southeastern university will be examined; in its completion, data from over 1000 undergraduate faculty members will be included. Preliminary data from education, humanities, and social sciences show that faculty frequently do not mention undergraduate research in their department's biography, faculty webpage, or linked external websites. We expect to find that STEM disciplines will be more likely to include mention of undergraduate researchers compared to other disciplines due to the strong emphasis on undergraduate research embedded within those disciplines. We also expect that assistant professors will be more likely than associate and full professors to include mention of undergraduate research on their sites as they are establishing their presence as professors. The results of this study will help improve the *undergraduate researchers' experience due to the ability to better connect with faculty that align with their research interests and navigate the undergraduate research process.*

Research Barriers and Mentorship Quality
Poster #21 (Convocation Center, VyStar Arena)
10:00am – 10:45am
Graduate Student(s): Amelia Baker
Undergraduate Student(s): Abeer Asif Kayser, Aichel Herrera-Candanedo, & Coraima Perez-Portillo
Research Mentor(s): Amy Buddie

Undergraduate research is widely acknowledged as a high-impact educational practice, contributing to students' academic success, professional readiness, and retention (Bhattacharyya et al., 2018). However, disparities persist in access, mentorship quality, and institutional support with many students' reporting uncertainty about how to access opportunities (White et al., 2023). Prior research has found that stipends significantly influence participation, especially among underrepresented students (Edwards et al., 2024; Messier et al., 2013). Other studies underscore the critical role of mentor accessibility and supportive research environments (Behar-Horenstein et al., 2010; Byars-Winston et al., 2023). Little research has examined the impact of these identified barriers on undergraduate students who have and have not engaged in research. This project aims to assess barriers, perceptions, and opportunities surrounding undergraduate research participation across Kennesaw State University. A mixed-methods survey was distributed university-wide to investigate students' experiences with mentorship, awareness of research opportunities, and structural challenges. This project focuses particularly on the equity of access, the effectiveness of mentor relationships, and institutional visibility and communication for students engaged in research and those who are not. While data collection is ongoing, preliminary results indicate that student researchers rated their research mentors highly, particularly in serving as positive role models ($M = 4.53/5$) and fostering a welcoming research environment ($M = 4.53/5$). The most reported obstacles to research participation were external commitments ($M = 3.66/5$), lack of time ($M = 3.61/5$), and lack of awareness of opportunities ($M = 3.48/5$), suggesting that competing priorities and limited knowledge of options may hinder student engagement. These findings identify actionable recommendations to university leadership, such as mentorship training, stipend programs, and centralized research resource directories, can further improve undergraduate research participation. The ultimate goal is to broaden participation, improve student outcomes, and strengthen the culture of undergraduate research at Kennesaw State University.

The Responsibilities of a Student Worker
Poster #15 (Convocation Center, VyStar Arena)
11:00am – 11:45am

Undergraduate Student(s): Bara Fall
Research Mentor(s): Amy Buddie

This autoethnography will explore how holding a job within college, especially within the first year of college, impacts and shapes the academic, social, and personal lives and experiences of students transferring into higher education for the first time. Drawing from my own personal experiences as a full-time student and part-time worker, I took the time to examine how this workload influenced me in terms of time management, stress management, social engagement in college, and an overall adjustment towards college life as a whole. Throughout this new school year and this research, I have traced back how my studies, emotional well-being, and daily habits were affected by the demands of a part-time job and the degree to which it was detrimental or beneficial to me as a student. The study highlights several themes, such as the constant struggle between academic priorities and financial responsibility, the strain of limited free time due to class and work schedules, and financial independence. While holding a job provides important benefits like income, time management, discipline, and practical work experience, it also contributes to fatigue, decreased participation in campus activities, and moments of academic strain. By relating personal experiences within the broader conversation of college workloads, economic pressure, and student success, this autoethnography attempts to shed light on the realities of what first-year college students with jobs face. Ultimately, this project argues that employment during the first year of college is a complex and often contradictory experience: it empowers students financially and emotionally while simultaneously amplifying stress and reducing opportunities for full campus participation. By sharing my story, I hope to provide a better understanding of how work shapes student identity, motivation, and resilience.

Struggling in Silence: The Distrust of Doctors Among Southern Black Americans
Poster #6 (Convocation Center, VyStar Arena)
1:00pm – 1:45pm
Undergraduate Student(s): Ciara Bond
Research Mentor(s): Amy Buddie

This project explores the deep-rooted distrust of doctors and medicine among Southern Black Americans, a topic that carries personal significance within my own family. The central research question asks: How have historical injustices and generational experiences shaped the ongoing mistrust of healthcare systems within Southern Black communities? Growing up, I witnessed many older relatives choose to endure illness or pain rather than seek medical attention. This behavior reflects not only personal choice but a broader legacy of fear and skepticism built over generations. Drawing on historical events such as the Tuskegee Syphilis Study and ongoing racial bias in healthcare, this project aims to connect personal family narratives to larger social and historical forces that continue to affect health decisions today. The research employs a qualitative approach, incorporating family interviews, narrative reflection, and historical *analysis to examine how stories passed down through generations shape health attitudes. Preliminary findings suggest that this distrust is not rooted in ignorance or stubbornness, but in generational trauma and self-protection. Understanding these experiences reveals how cultural memory influences modern healthcare relationships. The project seeks to emphasize the need for culturally responsive and empathetic medical care that acknowledges history while rebuilding trust between healthcare providers and Black patients.*